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~~SECRET~~

AI.3(c)1

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AIR MINISTRY INTELLIGENCE IN WAR

INTRODUCTION

THE OBJECTS AND SCOPE OF AIR INTELLIGENCE.

1. The object of this publication is to provide a permanent record of
 - (i) the manner in which the Intelligence Department at Air Ministry was built up,
 - (ii) the functions of the principal Branches and Sections, (iii) the methods devised for the exploitation of Intelligence material in the course of the war, and
 - (iv) the lessons to be drawn from that experience. These are reviewed in detail not as a measure of self-applause as a remarkable and outstanding achievement judged by the most severe standards, but in order to preserve this record for future study, reference and guidance in the most complete and concise form possible.
2. This is desirable since only as a result of the experience from 1939-45 has the full meaning, scope and purpose of Intelligence come to be realised as indispensable and, indeed, vital element in the conduct of air warfare: the part which it was able, and compelled, to play transcended far beyond any pre-war conception of the potentialities of Air Intelligence. It is this realisation that is so necessary to bear constantly in mind with the return to conditions of peace, and for the benefit and instruction of those who follow on.
3. Yet because by its nature Intelligence is reticent and therefore inconspicuous and, being a relatively new development lying somewhat apart from normal Service activities, its functions are liable to be overlooked, mis-understood or not appreciated at all. This danger is constantly present in peace-time, when the scope of Intelligence is necessarily circumscribed. To allow it to prevail would create not only a serious gap from the point of view of national defence, but also materially reduce the operational efficiency of the Royal Air Force.
4. Not only during the period from 1939-42, when German air power was in the ascendency, was sound Intelligence vital to the security of the United Kingdom and its forces in the Mediterranean; as the months went by, the Intelligence Department had to meet the growing requirements of a full scale war in which the Air arms of the United States and British Air Forces played an ever increasing part. It should be remembered that in the European Theatre it was the responsibility of

-2-

Air Ministry Intelligence to furnish all material requirements to the U.S.A.A.F in addition to those of the R.A.F., a commitment of very considerable magnitude. This continued through to the final climax of 1944-45 when the full scale of day and night air bombardment destroyed the fuel supplies and communications of the Nazi state; it thus made it impossible for the Germans to continue to operate or move the very considerable armed forces still at their disposal, and crippled their whole industrial potential.

5. In the clearest and fullest way, the Intelligence Branch was shown to be, and remains, the servant of the Operations Branch. The object, therefore, of the Intelligence Branch is to provide information of value to those who plan and execute Air Operations. Likewise it is its duty to provide information of value to those responsible for the design and development of R.A.F. service aircraft and equipment. Intelligence has, further, to safeguard our own secrets and at the same time to endeavour to mystify and mislead the enemy as to our current or forthcoming operations, while at the same time anticipating his own.

6. In providing Intelligence to the Operations Branch, the first duty of the Intelligence Branch is to look ahead. Air strategy and operations cannot be adequately planned and executed unless they are based on reliable information on what is "on the other side of the curtain". In the second German war there were many things we wished to know of the German Air Force: though at the beginning we had a fair idea of its size and its types of first-line aircraft, the production capabilities of the aircraft factories, projected new aircraft designs and the weaknesses in the German fighting machine whereat air bombardment should be directed were largely unknown factors.

7. The Air Intelligence department at the Air Ministry had therefore, throughout the war, to be built up in sections to cover every activity of the German Air Force; not only this, but every section of the German nation's fighting machine within range of our Air arm and likely to be a profitable target in our strategic war effort balance sheet if attacked came within the field of Air Intelligence responsibilities.

8. Again it was vital that the enemy should not spring a surprise on us through some war winning secret weapon or new design of aircraft or armament, or new place of concentration of attack. Intelligence Sections had to be built up to watch for

these possibilities and give the warning, and in conjunction with other departments, find the antidote.

9. The sections in the Air Ministry Intelligence department were therefore built up to cover special activities of the enemy and concentrate on these activities. To obtain the information on which to work a whole organisation of producer agencies was built up: wireless interception, long distance photographic reconnaissance with a team of experts to interpret the results, secret agents in foreign countries, Air Attaches in neutral countries, prisoner interrogation experts, teams of technical experts following the front-line troops and sending back reports and samples of new enemy material. There were also teams watching the enemy press and radio and technical publications.

10. The Air Ministry Intelligence Branch was likewise provided with a flow of information coming up the chain of Command from the air-crew themselves. After interrogation on the results of air operations, their reports would be sifted by the Squadron Intelligence officer, co-ordinated and sifted again by Wing, Station, Group and Command Intelligence staffs, and the final result passed to the Air Ministry. These were supplemented by other Intelligence reports from every operational theatre covering all aspects of enemy air activity.

11. It was not enough for the Air Ministry Intelligence sections to base their reports solely on the information coming to them by the Royal Air Force channels mentioned in paragraphs 9 and 10 above. Intelligence reports were regularly exchanged with the other Services, and, in the later stages of the war, a section was built up to ensure the interchange of information between the Air Intelligence Department and the Military and Naval Intelligence Departments. Likewise the "Targetting" section had its direct link with the Ministry of Economic Warfare and the Inter-Service Topographical Department. Again a section was added as soon as the United States entered the war to be a link with the Intelligence Department of the U.S.A.A.F. This latter section later detached a number of its staff to be integrated into the American Intelligence Staff in Washington.

12. The foregoing paragraphs show for what purpose Intelligence worked, and outline the sources of the information coming into the sections of the

department. It is an unforgivable sin for Intelligence to fail to circulate its products to the widest possible extent, consistent always with security; where possible it should permeate right down the chain to the aircrew who alone in the Air Force go into battle and who therefore want to know exactly what they are up against, what is expected of them and what they are risking their lives for.

13. At this stage a word should be said on the vital work required of the Head of the Intelligence Department and the Directors under him. Intelligence sections concentrating on their own subject are apt to work in watertight compartments: it is for the Director to weld these sections into a team. From the mass of information coming into the Department as a whole certain "threads" emerge in all sections: these threads have to be tied together before a true picture can be given. This is the main work of the Head of the Department. It is his duty to produce the complete picture based on evidence carefully weighed and based on sound judgment and not on his own "hunch". Likewise it is his function to present Intelligence appreciations to the Chief of the Air Staff and Commanders in the field in a manner which will inspire confidence in the assessment of the Intelligence data available.

14. The relationship between Air Ministry and Operational Commands is covered in the various chapters dealing with the work of individual Sections and no attempt has been made to review the methods employed by Commands in their handling of Intelligence information emanating from Air Ministry. Information on this aspect must be sought in the reports prepared by individual Commands. A paper entitled, "Organisation and Application of Air Intelligence in a Tactical Air Force",⁽¹⁾ was issued by A.C.A.S.(I) on 31.1.46, and embodies much of the experience developed in Tactical Air Forces during the War.

15. In conclusion, from the interrogation of the German Air Force Commanders and Staffs and from a perusal of their archives, one can fairly state that the Air Ministry Intelligence department was a more successful department than its opposite number in the German Air Force, for the following reasons:

(1) Now included in 'A Manual of Air Intelligence in War'(1)

- (i) Its scientific and technical sections were better developed.
- (ii) Its Photographic Reconnaissance never failed and was magnificently interpreted.
- (iii) The department as a whole was well co-ordinated and co-operated fully at every level with the Intelligence departments of the Navy, Army and U.S. Air Force; and lastly
- (iv) It was listened to by those for whom it produced information, because it won confidence by establishing a reputation for accuracy and sound judgment, and because its integrity gained universal aspect.

AIR MINISTRY
MARCH, 1946

AIR VICE-MARSHAL
A.C.A.S.(I)

PART I

ORGANIZATION OF INTELLIGENCE

AIR MINISTRY INTELLIGENCE IN WARPART I : CHAPTER 1DEVELOPMENT ^{and} OF ORGANISATION IN AIR MINISTRYIntroduction

1. The object of this Chapter is to give some account of the manner in which Air Intelligence at the Air Ministry has been organised and developed during the European War 1939 - 1945. At the beginning of this period Air Intelligence was divided into some 25 units (an expression used to include Directorates, Deputy Directorates and individual sections) and at the end it had expanded into a Department containing some 70 different units. No attempt is made to describe in detail the work of individual units, since the work of the more important units is well described in other chapters of this book. Further, it would be tedious to set out in narrative form the growth of 25 units into 70 units and accordingly reliance is placed so far as possible on the diagrams in the Appendices, which show the position at a glance at various dates. This chapter is therefore confined to the major changes in organisation which have taken place.

2. Position at beginning of War

2. Location The Directorate was then housed in the Air Ministry Building, King Charles Street, Whitehall, S.W.1. whither it had moved from Adastral House, Kingsway in February, 1939. Section A.I.1(b) which dealt with the production of target information, was the only exception to this having been subsequently transferred from Whitehall to Iver, Bucks. In August 1941, the great majority of the Intelligence Sections then located at Whitehall were moved to the new Air Ministry building ad 17 Monck Street, Horseferry Road, Westminster.

3. Organisation and Strength. Prior to the outbreak of the War, the Directorate of Intelligence consisted of a Director (working under the Deputy Chief of the Air Staff, who in turn was under the Chief of the Air Staff), three Deputy Directors, one Assistant Director and a Map Branch. Details of their respective duties are shown in Appendix 'A'. From Appendix 'A' it will be seen that the Directorate was small, consisting of under 40 officers about half of whom were regular officers and half were re-employed retired officers.

Selection and Training of Intelligence Personnel

4. In order to supplement the peace-time establishment in case of war a number of regular officers, mainly from the Royal Air Force Staff College,

/had

in peacetime 7

had been earmarked for these duties. As time went on however it became increasingly apparent that in the event of war the number of regular officers available would be small, and steps were consequently taken to earmark a number of civilians for appointments in the Directorate in case of war. This was before the formation of the Administrative and Special Duties Branch of the R.A.F.V.R. These gentlemen undertook to join up in case of war and were formed into a Civil (Staff Duties) Reserve which was entirely an Intelligence organisation. Later the Administrative and Special Duties Branch of the R.A.F.V.R. was formed. Applicants for intelligence duties appeared before a Selection Board, and if approved, were duly commissioned and attended for a week's training.

5. It was soon found that the number of Intelligence officers being commissioned in the V.R. was insufficient. This was mainly due to the fact that it had not been found possible in peace time to obtain people with the necessary experience. On the outbreak of war, however, many more applicants with suitable qualifications came forward and a further large number was commissioned.

6. Intelligence Officers were also required at groups and stations, and many were taken on for this purpose for which they required to undergo some kind of training. While it was not possible in the time available to organise proper Intelligence courses it was arranged that these officers should attend the Directorate for a week. During this short period they were given a number of lectures on various aspects of Intelligence and, on completion of this much abbreviated course, they were then posted for Intelligence duties to the commands, groups and stations.

Outbreak of War until November 1940

Continuation of peace-time basis

7. Intelligence was still run on a geographical basis, that is to say, except for certain special subjects an individual section with a Wing Commander normally in charge continued to be responsible as in peace-time for the collection and distribution of all matters of interest to air intelligence.

/relating

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relating to a particular foreign country or group of foreign countries; the same section, for instance, would deal with all questions relating not only to the order of battle, and strength, disposition and organisation of the German Air Force, but also to the rate of production of its aircraft, the state and number of its airfields and even the suitability of the various targets the country as a whole might offer to the attacks of the Royal Air Force and the damage inflicted on such of those targets as had been attacked.

8. Expansion and ^{etc}erection of new Sections

The first year of the war was marked by a rapid expansion in personnel (the number of officers in the Intelligence Directorate at Air Ministry grew from under 40 to about 230) and the creation of several new sections, but the main structure of the organisation remained unchanged.

Among the sections created during this opening period, (which all, however, dealt with special subjects rather than with countries generally) the following may be mentioned:-

- (a) A.I.l(k) which was formed on the outbreak of war and was responsible for the interrogation of German (and later, Italian) prisoners of war captured from crashed aircraft in this country and for the compilation of prisoner of war reports on the information received from these interrogations.
- (b) A.I.l(w) which was formed early in May 1940; the main purpose of this section was to provide a group of duty officers for Air Intelligence as a whole. It was formed during the Battle of Norway and on the eve of the invasion of France and the Low Countries, by which time the war had reached such an active stage that the work of night duty officer could no longer be carried out by an officer lent for the night by some other section; further, the rapid development of the war made it necessary to have some central office for operational intelligence to deal with the receipt and distribution

distribution among the various intelligence sections both by day and night of urgent signals and messages. This two-fold want was met by the creation of A.I.1(w) which (at a later stage under the name of A.I.3(a)1) maintained an unbroken watch until after all hostilities ceased.

- (c) A.I.1(z) formed in 1940 to deal with the Air Force aspects of postal and telegraph censorship.
- (d) A.I.10 formed in September 1940 to maintain close liaison with the Inter-Service Organisation dealing with underground activities in enemy countries: this section was subsequently transferred to that Inter-Service Organisation.
- (e) A.I.(J.I.C.) formed in June 1940 to collect and collate from within and without the Directorate all information required for the Intelligence Summaries and Reports of the Joint Intelligence Committee, a Committee which consisted of the three service heads of intelligence and a representative of the Ministry of Economic Warfare under the chairmanship of a member of the Foreign Office.

IV.

November 1940 to August 1941: Reorganisation and Further Development

Change from Geographical to Functional Basis

The first big change in the structure of the organisation took place at the end of November 1940. The old ^{geographical} ~~country~~ sections had worked well enough up to the outbreak of war and indeed thereafter up to the Battle of France, but with the collapse of France and the entry of Italy into the war the European position had changed so radically that the old frontiers became meaningless and the ~~country~~ sections (as organised for a peaceful Europe) began to bear little relationship to reality. It will be remembered that by this time Germany had conquered Norway, Denmark and North West Europe, threatened Spain and Portugal and was the master of Central Europe: Italy was at war with the British Empire in Egypt and the Mediterranean and with Greece in Albania, but the remaining Balkan countries were still neutral. There were thus two separate wars, the German war only capable of being fought by air and sea from and against the British Isles and the Italian war which was being fought in and around the

/eastern

eastern Mediterranean. In these circumstances it was decided to divide the countries of the world so far as Air Intelligence was concerned into three groups each under a Deputy Director holding the rank of a Group Captain. D.D.I.2. and the sections under him were allotted the neutral unthreatened countries, D.D.I.3. and his sections were allotted Germany and the countries overrun or threatened by Germany, and a new D.D.I.4. and his sections were given Italy and the Balkan and Middle East countries concerned or likely to be concerned in the Italian war.

10 At the same time a move was made in the department of D.D.I.3. to organise the sections within that Deputy Directorate on a functional rather than on a geographical basis; for instance, A.I.3(b) dealt with the order of battle and organisation of the German Air Force and the Air Forces of the countries occupied or threatened by Germany, while the new A.I.3(c) dealt with such economic matters arising in those countries as aircraft production, air raid damage and attacks on railways and other forms of transportation, and the new A.I.3(d) dealt with the airfields of these countries. The position after this re-organisation is set out at Appendix B.

Up-Grading of Directorate of Intelligence

11 A further re-organisation, this time on a higher level, took place in the spring of 1941: the Directorate of Intelligence had by then become so large and important that it was decided by the Air Council that the whole Department should be upgraded: consequently in April a new Air Vice-Marshal post of Assistant Chief of Air Staff (Intelligence) (A.C.A.S.(I)) was created to be responsible for all Intelligence Directorates, reporting on questions of security and allied Air Co-operation to V.C.A.S., and ~~to V.C.A.S.~~ on matters of operational Intelligence. ^{to D.C.A.S.} Under A.C.A.S.(I) three Directorates (with an Air Commodore in charge of each) were constituted:-

- (a) Directorate of Intelligence (Operations) (D. of I.(O)) controlling D.D.I.2., D.D.I.3 and A.I.(k) (later to become A.D.I.(K)).
- (b) Directorate of Intelligence (Security) (D. of I.(S)) controlling the Deputy Director of Intelligence (Organisation) (D.D.I.(Org.) formerly D.D.I.1), the new Deputy Director of Intelligence (Security) (D.D.I.(S)) and the Assistant Directorate of Maps, (A.D.I.-Maps)

/(c)

- (c) Directorate of Allied Air Co-operation and Foreign Liaison (D.A.F.L.), formed to co-ordinate matters affecting Allied Air Personnel and Units and their co-operation with the R.A.F.

New Assistant & Deputy Directorates.

12/At the same time certain Assistant or Deputy Directorates responsible directly to A.C.A.S.(I) were constituted namely:-

- (a) Assistant Directorate of Intelligence (Photographs) (A.D.I.(Ph.)) formed so that all photographic work carried out by the Photographic Reconnaissance Units and the Central Interpretation Units might be centralised in the department of A.C.A.S.(I).
- (b) Assistant Directorate of Intelligence (Science) (A.D.I.(Sc.)): this scientific investigation department was transferred from the Ministry of Aircraft Production.
- (c) D.D.I.4. The work in relation to the Italian war in the Eastern Mediterranean which had for the last few months been dealt with by the Deputy Directorate bearing this name was re-assigned to D.D.I.2 and D.D.I.3, as, with the arrival of the Germans in the Balkans and Africa, the German and Italian wars had merged. A new D.D.I.4 was then constituted under A.C.A.S.(I) to take over the work done by the Deputy Directorate of Signals Y; the new D.D.I.4 was responsible for the study of enemy wireless signals, their codes, cyphers and call signs and the production of air intelligence from decodes.

August 1941 to End of European War.

Reorganisation of D.D.I.2 and D.D.I.3

13/As already mentioned D.D.I.3 had at the end of 1940 already begun to change the organisation of his Deputy Directorate from a geographical to a functional basis. This partial change in organisation had already proved its worth: the new arrangement introduced a high degree of flexibility and the power to concentrate the whole of a section on a particular subject which might suddenly come into prominence. By the summer of 1941 with the outbreak of the Russian war, the elimination of almost all frontiers in Europe and the growing inter-relation of air aspects of Intelligence throughout the world, it was decided that D.D.I.3. should complete the change from a geographical to a

/functional

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basis and that D.D.I.2 should effect a similar change. The resources of these two Deputy Directorates were therefore pooled and all sections and establishments therein were re-arranged. The division of responsibility between D.D.I.2 and D.D.I.3 was, broadly speaking, that D.D.I.2 became responsible for sections dealing with airfields, technical information, matters relating to administration in foreign countries and industry, while D.D.I.3 became responsible for orders of battle, reserves, training questions, target information, air operations in connection with foreign Air Forces and all other matters falling generally within the Air Staff Field. For example, airfield information about airfields in all parts of the world was concentrated in A.I.2(b), and all operational ^{and organisational} aspects of ~~the~~ the Air Forces in Europe (other than Russia, Finland and Sweden) were concentrated in A.I.3(b); the study of the organisation of ^{the German Air Force was, however,} ~~these Air Forces being~~ separated from the operational aspects and assigned to a new ^{specialist} section A.I.3.(a).

Transferred to page 2

~~This reorganisation roughly coincided with the move of the great majority of the Intelligence Sections from the Air Ministry, Whitehall to the new Air Ministry building at 17, Horseferry Road, Westminster.~~

14. This ~~reorganisation~~ was the last major reorganisation before the defeat of Germany in May 1945. Thereafter, expansion continued and new Directorates and sections were formed as occasion required, but never again was there need for a complete re-arrangement.

Liaison with U.S.A.A.F.

15. In the winter of 1941-2 the entry of America into the war necessitated the formation in D.D.I.3 of a new section called A.I.3(U.S.A.): this section was not an ordinary intelligence section in the sense that it was not part of its duty to try to discover all that could be known about an Air Force that was trying to remain unknown: it was a section dealing with a close ally ready to give full and accurate information on its own Air Force and anxious to receive full and accurate information on the R.A.F., information which the R.A.F. was equally anxious to give. It was, thus, a clearing house of information for and between the two Air Forces.

Reorganisation of DDI(S)

16. In the same winter the Deputy Directorate of Intelligence (Security) completed its reorganisation, and

The position at the end of these changes is set out in the diagram at Appendix C, which though dated July 1942 represents the position throughout the first half of 1942.

Subsequent Developments 1943-44

Similar diagrams dated respectively September 1943 and April 1944 are set out at Appendices D and E. It will be noticed that these diagrams show little change. That of September 1943 shows that since the middle of 1942 A.D.I.(k) (dealing with the interrogation of Prisoners of War) had been substantially expanded and the work of A.I.3(o) had been divided into two sections, ^{viz. A.I.3(c)1} ~~of that name numbered 1~~ (dealing with the preparation of target material for aircrew) and ^{A.I.3(c)2} ~~2~~ (dealing with the assessment of air raid damage). The main changes shown in the April 1944 diagram are the creation of a new Directorate of Intelligence with the qualifying ^{title} word 'Research' (D. of I.(R)) and of a new section in D.D.I.3, namely A.I.3(f). The new D. of I.(R) had been created in the autumn of 1943 and to it had been transferred D.D.I.2. (from D. of I.(O)) and D.D.I.4 (previously directly under A.C.A.S.(I)); This Directorate was responsible for the investigation and dissemination of information on enemy technical development in relation to aeronautical matters, for industrial intelligence so far as enemy aeronautical industries were concerned and for all signals intelligence. The new A.I.3(f) was formed on account of the expansion of intelligence required in connection with the far Eastern war: A.I.3(d) had previously dealt with Russia and certain other countries as well as with Japan, and it was considered that it should now limit itself to Japan and a new A.I.3.(f) should take over Russia, ^{China and neutral countries in Europe and the Middle East.} ~~and the other countries.~~

(8) No diagram showing the organisation of Air Intelligence at a date later than April 1944 was prepared during hostilities and it is not considered necessary that one should be ^{included} ~~prepared now~~ as the only changes of note thereafter were the formation of two sections A.I.1(h) and A.I.2(h) under D. of I.(R) in the spring and summer of 1944 to deal with intelligence on the V weapons (a subject previously studied in the Department of A.C.A.S.(Ops)), the creation of the post of Deputy A.C.A.S.(I) in August 1944 and the transfer ^{of D.A.F.I.} ~~away~~ from A.C.A.S.(I) to A.C.A.S.(P) ~~of D.A.F.I.~~ in October, 1944.

/The

19. In the concluding stages of the war a further section A.I.3(m) was set up, the function of which was to ensure that all naval and military intelligence of air interest was obtained for the R.A.F. and was properly distributed and appreciated from the Air stand-point. ~~The increasingly important role played by the Air Force in naval and military operations had been inevitably accompanied by a steadily increasing need for naval and military intelligence.~~ It was recognised that the existing Air Intelligence Sections (in A.C.A.S.(I) 7) were not qualified to feed intelligence relating to ~~naval and military~~ ^{such} matters to Air Ministry, Commands and other authorities, especially those ~~authorities~~ specialising in maritime and close support operations, and that ~~a~~ ^{before came to be regarded as} specialist section was indispensable to ensure that all appropriate naval and military intelligence was supplied to the R.A.F. with particular regard to those developments in the fields of tactics, weapons, defences and other equipment, which might have a special implication for air sea warfare or strategic and tactical air warfare in support of land operations.

Personnel Strength

20. The Directorate of Intelligence which at the outbreak of the war possessed less than 40 officers ^{had expanded} at the end of the war ^{to} three Directorates under an Assistant Chief of the Air Staff with some 700 officers, of whom only ten Senior Officers of the rank of Group Captain and above were regular officers. The remainder being former civilians commissioned in the R.A.F.V.R.

A.I.3.(E)
16.10.45.

PART I : CHAPTER 2A.I.(J.I.S.) :RELATION BETWEEN AIR MINISTRY and CHIEFS
OF STAFF, WAR CABINET and LIAISON with
OTHER MINISTRIES, ALLIES and COMMANDS.The Joint Intelligence Committee

1923. 7
1. From the outset of the war, and even before, it was recognised that the activities of the three Fighting Services must be closely inter-related. To co-ordinate the work of the three Services, the Chiefs of Staff organisation was set up. Under the Chiefs of Staff Committee worked various Staffs and Sub-Committees, such as the Joint Operational Planning Staffs, Joint Administrative Planning Staff, Post Hostilities Planning Staff, and Joint Intelligence Sub-Committee. These Sub-Committees had, in turn, under their own working Staffs.

2 The Joint Intelligence Sub-Committee (J.I.C.) comprised, as members, the Directors of Intelligence of the three Services, a representative of M.E.W., and a representative of the Foreign Office as Chairman. There were also certain other members, for example, the Heads of the Secret Service Organisation and of certain Security Services, who were co-opted members and attended when matters of interest to them were under consideration.

Functions and Organisation of J.I.C.

3. The functions of the J.I.C. were to advise the Chiefs of Staff Committee on Intelligence matters of Inter-Service interest, generally to co-ordinate, on an Inter-Service basis, the work of the Intelligence Directorates of the various Ministries, and to direct the policy of certain Inter-Service bodies. The J.I.C. also worked in close touch with the Directors of Plans so as to provide them with the intelligence material required for the formulation of their schemes.

In addition

4. *Lastly* the J.I.C. formed a body for consultation with various organisations closely related to Intelligence proper, such as the Political Warfare Executive which worked under the direction of the Foreign Secretary and whose broad function was to direct propaganda policy; Postal & Telegraph Censorship which operated under the Ministry of Information; the Secret

/and

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and certain Security Services; the Special Operations Executive which functioned under the Minister of Economic Warfare and was responsible for clandestine operations in enemy and enemy-occupied territories; the "Y" Committee which co-ordinated the activities of the three Services "Y" organisations, and Radio Security Service, and the "Y" organisation maintained by the Post Office.

The Joint Intelligence Staff (J.I.S.)

5 The J.I.C. was assisted by a whole-time Staff (J.I.S.) responsible for drafting for it the appreciations, required by the Chiefs of Staff and other Bodies, of enemy intentions and capabilities. This Staff was composed of representatives of the three Services and of the Foreign Office and M.E.W. During the war it worked in the War Cabinet Offices, in rooms adjoining those of the Joint Planning Staffs and with the help of a joint secretariat. Thus the Joint Intelligence Staff was constantly informed of operational events and requirements, and the Joint Planning Staff was, in turn, constantly provided with intelligence advice on an Inter-Service basis.

Other Staffs subordinate to J.I.C.

6 In addition to the J.I.S., the J.I.C. had working under it two other standing Staffs:-

(a) The Inter-Service Security Board, whose main function was to co-ordinate measures for preventing leakage of information to the enemy in connection with our own plans and operations and generally to co-ordinate security measures.

(b) The Intelligence Section (Operations) (I.S.(O)), which was set up as a channel for factual intelligence of all kinds required by the Joint Planning Staffs, both within the War Cabinet and in Operational Commands. In the earlier stages of the war these Staffs used to collect their information direct from the Intelligence Directorates of the various Ministries. It was found, however, that the setting up of I.S.(O) as a Central Clearing House enabled this information to be correlated on an Inter-Service basis before it reached the Staffs requiring it, with a considerable saving of duplication. In other words the function of I.S.(O) on the purely factual side of intelligence was closely analogous to that of the J.I.S. in the realms of intelligence appreciations.

Finally,

7. Finally, the J.I.C. directed the policy of various Inter-Service Bodies, which were administered by one or other of the Service Ministries but whose work was carried out on an Inter-Service basis, such as the Photographic Reconnaissance Organisation,⁽¹⁾ the Combined Services Detailed Interrogation Centre, and the Inter-Services Topographical Department.

Functions and procedure of A.I. (J.I.S.)

8. The Section within A.C.A.S. (I)'s Department which dealt on a staff level with the J.I.C. was A.I. (J.I.S.) - a Section working direct to the A.C.A.S. (I) but in close co-operation with D. of I(O)'s Directorate.

9. The establishment of A.I. (J.I.S.) was a Wing-Commander and a Squadron-Leader, with a confidential clerk (attached). The Wing-Commander was the Air Ministry representative on the G.1 team of the J.I.S., the Squadron-Leader being the representative on the G.2 team. Representation on these teams of the J.I.S. was the main function of the Section, but in addition it operated as a useful clearing house between the War Cabinet Officer and the Air Ministry of all documents, whether dealing with operational intelligence, security matters, or organisational problems. In this Section too were maintained all the files and records of J.I.C. meetings and memoranda.

10. The procedure followed by the J.I.S. for the preparation of Intelligence appreciations was normally as follows:-

(a) The Terms of Reference for the preparation of appreciations, whether emanating from the Chiefs of Staff, Joint Planners, or elsewhere, were issued by the War Cabinet Secretariat.

(b) The J.I.S. would, where necessary, have a preliminary discussion to clear up any ambiguities in the Terms of Reference or to expand or clarify them; to settle in skeleton the form in which the appreciation was to be prepared; and to allocate the functions as between the different members, e.g. whether the paper called in the first instance for contributions by all or more than one member, or whether the appreciation primarily concerned the work of one Ministry and called for a first draft by the representative of that Ministry alone.

(c) The member or members of the J.I.S., who had to contribute drafts, issued within their own Directorates the Terms of Reference (amplified

(1) See Chapter 2 paras 11-14 /where

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where necessary) to the Sections concerned, indicating the time and date by which the Sections' contributions had to reach A.I. (J.I.S.).

(d) A.I. (J.I.S.) consolidated the contributions from the Air Ministry Sections in a draft in suitable form for consideration by the J.I.S.

(e) The J.I.S. met and produced, on an Inter-Service basis, a consolidated draft based on the contributions from the various Ministries, or if one Ministry only had produced a draft, based on that draft as amplified in discussion by the J.I.S.

(f) This preliminary draft was issued by the Cabinet Secretariat (in the case of the Air Ministry through A.I. (J.I.S.)) for comment by the Sections concerned in the various Ministries. It was the practice, at any rate in the Air Ministry, at the same time to submit this draft to the Deputy Director or Directors concerned so as to ensure that the views expressed by the Sections were in line with those of their Deputy Directors.

(g) A revised draft, based on the preliminary draft plus Section and Deputy Directors' comments, was prepared by the J.I.S. The resultant draft was known as the Directors' Draft.

(h) The Directors' Draft was issued by the Cabinet Secretariat (in the case of the Air Ministry through A.I. (J.I.S.)) for comment or approval by Directors.

(i) The J.I.S. met again to consider Directors' comments. If no difficulty was experienced in reconciling these comments the appreciation was issued in final form by the Cabinet Secretariat with Directors' names appended. In cases where the J.I.S. were unable to reconcile these comments, e.g. where a difference of view on a question of principle was apparent between two or more Directors, a Directors' meeting would have to be called at which the appreciation was finalised or at which it was referred back to the J.I.S. to finalise in accordance with decisions arrived at by the Directors at their meeting. Normally members of the J.I.S. attended at the Directors' meeting at which one of their appreciations was under discussion in order that they might hear the Directors' views and answer any questions by the Directors on the draft.

Notes:

Notes: (i) Occasionally, where an appreciation was called for urgently, time did not allow of the full procedure set out above being followed, and some of the steps had to be telescoped.

(ii) Where appreciations were called for on minor matters, or where they were called for by lower level Bodies or Staffs, e.g. by the working Staffs of the Joint Planners, the final appreciation was issued without Directors' signatures and it was within the discretion of the J.I.S., in appropriate cases, to issue appreciations on this level without reference to Directors.

The scope of J.I.C. Appreciations

11. The bulk of the appreciations produced by the J.I.C were called for by the Chiefs of Staff or the Directors of Plans. ^(See Appendix 'A') In exceptional cases they might be called for by the War Cabinet or the Defence Minister himself, in which case they would be submitted through the Chiefs of Staff if time allowed, or direct, a copy being sent simultaneously to the Chiefs of Staff. It was soon found, however, that the J.I.C., with its working staff, was a useful standing body for producing on an Inter-Service basis appreciations and memoranda on a large variety of matters, not only within the sphere of Intelligence proper and Security, but also in other spheres such as political strategy, propaganda, relations and dealings with Allies, Neutral countries and Resistance Groups in occupied territories, etc. etc. ^(See Appendix 'B') Terms of Reference submitted to the J.I.C. on some of these matters called for co-operation by the J.I.C. and the J.I.S. with organisations such as P.W.E., S.O.E., Censorship, the Security Services, etc.

12. Another important class of customers for J.I.C. and J.I.S. appreciations was Commands at home and abroad. This necessitated close co-operation with parallel J.I.C. organisations which were gradually set up in the different theatres of war, such as the Mediterranean, Far East, and later S.H.A.E.F. on the Continent.

Co-operation with other Joint Intelligence Committees

13. ^{Washington} After America came into the war, an American Chiefs of Staff organisation was set up in Washington on the lines of the British Chiefs of Staff Committee with, under it, an American J.I.C. and J.I.S. To ensure close co-operation with this American organisation a British Chiefs of Staff Committee and, under it, a British J.I.C. and J.I.S. were set up in Washington. The British J.I.C. and J.I.S. in London worked in close co-operation with their British opposite numbers in Washington, and through them with the Combined Anglo-American J.I.C. organisation which met periodically in Washington.

SECRETMoscow

14. / No similar parallel organisation was set up in Moscow. The J.I.C., however, worked in close co-operation with the British Staff Mission which was set up in that city.

Operational Theatres
15. / With the setting up of J.I.C.'s in the various theatres of war and in Washington, the J.I.C. in London gradually assumed a further function, namely to comment on appreciations which had been initiated by these J.I.C.'s abroad. As time went on the number of appreciations and memoranda sent from J.I.C.'s, Commands and other bodies abroad to the J.I.C. in London for comment grew to considerable proportions.

A.I. (J.I.S.)

20.7.45.

LIAISON WITH ALLIES

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Introduction

Note: Liaison between the Air Ministry Intelligence Directorate and the Allied Air Forces varied considerably, being closest with the Americans and practically non-existent with the Balkan countries. This being the case, the greater part of this chapter is therefore devoted to accounts of liaison with the United States Air Forces.

I LIAISON WITH UNITED STATES AIR FORCES

~~Liaison with~~ A. I. 3. (U.S.A.) (liaison section between Air Intelligence and the Americans).

Functions

1. A. I. 3. (U.S.A.) became a clearing house of air information of U.S. and British origin and the subjects with which it dealt were often on or over the border line dividing intelligence, operations and organisation; half of A. I. 3. (U.S.A.)'s dealings were with Air Ministry branches outside A.C.A.S. (I); but no duplication or difficulties arose on that score, and relations with the United States authorities were throughout smooth and pleasant.

2. **Supply to British Units of information from U.S. Sources**

Information on the organisation, actual and projected strength and equipment of U.S. Air Forces was in day to day demand by British formations though it was not always appreciated that it was no part of the work of the U.S. Air Force Headquarters in Europe to deal with questions of this nature. The U.S. War and Navy Departments, however, willingly supplied copies of their air forces' strength returns to the Air Ministry. Since in their original form these returns would not have been acceptable to British formations which had not followed the American organisation in detail, it fell to A. I. 3. (U.S.A.) to break down the figures and to supply the information required by the Air Staff, the Prime Minister's office, Admiralty, War Office and C.O.H.Q., in a form paralleling R.A.F. returns.

3. The section distributed to British units, air operations reports and air intelligence reports from U.S. sources and also prepared monthly statistical summaries of U.S.A.A.F. operations in Europe from their beginning until March 1944. Periodical summaries of U.S.A.A.F. air effort (as distinct from reports of individual operations) were also supplied in response to wide requests until from March 1944 onwards, the U.S.A.A.F. in Europe issued its own summaries of operations, and willingly incorporated in them information required by the Air Ministry over and above the internal needs of the U.S.A.A.F.

4. Through following the U.S. Air Forces' order of battle and operations so closely, A. I. 3. (U.S.A.) were able to answer promptly most of the day to day questions from British sources on such matters, thus ~~reducing~~ ^{saving} multiple requests from individual British units to U.S. Headquarters. The section was also able to answer a number of questions which it would have been inconvenient at the time to put to the U.S. authorities direct.

5. **Distribution of British Documents to U.S. Agencies**

The supply to American authorities in the United Kingdom of intelligence from British sources was dealt with by D.A.F.L. up to April 1942. At that time these duties were taken over by A. I. 3. (U.S.A.), who also undertook liaison between the Air Ministry and the U.S. Embassy, until then in the hands of D.A.F.L. The distribution of information to the Americans fell into two more channels: (1) U.S. forces in the European theatre and (2) to Washington.

6. In April 1942 a major (late colonel) of the U.S.A.A.F. was attached to A.C.A.S. (I) as Intelligence Liaison Officer between the Air Ministry and the U.S.A.A.F. in Europe. This officer dealt - for the most part verbally and on a high level - with matters arising between A.C.A.S. (I) and the Commander of U.S.A.A.F. in Europe. (He was not primarily concerned with exchange of information with Washington nor with Washington agencies in London).

At

7. A.I.3.(U.S.A.) was responsible for distributing to United States forces in the European theatre all available written air information involving some 190 different series of papers, regularly issued, and many occasional papers. Frequent changes in size, locations and names of U.S. organisations in Europe would have made it impracticable for the respective Air Ministry sections originating papers to have dealt individually with distribution to U.S. forces.

8. The R.A.F. Delegation, Washington, was looked upon in the Air Ministry as the channel for supplying all the British air information requested by U.S. Washington authorities, though this function was never laid down in black and white, nor did the U.S. Government, in practice, accept RAFDEL as being the only or the main channel. A number of U.S. Government agencies in London - the more important were U.S. Military Air Attache, U.S. Naval Air Attache, U.S. Naval Attache, Office of Strategic Services, Economic Objectives Unit and U.S. Strategic Bombing Survey - were all charged with obtaining information from the Air Ministry to forward to Washington. These agencies tended to pursue, independently of each other, overlapping subjects. It fell to A.I.3.(U.S.A.) to distribute British documents to these agencies, examine their enquiries and prevent as far as possible the duplication of requests to Air Intelligence research sections and Directorates of Operations.

9. Liaison with A.I.3(b) (German Air Force Operational Intelligence)
Within

9. Air Ministry. Liaison between A.I.3(b) and our American Allies on intelligence matters was simple and therefore good. In the early days of the war the American representative on A.C.A.S.(I)'s staff, soon became so convinced of the soundness, both of the methods employed by A.I.3(b) and of the judgment of that Section, that he was able to persuade American organisations and operational Headquarters to accept the intelligence supplied by British sections at its face value.

(more success than MID!)

10. This was an achievement of great merit for, in those early days, American opinion on the strength of the enemy Air Force, on the quality of its aircraft and on the all-round efficiency of the Luftwaffe was considerably higher than the British. Having no intelligence organisation comparable with the British, American opinion fluctuated greatly and credence was liable to be given to the most alarmist and exaggerated exaggarations.

11. Thus, with this satisfactory beginning, the maintenance of good relationship was easy and British opinion, far from being merely accepted, was eagerly sought. Representatives from American Operational Headquarters and from the office of the American Air Attache made regular frequent visits to the Section to discuss problems peculiarly American and to absorb as much knowledge as possible on matters concerning the German Air Force.

12. From these visits developed the attachment to the Section for a short period of the Head of G.2. in Washington in order to study British methods of working and British sources. An officer from the same Section in Washington who accompanied him stayed to become a working member of the Section through the whole period from early 1943 until the end of the European war. While his role was primarily to ensure that interests in Washington were well served, he also undertook intelligence duties over and above his original assignment, thus becoming in effect an active member of the section. Subsequently, two other American civilians and one officer were attached to the Section expressly to work as active members, and contributed much valuable work on their own specialised subjects.

13. A.I.3(b) - RAFDEL Liaison

the R.A.F. Delegation

Further liaison with Washington was provided by (RAFDEL) to which organisation A.I.3(b) sent copies of all signals dealing with matters of importance concerning the enemy Air Force. This was almost entirely a one-sided arrangement, liaison consisting of the supplying by this Section of material to RAFDEL and of answers to queries by RAFDEL on behalf of A.2 and G.2., Washington. Little or nothing was sent back to A.I.3(b) except for American publications, the excellence of whose format betrayed an abundance of available manpower, time and money, presenting intelligence data frequently in pictorial or diagrammatic form which, in many instances, had been originated by A.I.3(b).

14. A.I.3(b) - U.S. VIII Air Force and other Commands

In the early period of the VIIIth Air Force history, liaison between A.I.3(b) and the intelligence branches of that Command was very close. Frequent meetings took place on such purely operational matters as the routing of the VIIIth Air Force bombers in their attacks on targets on the Continent and on tactics to be employed by bombers and escorting fighters, first to outwit and later to destroy the enemy defensive fighters. Contact was so widespread that *L Open East intelligence* the majority of the American ~~and~~ sections, created with the setting up in Europe in 1943 and 1944 of the increasing number of American Operational Commands, spent periods of time with A.I.3(b), thus getting to know both the working and the members of that section personally. Throughout the subsequent period of the war, intelligence officers of all U.S. Operational Commands continued to look to the Section for advice and guidance on many matters concerning the enemy Air Force.

15. Liaison with A.I.3(E) (Intelligence on G.A.F. Organisation)

A close liaison was maintained by A.I.3(E) with varied American organisations in the European Theatre. Target information was passed to the representatives of the U.S. VIIIth, IXth and Xth Air Forces and copies of papers produced by the section were sent to all the large American commands and departments. An American officer was attached to A.I.3(E) from April 1944 until hostilities ceased and proved invaluable as a liaison officer, bringing targets to the notice of the different air forces. This officer eventually held a strategic position as Secretary of the P.O.L. Depot Working Committee under the Combined Strategic Targets Committee.

16. The Americans were also supplied with running lists of Senior G.A.F. officers both in the OKL (Supreme Command of the G.A.F.) and in the higher operational and territorial commands in all theatres of war. These were amplified by biographies of all senior G.A.F. officers and of important personalities in operational commands in the West (e.g. fighter aces) together with photographs.

17. After the capitulation they were provided with complete lists of all Generals and General Staff officers and all officers of the rank of Colonel in the G.A.F. These lists also included such officers of the medical and engineer Corps and such higher civil servants as were known to us. They were also supplied with details of those G.A.F. officers whom they wished to interrogate, and with appreciations of the officers whom they considered employing.

18. Liaison with A.I.2(a) (German aircraft production Intelligence)

Since the Production Section was closely connected with the selection of targets for the U.S.A.A.F., as well as for the R.A.F., a close liaison was built up with the American Intelligence organisation. An American officer was attached to the Section, and for nearly 2 years he filled a post which would otherwise have required an R.A.F. officer of the rank of Squadron Leader, since he did in fact function as deputy to the Head of the Section in regard to the German Air Force.

19. Liaison with the Americans was effected largely through the Jockey Committee, with such interim meetings as are mentioned in Chapter ~~in~~ *11 (w)* describing the activities of that Committee. The presence of the American officer in the Section greatly facilitated day to day discussion on all matters likely to affect the operations of the U.S.A.A.F. Inter-change of information with the American Intelligence Sections in Washington was effected through the R.A.F. Delegation.

20. Liaison with A.I.2(b) (Airfield Intelligence)

Liaison with the Americans was complete, and ultimately proved highly valuable. It took the following forms:-

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- (i) The training by A.I.2.(b) of American officers who later joined the Intelligence Staffs of the U.S. of Inter-Allied Headquarters in the E.T.O. These officers learnt our methods, handled our materials, and became familiar with our aims. They thus acquired a thorough grasp of our assets and our deficiencies, and when they left to take up posts elsewhere were in a good position both to profit by the former and to help remedy the latter.
- (ii) The attachment to A.I.2.(b), on indefinite temporary duty, of certain officers from the A-2 Division, U.S.S.T.A.F. These officers, ultimately 2 in number, worked as full time members of the Section and fulfilled exactly the same duties as their British counterparts. When trained, they not only provided a sorely needed increase to the manpower of the Section, but rendered valuable service to it (a) in connection with the rising demands for day-to-day operational intelligence made by the commands, particularly the U.S.VIIIth Air Force, and (b) by acting as liaison officers with the numerous American organisations with whom A.I.2.(b) dealt. When the Airfield Section at Advanced A.E.A.F. (subsequently Forward S.H.A.E.F.) was formed, one of the American officers from A.I.2.(b) was transferred to the Continent and worked in that Section alongside two British officers from A.I.2.(b) and an American officer from A.E.A.F. who had been trained by A.I.2.(b). Continuity of aim and method was thereby ensured, and liaison with American formations on the Continent developed and strengthened. The advantages of an Inter-Allied section of this sort, forming part of Supreme Headquarters but at the same time working in the closest collaboration with its Air Ministry parent, proved overwhelming.
- (iii) An inter-change of visits between members of A.I.2.(b) and of the Air Movements Branch, Washington - their opposite numbers in the War Department. These visits, which began in the Winter of 1942-3, led first to a steady improvement in the standard of Airfield Intelligence put out by the Air Movements Branch, and eventually, in early 1944, to a reciprocal agreement whereby areas of responsibility were apportioned between the two Sections. Under this arrangement, A.I.2.(b) became responsible for all Intelligence relating to airfields in Europe, Africa, the Middle East, and as far east as India, while Air Movements undertook responsibility for the Pacific and the Far Eastern theatre generally. In the summer of 1944, an officer from A.I.2.(b) was despatched to Washington to work in Air Movements, taking with him micro-filmed copies of all our files on the Far East. British and American sources of information were pooled, and thereafter A.I.2.(b) ceased to issue its own publications on countries in this area. Instead, stocks of Air Movements' publications were flown to this country and to India for distribution as required.

This arrangement (~~which incidentally is still operative~~) proved highly advantageous to both parties. It not only ensured a more complete coverage of source-material and a more consistent standard of evaluation, but made possible an infinitely more rapid flow of intelligence to recipients.

- (iv) The employment by A.I.2.(b) of American technical facilities for the rapid reproduction of airfield maps, plans etc. These facilities were made available to us both in this country, where a mobile U.S. printing unit did invaluable work for us over a long period, and in America, where a special series of "Operational Air Maps" covering most of the world were printed for the joint use of A.I.2.(b), Air Movements, and their respective customers.

21. Liaison with A.I.2.(g) (Technical Intelligence)

As soon as the Americans began deploying their forces for operations in Europe, harmonious relations were established between the two Technical Intelligence Sections. Each section worked independently so far as the interpretation of data and issue of reports was concerned, but all the raw

/intelligence

intelligence, from whatever source, was common property. Thus, although there might be differences of opinion as to the authenticity of a report, or the significance of a new development, each Section was fully informed of the views of the other. Liaison officers representing the U.S. Army Air Forces and later the U.S. Navy, were attached to Technical Intelligence and the most friendly relations were maintained throughout. Information amassed by the Air Ministry prior to America's entry into the war was, of course, placed at the disposal of our Allies and was of great value to them at a time when they were lacking in operational experience.

22. Only in the closing stages of the war, when the armies were advancing rapidly into Germany and Technical Intelligence, despite such precautions as had been possible, was temporarily overwhelmed by the amount of material which suddenly presented itself, did this friendly partnership show signs of strain. With the end clearly imminent a commercial interest in German research and development, which during the war had lain dormant, became more active. Many technicians from leading American firms came to Europe to investigate developments at first hand and did much valuable work as members of official teams.

II. LIAISON WITH U.S.S.R.

23. Liaison with A.I.3.(b)

Liaison with the U.S.S.R. was almost exclusively unilateral. It consisted mainly of the furnishing by A.I.3.(b), both to 30 Military Mission, Moscow, and to the Soviet Air Attache in London, of routine material and of answers to specific questions, with little or no corresponding information received in return. In the early days of the war and the second half of 1941 and early 1942, the methods of passing information inclined towards "barter" rather than to free exchange, but experience proving this system quite inadequate, information was later given to the Russians freely without any attendant conditions; it was given factually together with an opinion as to validity and comprised Order of Battle, dispositions of the G.A.F., appreciations of enemy operations and intentions on the Russian front. No discussion of sources or of the methods employed in arriving at given conclusions was undertaken with the Russians in any detail.

works

24. 30 Military Mission in Moscow provided only little information from Soviet intelligence branches of any value. This was entirely due to the unwillingness, often inexplicable, on the part of the Soviet authorities to provide even the simplest and readily accessible material, e.g. frequent requests were made in vain for unit markings and numbers of German aircraft although at the time German aircraft were on public display in Red Square. Later, some statistics on the German scale of effort on the Eastern front, together with Russian estimates of enemy losses, were provided by Moscow at regular intervals, in addition to some intermittent messages on Order of Battle questions. The estimate of enemy scale of effort was the only Russian contribution which was of any permanent value.

25. While personal relationship between A.I.3.(b) and the Soviet Air Attache in London was good, it was obvious that however excellent his intentions may have been to produce information from Soviet sources, he was in no position to obtain it. The obstruction clearly originated in Moscow where Soviet authorities displayed a marked reluctance in the ability to exchange information on operational air intelligence matters.

26. Liaison with A.I.3.(E)

A.I.3.(E)'s liaison with the Soviet consisted largely of supplying them, either through 30 Mission, or the Soviet Air Attache in London, with information on G.A.F. air transport, training and parachute troops and information on G.A.F. personalities. So far as personalities were concerned the liaison took the form of sending running lists of Senior G.A.F. officers in the German Air Ministry and in higher operational and territorial commands in all theatres of war; also lists of officers commanding operational units in all theatres of war. They were also provided with biographies of Senior G.A.F. Officers in general and in answer to specific questions.

SECRET

/A-

27. - In return, A.I.3.(E) occasionally received reports on the interrogation of G.A.F. aircrew shot down in Russia, these being helpful in giving the names of commanders of smaller operational units. Had the supply of these been more regular, the information derived from them would have provided a better picture of the G.A.F. operational personalities on the Russian Front. As it was, the intelligence received was of value in view of the general lack of information of this kind in that theatre.

28. ~~Liaison with~~ A.I.2.(a)

Liaison with Soviet Air Intelligence was effected through the Air Section of the Military Mission in Moscow and direct with the Soviet Military Air Attache in London. A.I.2.(a)'s monthly production papers were supplied to both these agencies and, in return, periodical estimates drawn up by the Soviet authorities themselves were provided for that Section's consideration. On the whole, liaison with the U.S.S.R. was not satisfactory, since they were not prepared to furnish much of the information for which they were asked, in particular, in regard to crashed aircraft for the examination of which they did not have an efficient organisation.

29. ~~Liaison with~~ A.I.2.(g)

Following the German attack on Russia in the summer of 1941 the Military Mission in Moscow served as a clearing house for the exchange of technical information on enemy equipment. The exchange was admittedly onesided since much more material was supplied to the Soviet than was received in return. This was not because the Russians lacked opportunity for acquiring technical information of value, for many new types or versions of aircraft were introduced into operations on the Eastern Front, notably the He.177, the Me.109 G, the Hs.129, and the Fw.189; new anti-tank aircraft weapons were also first tried out against the Russians. Whilst it is probably true that the Soviet authorities attached less importance to the collection of technical intelligence than we ourselves did, they nevertheless displayed a very apparent reluctance to exchange information.

III. LIAISON WITH OTHER ALLIES.

Norwegians and French

30. Liaison with the other Allies - Norwegians, French, Czechs, Poles and Dutch was intermittent for the most part, though a close, cordial and productive co-operation between A.I.2.(b) and the Norwegians resulted in airfield information on Norway being more accurate and detailed than on any other country in Europe. This section also developed a useful liaison with the Free French Forces through which were secured details and sketches of French airfields, of considerable value at the time and helping to fill some of the widergaps in their information. Between A.I.2.(g) and the French during 1939-40 there was a full interchange of information as long as circumstances permitted. British officers were attached to the experimental establishment at Orleans/Bricy and during this period some excellent reports describing such aircraft as the Me.109E and the Me.110C were handed over by the French. When France had been liberated, cooperation was resumed although it was no longer found necessary to maintain personal liaison.

Contacts made through DAFI

31. Contact with the other Allies was established through the appropriate section of D.A.F.L. While some useful exchanges of information took place in this way, the volume of intelligence of value to the prosecution of the war obtained from these sources ~~was~~ limited by force of circumstances, and so far as their requirements for intelligence were concerned they were met through usual routine channels.

AIR MINISTRY INTELLIGENCE IN WAR

PART I : CHAPTER 4

A.I.2(c)

CLANDESTINE OPERATIONS

Organisation

Special Duty

1. On the formation in August 1940, of 419 ~~S.D.~~ Flight, engaged on clandestine air operations to Occupied Europe, the Flight came under the operational control of D.D.Flans (M.C.), who consulted D. of I. on the intelligence aspects of projected operations. On the expansion of the Flight in October 1940, to include heavy as well as light aircraft, it was decided that since Intelligence ^{was} ~~were~~ more closely concerned in the planning and execution of these operations than any other Directorate in the Air Ministry, the responsibility for operational control of operations should vest in D. of I. (later A.C.A.S.(I)). Accordingly D.D.I.4, and later D.D.I.2., were charged by D. of I. with the general control of S.D. operations and policy questions arising therefrom, and a section, A.I.2. (later A.I.2(c)) was formed in this Directorate to deal with training, equipment, and the day to day planning and execution of operations.

SOE?

2. This Section, during the period October 1940 to September 1943, was the central planning and controlling authority for all S.D. operations, both parachute and landing, which were carried out from the U.K. during the period. It was also the link between the Air Ministry and the two clandestine Organisations, S.I.S. and S.O.E., on policy questions affecting not only S.D. operations to N.W. Europe but also S.D. operations in all other theatres of war.

3. Owing to the operational character of the Section and the nature of its functions, its establishment provided that the Head of the Section should be a G.D. officer, and during the course of the War this Officer was, in fact, at all times a G.D. Officer who had completed at least one tour on S.D. operations and was thus fully familiar with the duties involved.

/Direction

Direction of Policy

4. On the policy side, the Section was principally engaged throughout the entire period 1940 - 1945, with questions concerning, in all theatres, the chain of operational control, R.A.F. organisation, development of operations, formation of S.D. Squadrons, aircraft establishment, research into and the provision of equipment (i.e. aids to navigation such as Rebecca/Eureka and S-Phones, parachutes, containers and packing etc.), development and modification of aircraft types for landing and parachute operations, (including helicopters), extension of operations to countries and ranges not previously covered, and provision of supplementary S.D. effort by non-S.D. aircraft.

5. Among the policy questions with which A.I.2(c) were particularly concerned during the War, the more important were in regard to S.D. operations to Poland, (in particular, operations to Warsaw during the siege), Czechoslovakia, Yugo-Slavia (especially during the early stages of resistance), France (especially the large scale organisation of supplies for resistance), and to Scandinavia.

6. Other duties undertaken by the Section during the entire period were the training, in collaboration with the Organisation and the S.D. Squadrons, of aircrew and agents in the techniques of clandestine landings, parachute drops, and Mail pick-up by aircraft. The Section was also responsible for providing the statistical summaries and progress reports on S.D. operations required by the Air Staff, covering all theatres of war. During 1941 and 1942 the Section also controlled a special parachute and container packing station in London, which packed the parachutes and containers required for S.D. operations.

Integration with Bomber Command

7. The question of the best system for the operational control of S.D. operations occupied the attention of the Air Staff on a number of occasions during the war, the principal objection until 1943 being to the vesting of control in a Directorate of Air Ministry (and in an Intelligence Directorate as opposed to an Operational Directorate), instead of in Bomber Command, who were in administrative control of the Squadrons and their Station. As a result, following a decision of the Air Staff in August 1943, the greater part of the functions of operational control were transferred from A.I.2(c) to a special section at Bomber Command.

15-

8. Thereafter the main responsibilities of the Air Ministry Directorate and A.I.2(c) were with policy questions and with the intelligence requirements. The latter consisted mainly of vetting and approving all pin-points submitted by the Organisations for projected landing and parachute operations. This responsibility was in itself a major task since from the middle of 1943 onwards, projected operations were being submitted to A.I.2(c) by the Organisations at a rate varying from 70 to 150 a day. It was not found possible to transfer this responsibility to Bomber Command since a close geographical location for the vetting section was essential in view of the close liaison maintained with the Headquarters in London of the Organisations in connection with planning.

Conduct of Operations

9. On the operational side of the Section's work, the Section was, between 1940 and September 1943, the central operations room for all S.D. operations carried out from the U.K. The S.D. effort in 1941 was not large, all sorties being carried out by one Squadron, No.138 (previously 419 Flight), but with the formation of a second Squadron, No.161, early in 1942, and the development both of technique and resistance in Europe, parachute operations began to expand rapidly in scope and numbers, eventually covering France, Belgium, Holland, Poland, Czechoslovakia, Austria, Germany, Norway and Denmark. From January 1944 onwards, the S.D. effort was increased by the supplementary effort put up by aircraft of No.38 Group, Bomber Command, and the U.S.A.A.F., all being on behalf of S.O.E. whose Air Transport Organisation arranged the execution of operations direct with the Headquarters of the Commands concerned. The total number of S.D. sorties flown from the U.K. during the War amounted to about 12,500 on parachute operations and about 320 on landing operations. Accurate figures are unknown, owing to absence of records of early operations.

10. Landing operations also steadily increased in number from 1941 onwards, reaching their climax in 1943, when still under the direct control of A.I.2(c), and during which year 95 successful operations were completed by Lysander or Hudson aircraft of 161 Squadron, apart from numerous abortive sorties. Altogether during the war, 468 persons were landed in Occupied Europe and 749 brought back.

11. Up to the end of 1943, when Bomber Command took over the day to day control of operations, details of all projected S.D. operations which they had

/approved

approved were held by A.I.2(c), who checked the loads, range and reception times and gave an approximate date for the flying of the sortie. Details were passed to R.A.F. Station, Tempsford, where the S.D. Squadrons were stationed. Each day the Organisations passed to A.I.2(c) the code-names for such of their operations as were ready to be flown, together with a priority, and these prospective operations were matched against the aircraft availability notified by Tempsford and allocations made. Tempsford and the Organisations were then informed of the projected programme and final arrangements made. Cancellations and amendments of sorties were communicated through A.I.2(c), who subsequently compiled records of operations flown and passed copies of the pilots reports to the Organisation concerned.

12. While the responsibility for operational control was removed from A.I.2(c) in September 1943, the responsibility for vetting and approving all pinpoints remained vested in the Section during the entire period, as well as the policy aspects of projected operations. During the early stages of S.D. operations they were planned in very close liaison with the Organisations and the Officer Commanding the S.D. Flight or Squadron; after 1942, however, this close link was not so necessary, (apart from the planning of landing operations), since the precise operational possibilities were by then well known and the execution of operations had become straightforward. In the majority of cases, therefore, the Station or Command concerned were not consulted by the Section before a point was approved. It sometimes happened that an Organisation had special reasons for wishing to fly a sortie to a particular pinpoint which did not meet with the approval of A.I.2(c), and in that case the Section usually consulted the Command concerned. This was constantly the case during the last months of the War when both Organisations wished to drop agents a short distance behind the front line to be later over-run by advancing Allied forces. Decisions in these cases depended on the day to day experience of the Command which was flying the sortie.

13. Approval of pinpoints was based on the suitability of the spot submitted when considered in relation to topography, defences (ground and air), ground intelligence, and in the case of landing grounds, surface, obstructions and dimensions. Details of ground defences and military activity were obtained from the departments of the War Office concerned, and of air activity, from

A.I.3(b). In the case of "blind" drops (i.e. not to receptions), it was found that maps and ground intelligence was often unreliable, and it was usual for photographic cover to be obtained and interpreted before a point was approved. This was always the practice in the case of clandestine landing grounds, and in considering grounds submitted, the Section was guided to a large degree by the detailed interpretations prepared for the purpose by the small section at C.I.U. which handled these requirements. Most of these landing grounds were submitted by agents in the Field, who supplied measurements and descriptions from which the ground could be recognised on the map and photographs.

14. Also in collaboration with the Clandestine Organisations and Coastal Command, a number of clandestine flying boat landings were planned and executed to the north of Norway, the sorties being flown by aircraft of the Norwegian Squadrons.

15. Bombing of Special Targets. Another type of special operation in which A.I.2(o), in collaboration with the clandestine organisations, was closely concerned on the planning and intelligence aspects, was the bombing by light forces of special targets submitted to the R.A.F. through clandestine channels. The best known of these operations were those against the prison at Amiens and against the Gestapo Headquarters at Oslo and Copenhagen. After general consideration of these projects at Air Ministry, they were handed on to the Command providing the attacking force for detailed planning. Latterly these operations were carried out by No.2 Group or the Tactical Air Force, but a number of special objectives, chosen by Bomber Command, were attacked by aircraft of the S.D. Squadrons during the earlier part of the War and formed one of their main non-moon duties.

PART II.

SOURCES OF INTELLIGENCE

PART II : CHAPTER 5A.D.I.(Ph.)PHOTOGRAPHIC INTELLIGENCEORGANISATION and FUNCTIONS.Introduction

1. Photographic Reconnaissance is still regarded by some people as a mystery. The mystery must now be dispelled, because P.R. has come to be one of the permanent and quite normal functions of the R.A.F.

2. It is impossible to differentiate clearly between strategic and tactical reconnaissance, at any rate so far as P.R. is concerned; the same photograph may be of strategic interest to one unit while it is of tactical interest to another. The purpose of 106 Group was to provide reconnaissance for strategic purposes, and although sometimes, for reasons of expediency, the Group was drawn into work of a semi-tactical nature, it was not its main function and was avoided as far as possible.

3. This ^{chapter} section is intended to describe the organisation of Photographic Reconnaissance for strategic purposes as dealt with by 106 Group in the European theatre in October, 1944. It is not intended to convey any dogmatic pronouncement of principles; it merely describes the system which had been evolved after four years of experiment, and which appeared to suit very well the situation as it had developed at that date. It was perhaps a virtue of the organisation then existing that it was not bound by any supposed principles and was ready to adapt itself to the circumstances of the moment, or of the future, as rapidly as possible.

4. The Purpose of ~~P.R.~~ Photographic Reconnaissance

4. The Photographic Reconnaissance organisation was essentially a Service the purpose of which was to provide every branch of the Government at war with any information which could be extracted from photographs. The organisation embraced five stages:-

Stage I: The assessing and crystallising of the job by a Priorities Committee (Joint Photographic Reconnaissance Committee) who had to be well-informed on higher policy; (paras 11 - 14).

Stage II: The flying of the sortie by aircraft of the highest performance; (para. 15).

Stage III: The production of the photographs by well-equipped Photographic Sections; (paras 16 - 25).

Stage IV: The interpretation of the photographs; (paras 26 - 127).

Stage V: The delivery of information and photographs by a good communications service; (paras 128 - 132).

5. With this organisation working smoothly, and weather permitting, the ^{body} customer who urgently required information was provided with the prints and interpretation reports within 24 hours of the photograph being taken.

6. Apart from the basic stages which constitute Photographic Reconnaissance and Photographic Interpretation, certain ancillary units required by a 'parent' organisation such as 106 Group must be briefly mentioned in order that the reader may have a wider understanding of the scope of photographic reconnaissance. The Photographic Reconnaissance and Photographic Interpretation Organisation, including the basic stages and ancillary units, is explained diagrammatically at Appendix I. A plan of the Organisation of Interpretation is included at Appendix II.

Mockler Ferryman ^{p. 64 p. 61} Shows J.C. PR
Cutter ^U owned early 1944

PR Narrative + J.C. notes show
May 1944

Photographic Reconnaissance as a source of Intelligence.

7. Potentialities

Photography has been shown to be capable of providing an enormous amount of information on enemy territories and activities.

8. Among the subjects normally covered were enemy industry, aircraft movements, rail and road movements, shipping, radar organisation, bomb damage, defences, etc.

Repeat

9. In providing this information, the photographic reconnaissance organisation was essentially a Service, and the servant of every branch of the Government. The customers who normally made direct application for photography were the following:-

- Admiralty
- War Office
- Air Ministry
- Ministry of Economic Warfare
- R.A.F. Commands
- Army Commands
- Naval Commands
- S.H.A.E.F.
- A.E.A.F., etc.

(See Appendix III for more detailed list) ~~of customers~~.

10. In an emergency, however, applications for photographic work were accepted from lower formations and any customer was considered on his merits.

Stage I - The Joint Photographic Reconnaissance Committee

date

11. The Joint Photographic Reconnaissance Committee was an inter-Allied, inter-Service Committee, and was a sub-Committee of the Joint Intelligence Sub-Committee through which it was responsible to the British Chiefs of Staff. It consisted of two Army officers, two Naval officers, two R.A.F. officers, and two American officers, and was under the Chairmanship of an American Colonel. Since the first and essential function of this Committee was to arrange the requirements in the order of their importance, it was essential that the members of the Committee should be very fully informed of the higher strategy of the Government. To this end the various members of the Committee paid frequent visits to their parent Ministries and to the higher formations and obtained the most recent information on impending events. The Committee met twice a day, went through the list of applications for cover, and against the background of their knowledge of impending events, arranged the list in order of importance. Certain classes of jobs, such as Damage Assessments, were authorised automatically.

12. The Committee also performed another extremely useful function in clarifying ill-worded or ill-judged applications. For instance, they were able to reduce some vague enquiry to terms of accurate co-ordinates and which had to be taken. Alternatively they pointed out to the customer that the task, although possible, would be exceedingly dangerous, and justified only if the result were a matter of the highest importance.

13. It will be appreciated that in this capacity it was a great advantage that it was an Army Colonel who spoke to the War Office, a Naval Commander to the Admiralty, and an American Colonel to the Americans.

14. The Committee also ascertained whether photographic cover was already in existence, and if so, whether it would suffice. By the time, therefore, that a Job (i.e. a request for cover that had been approved and put on the flying programme) left the Joint Photographic Reconnaissance Committee, it was certain that it was really necessary, its degree of importance was known, and was reduced to accurate map co-ordinates and scale.

Stage II - The Flying of the Sortie

15. When the Job reached the Operations Room, the Sortie was laid on for a Mosquito, Spitfire, or sometimes a Mustang, according to the nature of the work. With precise information of area and scale, orders were given for the type and setting of the camera to be used and the height at which it should be flown. It was quite normal for a Spitfire to take up to a dozen different targets in the same area, or for a Mosquito, in the course of one flight, to take a convoy in the Baltic with the oblique camera, a ship building in Koenigsberg with the 36" vertical, a large area with the 14" verticals for map correction in Prussia, a bomb damage assessment on an aircraft works near Vienna with the 36" verticals, and to land in Italy.

* Note: See Chapter 12, para 7.

new engines or ^{omit} greater tankage to increase the range. P.R. Units must be able to exploit every advance both in aircraft and in photography. This clearly necessitates a very lively programme of work in the Photographic Reconnaissance Development Unit.

Stage III - The Production of the Photographs

- General*
- 16 41. Following the completion of the flying task, the next stage was to process the film and produce the required number of prints as quickly as possible for the 1st Phase interpretation and initial distribution.
 - 17 42. Quality of negatives and prints is all important if maximum information is to be obtained from the photographs. A further important consideration is speed of production of the finished prints, since the sooner the information obtained from the photographs is in the hands of the "customer", the sooner it can be acted upon. Excessive delays often render the sortie abortive.
 - 18 43. To achieve these objects, research into improved methods of processing and printing must be continually maintained, and improvement of the photographic emulsions used for negative and print making must continue.
 - 19 44. On arrival at the airfield Photographic Section, the exposed films were processed on a Kodak Continuous Processing Machine. This machine developed, fixed, washed, and dried any width of film up to $9\frac{1}{2}$ " wide at a rate of approximately 400 $7" \times 8\frac{1}{2}"$ negatives per hour. The conditions of processing were such that, given correct exposure, negatives of perfect quality resulted. Any length of film could be processed, and films could be spliced to each other with the machine running to allow continuous processing.
 - 20 45. The film was then viewed by an Intelligence Interpretation Officer who selected negatives of the target area of which rush prints were required. The film was then numbered, after which rush prints were made from the selected negatives, this being followed by routine printing of two complete sets. These were despatched with the film to Allied Central Interpretation Unit, Medmenham, where a 2nd Phase Interpretation was made and the area covered was plotted.
 - 21 46. Routine sets were invariably printed on Williamson Multiprinter machines, each capable of producing up to 1,000 finished prints, size $7" \times 8\frac{1}{2}"$, an hour. The printing exposure was adjusted by means of a grader unit, which measured the negative density through a photo-electric cell, and caused the necessary amount of light for correct exposure to reach the negative during exposure, thus ensuring good print quality and maximum speed of production.
 - 22 47. These processing and printing machines in their present perfected state are the result of years of experience and experimental work, and their use enables the vast numbers of negatives and prints dealt with to be produced efficiently, in the shortest possible time, and with the minimum of personnel. On a busy day as many as 25,000 negatives and 60,000 prints were produced at the airfield Photographic Section at Benson. The average time for high priority sorties - from the time the aircraft landed to the issue of the films and prints to Allied Central Interpretation Unit - was from 3 to 4 hours. The Form White, or 1st Phase Report, which was made from selected prints, and did not therefore have to await the production of the full sets, would normally be issued approximately two hours after the aircraft landed. The time elapsing between aircraft landing and the issue of First Phase report was as follows: -

<u>Lower Limit</u>	→	<u>Upper Limit</u>
BENSON (RAF)	$1\frac{3}{4}$ hrs.	8 hrs.
MOUNT FARM (USAAF)	6 hrs.	8 hrs.
LEUCHARS (RAF)	3 hrs.	9 hrs.
ST. EVAL (RAF)	$2\frac{1}{2}$ hrs.	9 hrs.
GIBRALTAR (RAF)	2 hrs.	12 hrs.

At BENSON the average time between the receipt of photographs by interpreters and the issue of the Form White was from half to one hour; at LEUCHARS $2\frac{1}{2}$ hours. The upper limits are largely accounted for by rushes of work in the photographic processing departments. Information of an urgent nature was telephoned to recipients in considerably less

time than those given above, often within 1½ hours of the aircraft landing.

Production at Allied Central Interpretation Unit

23rd October, 1943

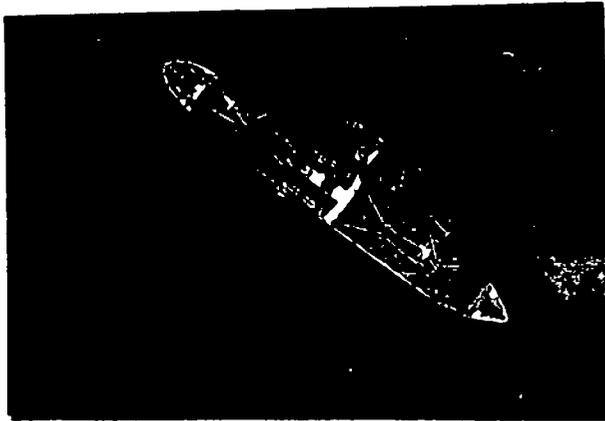
- 13 48. On arrival of the films and initial sets of prints at Allied Central Interpretation Unit, the negative was filed and indexed, and one set of prints used to make a plot of the total area covered. The other set of prints went to the 2nd Phase Section for a more detailed interpretation, and then, if necessary, to the 3rd Phase, or specialist Sections composed of British and American personnel as shown in Appendices V and VI. Until ~~1943~~, 2nd Phase reports left A.C.I.U. by 0730 hrs of the day following flying. After that date (when 2nd Phase ceased to work on a 12/24 hour watch system, in order to specialise on areas), reports left by 0730 hours on the 2nd day following flying. The time elapsing between the issue of 2nd and 3rd Phase reports varied greatly with the subject matter. Urgent 3rd Phase reports, for example, reports on the activity of oil plants would be issued as quickly as or more quickly than 2nd Phase reports, but those of a less urgent and more general nature might be issued many months after the receipt of some of the sorties used.
- 14 49. The Allied Central Interpretation Unit, with Sections at Medmenham, Nuneham, and Pinetree (High Wycombe), was responsible for bulk distribution of prints required from current and past sorties. All demands passed through a Progress Section where priorities were allotted to one of the above Sections. The monthly print potential of A.C.I.U. was approximately five million prints.
- 15 50. In addition to the normal production of contact prints, Allied Central Interpretation Unit was responsible for a large variety of other photographic work required for specialised commitments. These included: -
- (a) Mosaics, enlargements, and rectified enlargements;
 - (b) Reproduction of target maps and illustrations;
 - (c) Duplication of negatives and production of diapositives;
 - (d) Photostat, lithograph, and rotaprint reproduction.

All orders had to be promptly executed and large orders "farmed out" to ensure the shortest production times. Both the forward photographic sections and Allied Central Interpretation Unit sections worked on a 24-hour basis (R.A.F. ~~at~~ Medmenham and Nuneham, and the U.S.A.A.F. ~~at~~ Pinetree).

administering

Stage IV - Production of Intelligence

- 26 51. ^{General} The main purpose of intelligence is to supply the (Higher Command) with accurate information of the enemy forces, military, industrial and morale, his intended use of these forces, the actual stage of execution of his intentions, and his attempt to thwart or mislead us on these matters.
- 27 52. Many sources of intelligence contribute information to the responsible collating department. At many and various stages of collation, Photographic Reconnaissance and Photographic Interpretation are called upon. "Other Sources" of intelligence are of great value in directing reconnaissance and interpretation to areas or places or industries, while the fruits of such directed Photographic Reconnaissance and Photographic Interpretation give a concrete foundation for the further "build up" of either pure intelligence (for long term planning) or of operational intelligence (for strategic and tactical military, economic, and political propaganda action). Much of this "directed" interpretation may be obtained in any one single sortie.
- 28 53. Beyond this complementary role, however, P.I. produces a great volume of intelligence on its own initiative, from photographs originally taken for entirely unrelated purposes, at irregular intervals extending over a period of months or years. This "research" photographic interpretation, as opposed to "directed" interpretation, can never be achieved by quick and easy inspection of a single photograph or sortie. The essential principle of all photographic interpretation is system, and comparison between photographs, taken at different times and dates.



Para ³³~~58~~

Plate 1. The 6103 g.r.t. German cargo liner ELSA ESSBERGER photographed on 7th February, 1942, while taking refuge in EL FERROL. She had been attacked on her homeward passage from the Far East.



Para ³³~~58~~

Plate 2. ~~THE~~ The ELSA ESSBERGER was later taken into Bordeaux, repaired, and made ready for her next voyage. She is seen here on 7th November, 1942, photographed during an attack by Mosquito aircraft as she was leaving the Gironde. After the attack she had to return for further repairs.



33
Para 58

Plate 3. The ELSA ESSBERGER berthed at the Customs House Quays, BORDEAUX, on 6th January, 1944. She had been in dockyard hands for several months and was presumed ready for sea. By the end of 1943, however, the losses among Far Eastern blockade runners had become so heavy that the traffic had virtually ceased and the ELSA ESSBERGER in fact never again attempted the passage.



33
Para. 58

Plate. 4. In August, 1944, the Allied advances resulted in the wholesale scuttling of enemy ships off the French coast. This photograph shows the ELSA ESSBERGER, together with other large merchant ships, on fire and sinking in the main channel below BORDEAUX.



Many rumours were current regarding the scuttling of the French Fleet before the question was finally settled by air photographs which revealed the destruction of the greater part of the Fleet in Toulon harbour on 28th Nov, 1942.

SECRET
(Scanned here)

Edwards 8/9



aria. 34

Plan of balloons seen flying at Sorpe Dam.
North West is on the ground.

The balloon pointing



SECRET

56

SECRET

SECRET

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Aspects of the work of A.C.I.U. in Stage IV

29 54. Some examples of the type of intelligence obtained from interpretation are given in the following accounts of the work of various sections at A.C.I.U. :-

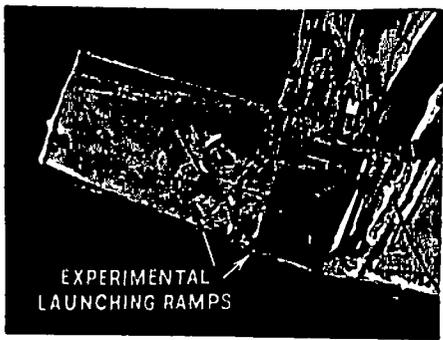
Second Phase

- 30 55. The function of Second Phase was to report on enemy activity in considerable detail before the information had ceased to be value. In practice this meant that the reports reached recipients on the morning of the first or second day following the taking of the photographs. Shipping and general activity was reported in a separate report for each area, while a Daily Airfield Report and a Daily Railway Report collected the results of each day's interpretation on these subjects.
- 31 56. The Second Phase interpretation of a big port was one of the most difficult and highly skilled jobs a photographic interpreter was called on to perform. A shipping detail had first to be prepared, listing, basin by basin and quay by quay, every vessel in the port, each arrival and departure since the previous sortie, and each movement of a vessel within the port. Only when this was complete could the general position be assessed and the significance of particular movements be gauged.
- 32 57. The recognition of enemy shipping was developed to a high degree of certainty during the war. This was the result of the compilation of what is virtually a "photographic" "Lloyds" Register of individual vessels in enemy hands, slowly built up by routine photography of enemy ports. From this Register it was possible to appraise the movements of individual ships, to deduce types of cargo, to estimate the frequency, routing, disposition, escort, and armament of convoys, and to forecast shipping movement, blockade-running, etc.
- 33 58. The value of this photographic Register was particularly apparent in the detection of blockade-runners. It was during the winter of 1941/2 that the Germans became boastful about the success of blockade-running to the Far East; and, indeed, the number of arrivals and departures of large freighters in Bordeaux and other Biscay Ports seemed to give point to their claims. But with the improvement of cameras and advance in the technique of interpretation it became possible to identify a great number of these vessels by name and to determine identification features that were visible even on photographs of small scale or indifferent quality. Once this was done it became evident that the movements of the ships were largely between the various ports of the French West Coast and from berth to berth within the same port, and that the number of arrivals and departures to and from the Far East was not so formidable as had been feared. An extract from the photographic biography of a freighter that did make the voyage from the Far East appears in Plates ~~Annexes~~ 1 to 4.
- 34 59. Yet another aspect of the many Second Phase activities was the detection of balloon barrages sited round important targets - bridges, dams, industrial plants, etc. The accompanying illustration shows how the balloons were plotted.
- Where

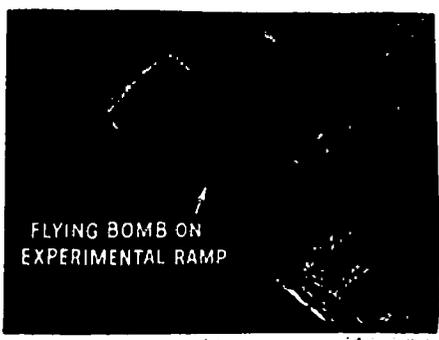
3560. THE BATTLE AGAINST THE FLYING BOMB

3560. In no other major operation of the war was the part played by Photographic Reconnaissance so complete or all-embracing as in the battle against the flying bomb.
361. Ground intelligence very early in 1943 had indicated that secret experimental work was in hand at PEENEMUNDE, work connected with the manufacture and perfection of a secret weapon on which high hopes were placed, though no details as to its form or performance were available. Immediately attention was paid to this part of the world, and regular cover was flown to watch developments. Certain installations became suspect though their use was unexplained (Plate 1) and interest in this area was intensified. In November, 1943, cover was obtained of ZINNOWITZ, another Baltic experimental station and 'ramps' similar to those at Peenemunde were also observed.
362. For some months certain "constructional works" of unidentified purpose had been under construction in the PAS DE CALAIS and elsewhere in N.W. France. Parallels were drawn between these and the installations at Peenemunde. The appearance of the first flying bomb on one of the ramps at Peenemunde immediately solved the puzzle (Plate 2). All those "unidentified military constructions" in N.W. France were explained and their dangerous character revealed as launching sites for the flying bomb. Between October, 1943, and January, 1944, all 96 of these firing sites - the BOIS CARRE type - were detected, photographed, and targetted, as the result of a colossal reconnaissance programme. All were continually bombed and not one was allowed to fire in its original form (Plates 3 and 4).
363. This type of firing site was obviously too difficult to conceal owing to its layout and the multiplicity of standard buildings. The Germans accordingly adopted a modified pattern - the BELHAMELIN. All non-essential buildings were cut out and in an effort at greater concealment the greatest possible use was made of woods and orchards. Ramps often followed the lines of roads, and large farm buildings were frequently used to house a complete unit of the firing site (Plate 5). Between May and September, 1944, a total of 133 Belhamelin type firing sites was discovered from photographs, pin-pointed, and targetted. The whole of the area was flown incessantly so that the state of serviceability of any one site was always known. Bombing to the best advantage in the months that followed ensured that only about one third of the sites were usually able to fire at any one time.
364. An essential part of the battle was the location of manufacture, supply, and storage depots for the flying bombs. As all dumps were situated underground in an effort to escape bombing, ground information generally led to the discovery of such storage sites. Photographic cover was ceaselessly searched to prove or disprove such reports. A typical storage site was that at ST. LEU D'ESSERENT where old mushroom caves were taken over, enlarged, and entrances fortified by steel and concrete doors. Invaluable information was gathered by low-flying pilots who took remarkable obliques showing amount of overhang over tunnels and other technical data necessary for the best bombing results. (Plate 6)
365. Heavy bombing followed targetting (Plate 7) and it is significant that following the bombing of ST. LEU D'ESSERENT the number of flying bomb incidents in Britain fell considerably. When the first stage of the battle against the ground-launched flying bomb ended with the liberation of the PAS DE CALAIS, a total of well over 3,000 sorties had been flown and over 1,200,000 prints interpreted.
366. On March 2nd, 1945, the ground launching of flying bombs against London, was, however, resumed from bases in W. HOLLAND. These bases were skilfully camouflaged; the site at YPENBURG was built under existing camouflage, but it was identified on photographs before firing, on account of the alignment on LONDON.
367. The best camouflaged site was at DELFT/HALMIONING, where the ramp was

aligned parallel to existing pipes (Plate 8). This site became apparent only when the flying bombs damaged two buildings in front of the ramp (Plate 9). These sites fired until they were over-run by the Allied Armies at the end of March, 1945.



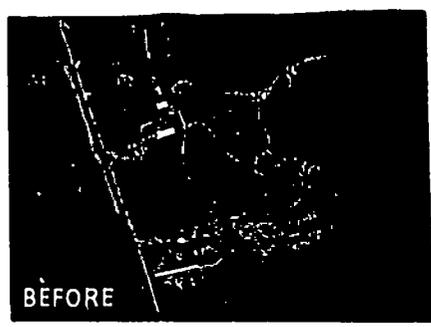
Para 36
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Para 37
~~67~~

Plate 1

Plate 2



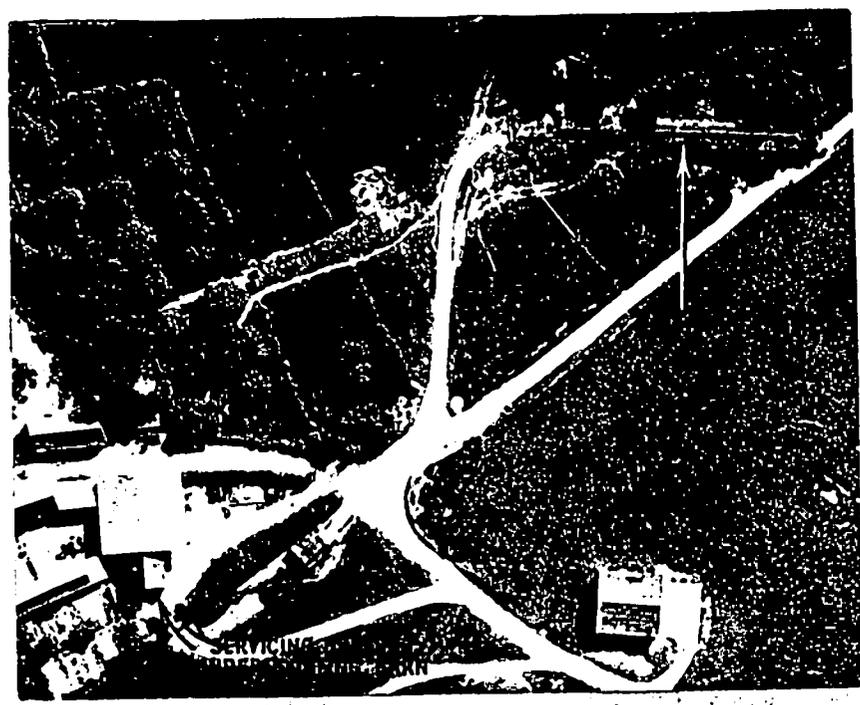
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Para 37
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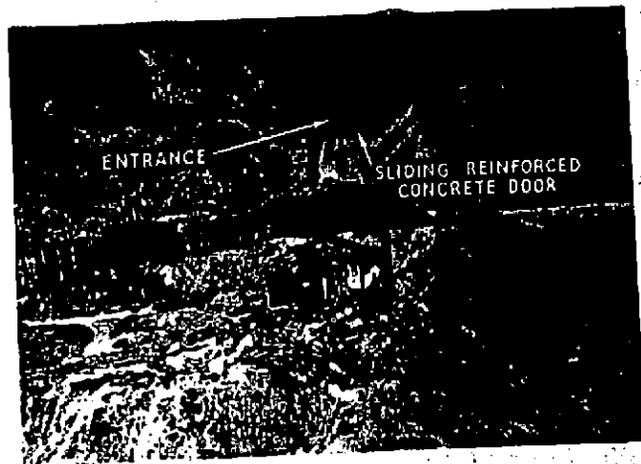
Plate 3. (Bois Carre)

Plate 4.



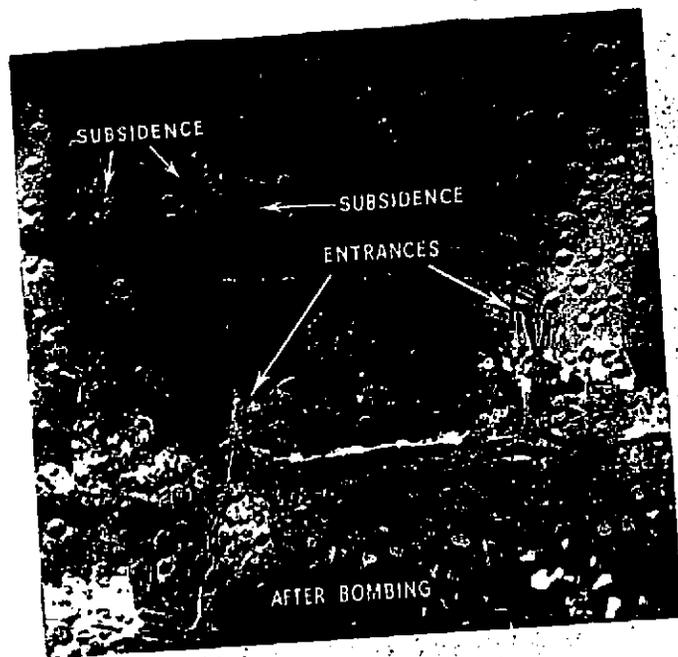
Para 38
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Plate 5.



*Para 39
64*

Plate 6



*Para 39
65*

Plate 7.

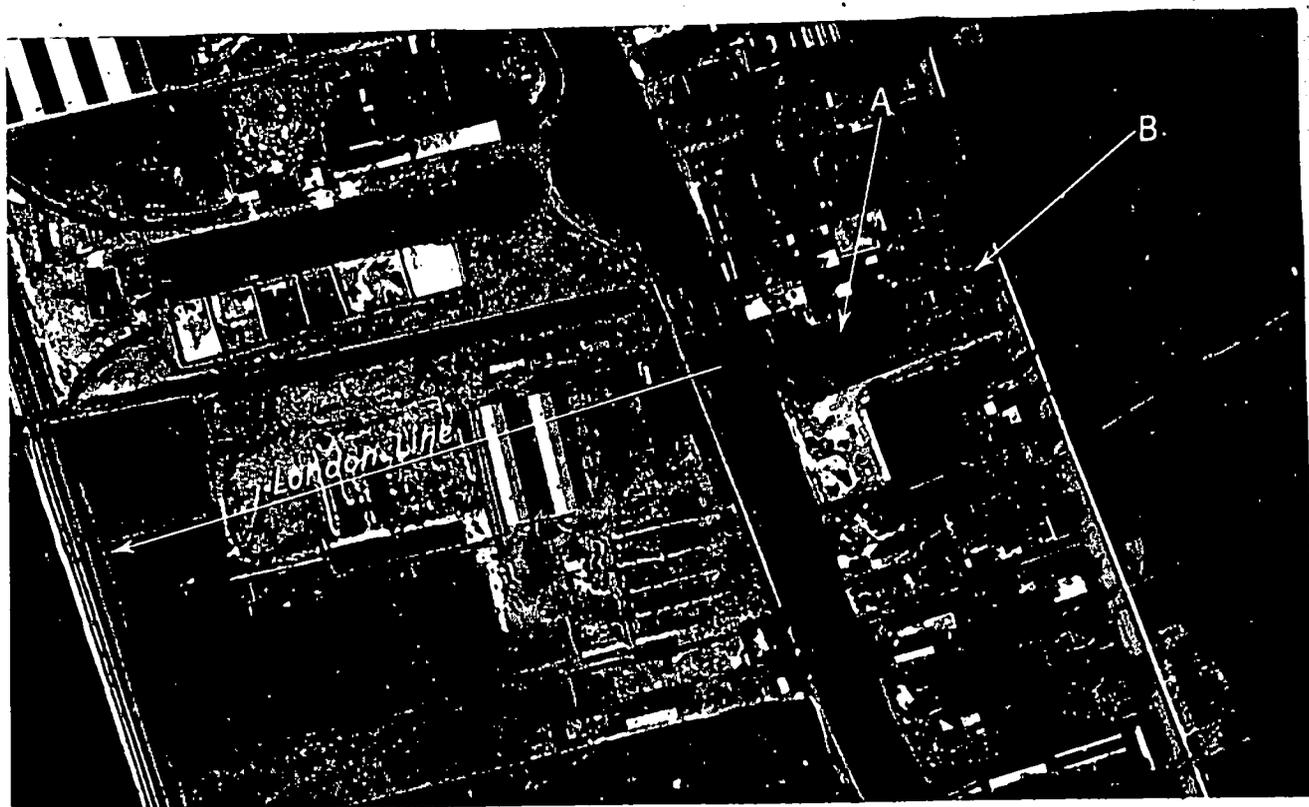


Plate 8.-- Flying bomb site at Delft before firing. A-- Ramp beneath overhead pipe lines. B.-- Square building slightly out of alignment with flanking buildings due to difficulties of access.

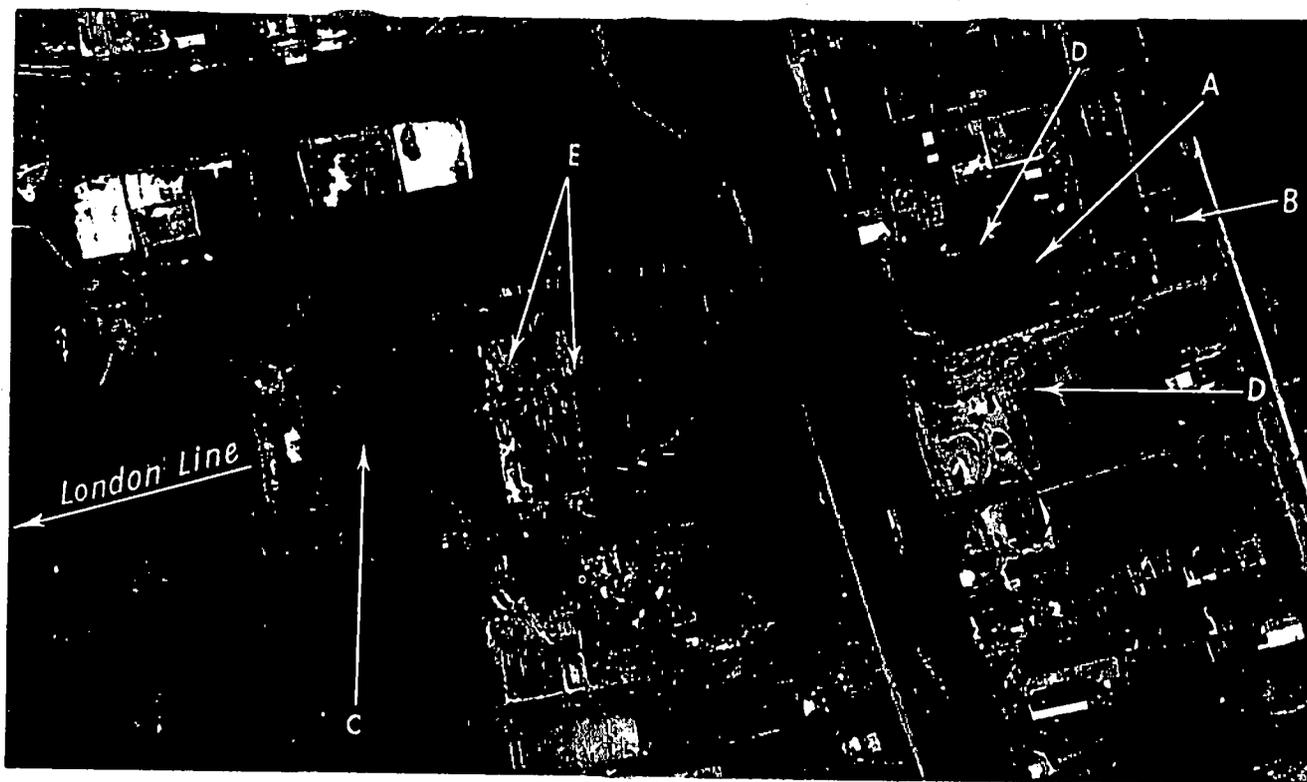


Plate 9.-- Flying bomb site at Delft after firing. A.-- Support for ramp. B.-- site of square building, which has been removed. C.-- Ground scarring due to pistons falling. D.-- Damage due to detonating flying bomb. E.-- Damage probably due to falling pistons and/or cradles.

Smalls PHOTOGRAPHIC INVESTIGATION OF THE A-4 ROCKET

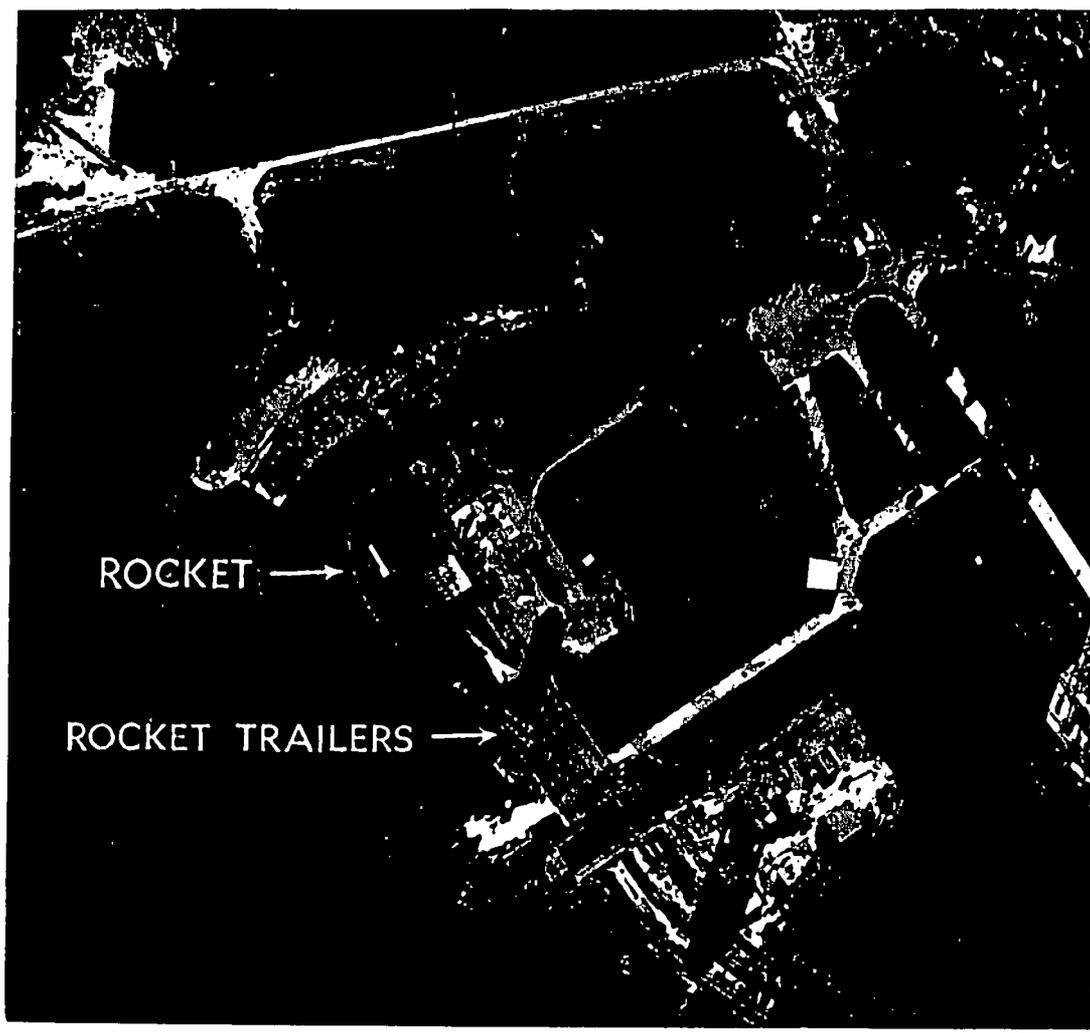
43 68. Ground reports indicated as early as February, 1943, that the Germans were experimenting at PEENEWUNDE with a long-range rocket projectile. The area was photographed at fortnightly intervals and on 23rd April, 1943, a rocket over 40 ft. long, with fins 5 ft. long, was seen in the area known as the "Elliptical Earthwork" (Plate 1). Subsequently rockets and road trailers for transporting them were seen on many occasions.

44 69. Similar rockets were seen at BLIZNA, in POLAND, from 19th June, 1944, (Plate 2), and in August, 1944, rockets were identified in a vertical firing position on the foreshore at PEENEWUNDE, with the attendant vehicles (Plate 3).

45 70. The concrete platforms which the Germans prepared in FRANCE and which were found by the invading Allied armies were too small to be visible on air photographs. Continuous attempts were made to locate the firing positions and forward storage in W. HOLLAND, but it was not until 29th December, 1944, when the leaves began to come off the trees, that the first rockets were seen in an operational area, the HAAGSCHE BOSCH at THE HAGUE. Isolated rockets were seen in transit in other parts of THE HAGUE, in E. HOLLAND, and in W. GERMANY, but on only one day was a rocket actually photographed ready for launching at an operational firing site (Plate 4). The rocket at THE HAGUE/DUINDICHT was by a curious chance photographed three times in 5 minutes by aircraft operating independently (26th February, 1945). The completely mobile nature of the sites made them an impossible target for photographic reconnaissance.

46 71. The central rocket production and assembly factory at NIEDER-SACHS-WERKEN was identified on air photographs in August, 1944, and special railway vehicles were identified on routes between the factory and the firing areas. The identification of the vehicles was finally confirmed by the blowing-up of a train at WILHELMSHAVEN where rockets were revealed under the camouflage.

Area 48



ROCKET →

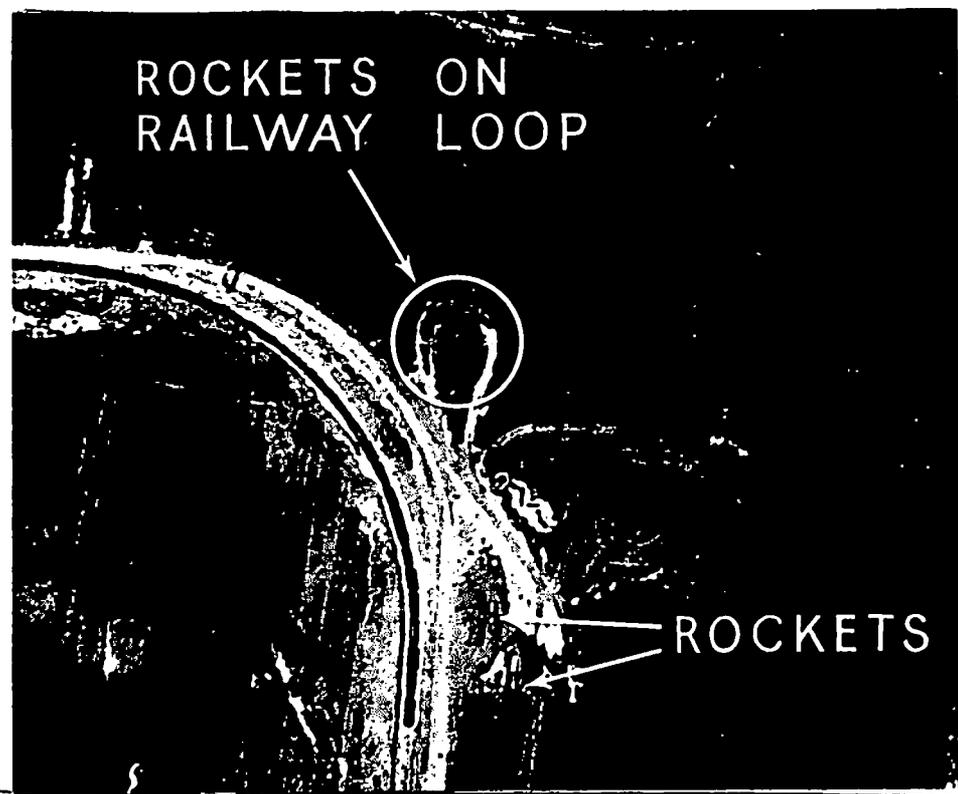
ROCKET TRAILERS →

Plate 1. A rocket at Peenemunde experimental station, April, 1943

Station, April, 1943.

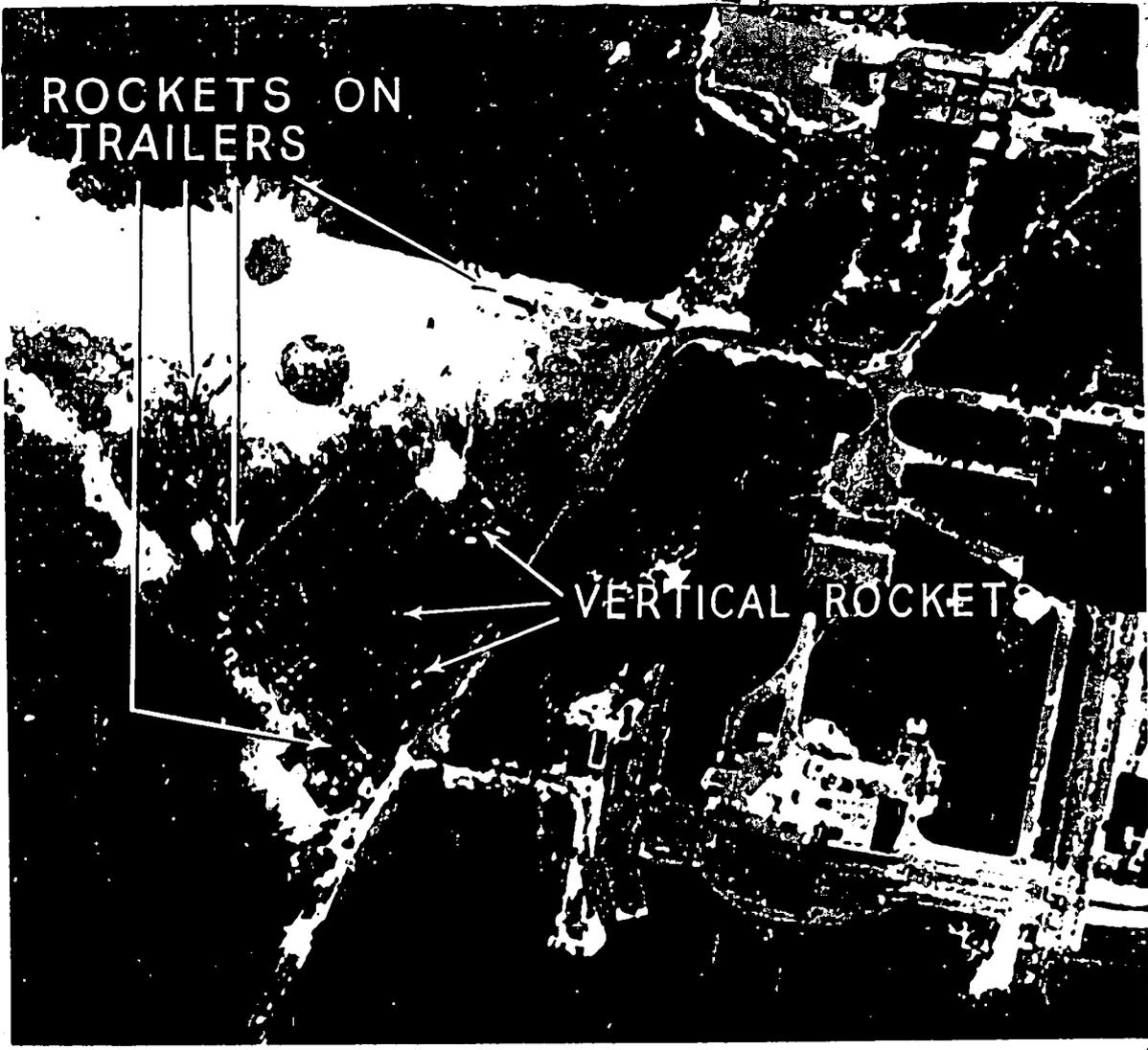
ROCKETS ON RAILWAY LOOP

Area 48



ROCKETS

Plate 2. Rockets at Elizna, Poland, June, 1944.



Para 67

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Plate 3. Rockets in firing position at Peenemunde, August, 1944.

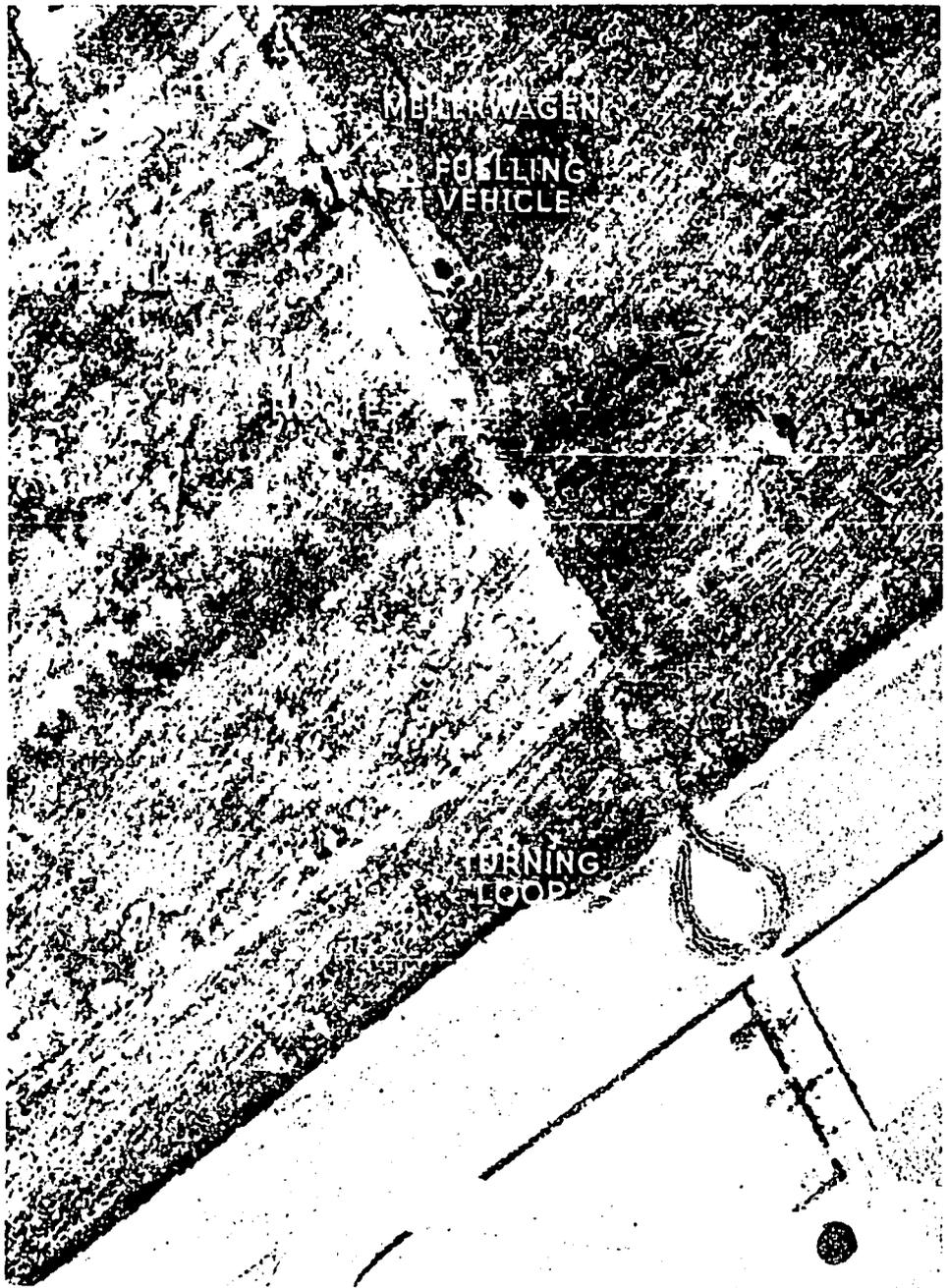


Plate 4. Rocket in vertical firing position at The Hague/Duindicht, February, 1945.

Smalls UNDERGROUND INSTALLATIONS

- 47 ~~74~~ The first underground installations to be targetted by photo-interpretation in the European theatre were the limestone mines of the Oise Valley and the chalk tunnels of the Pas de Calais, used to store flying bombs during the summer of 1944. The best-known of these depots were ST. LEU D'ESSERENT and NUCOURT. Geological maps were consulted in order to determine the kind of rocks which formed their roofs, but estimates of thickness were not attempted. Massive subsidances were achieved with 12,000 lb. bombs through thicknesses of limestone varying between 20 and 30 ft. During this period three French underground factories, reported by ground sources, were confirmed and located by photo-interpretation.
- 48 ~~75~~ Early in September, 1944, air photographs showed that a large underground project was developing at HALBERSTADT (Plate 1) near a Junkers surface factory. Faced with reports that a large-scale underground dispersal of German war industry was in progress, the appropriate Air Intelligence section at the Air Ministry requested that a special effort be made - first, to determine from air photographs whether the project was to house a factory; secondly, to assess its vulnerability to penetration bombing; and thirdly, to assemble briefing material covering topography, obstructions, and flak. With the help of geological maps and memoirs, sections were drawn through the hill in the area believed to contain the tunnels; and a large-scale plan was prepared from photographs showing areas suspected of being protected by less than 60 ft. of sandstone (Plate 2). A model was made from photographs at a scale of 1:5,000; and photographs of the model, simulating low-level oblique views of the entrances, were taken for briefing - thus avoiding the danger to security associated with low-level air photography. Subsequent examination of the target showed that the overburden estimates were correct to within 5 ft., and confirmed the estimate of the extent of the tunnels.
- 49 ~~74~~ Already a dozen new underground factories had been revealed by air photographs, and as a result of the intelligence effort on the HALBERSTADT target a section was formed at A.C.I.U. to specialize in targetting underground industry. Since basic aerial cover of Germany in rural areas was patchy and infrequent, it was decided not to search for underground targets, but to attempt to confirm or deny ground reports selected on a priority basis by ground intelligence departments; and where confirmation was obtained, to prepare target material.
- 50 ~~75~~ The sixty-five interpretation reports issued were of two kinds - preliminary reports concerned to identify a target and estimate its size; and detailed reports with a large-scale contoured plan and geological sections through the project (Plate 3).
- 51 ~~76~~ A routine was developed enabling such detailed reports to be prepared in 10 days. This included revision of map contours in the target area with a parallax bar; in Austria and Czechoslovakia, where contoured maps were seldom available, it was necessary to contour the target entirely from air photographs. One site the vulnerability of which was assessed by this last method has been examined; at EBENSKE, Austria, the estimate was accurate to within 2 ft. on a thickness of 130 ft. and to within 15 ft. on 490 ft. (Plate 4).
- 52 ~~77~~ Although it was seldom possible to distinguish the function of an underground factory (though this was done at two plants), the photo-interpreter was often able to confirm specific allegations. At NORDHAUSEN the final assembly plant for the V2 rocket was distinguished owing to exact correspondence between the photographic

appearance of trains at the delivery tunnel entrances and a description of rocket-carrying trains from a ground source.

5a 78. Since the construction of most German underground factories began in the summer and autumn of 1944, their detection and targetting from air photographs was a subject of which there was much to learn at the end of hostilities. A German official statement for November, 1944, showed that there was 13,400,000 sq. ft. of completed underground industrial floorspace in Central Europe, and that projects providing a further 71,317,000 sq. ft. were under construction.

Smalls AIRFIELDS

54 79. Photographic interpretation of airfields (apart from Factory Airfields) was divided into three parts :

- (1) The location ^{by} means of photographic cover.
- (2) The measurement of landing area and runways, and the reporting of facilities.
- (3) The recording of construction, developments, and changes.

55 80. Airfields were covered either as a result of specially flown cover, usually following ground reports, or casually in the course of flying other objectives. Airfields and the larger landing grounds are usually easily distinguishable on air photographs owing to the great area of ground occupied and the tone difference as compared with the surrounding landscape, while runways are generally conspicuous, except immediately after camouflage. The smaller and tactical landing grounds, where installations are few, may not be so easily found. BOGENSE (Denmark) is an illustration of a landing ground which might easily be missed were it not for the aircraft shelters hidden under trees (Plate 1).

56 81. Airfield information extracted from air photographs in the hands of an experienced interpreter often provided an almost complete picture of the function and operational capacity of an airfield. The dimensions of the landing area and the length of the runways largely determined the type of aircraft that could be used. For example, a landing ground with maximum run of 800 yards would be unsuitable for medium or heavy bombers.

57 82. Much was also learned from watching an airfield under construction, and, given frequent cover, information could be obtained as to methods of construction and material used. In the early stages, when little more than clearance and levelling had taken place, a fair guess could often be made as to the shape and final purpose, while in the later stages it was often possible to estimate the time required to achieve serviceability. (See Plates 2 and 3).

58 83. Airfields developed in accordance with the needs of aircraft and in particular, the tendency towards heavier and faster aircraft necessitated longer runways. An extension to a runway was therefore of importance, as it indicated that the airfield might become a base for heavier or faster aircraft.

59 84. Other airfield changes resulted from tactical considerations. Thus, the growth of remote dispersal areas followed increasing air attacks (See Plate 4). The accurate reporting of the extent of the dispersal areas was necessary in briefing for low-level attacks.

60 85. Airfields and landing grounds were sometimes artificially obstructed to prevent hostile landings. These obstructions were either temporary (eg., by logs, poles, tripods, boulders) or permanent (by ditching or by the detonation of mines). In either case, the presence of obstructions gave valuable indications of the enemy's plans or state of nerves.

61 86. Some airfield changes were of little importance; for instance, the addition of a couple of barrack huts. Other changes might be of vital significance, such as the installation of a large bomb store, or the fitting of new night-landing equipment, which might presage operational changes of function.

Para 55
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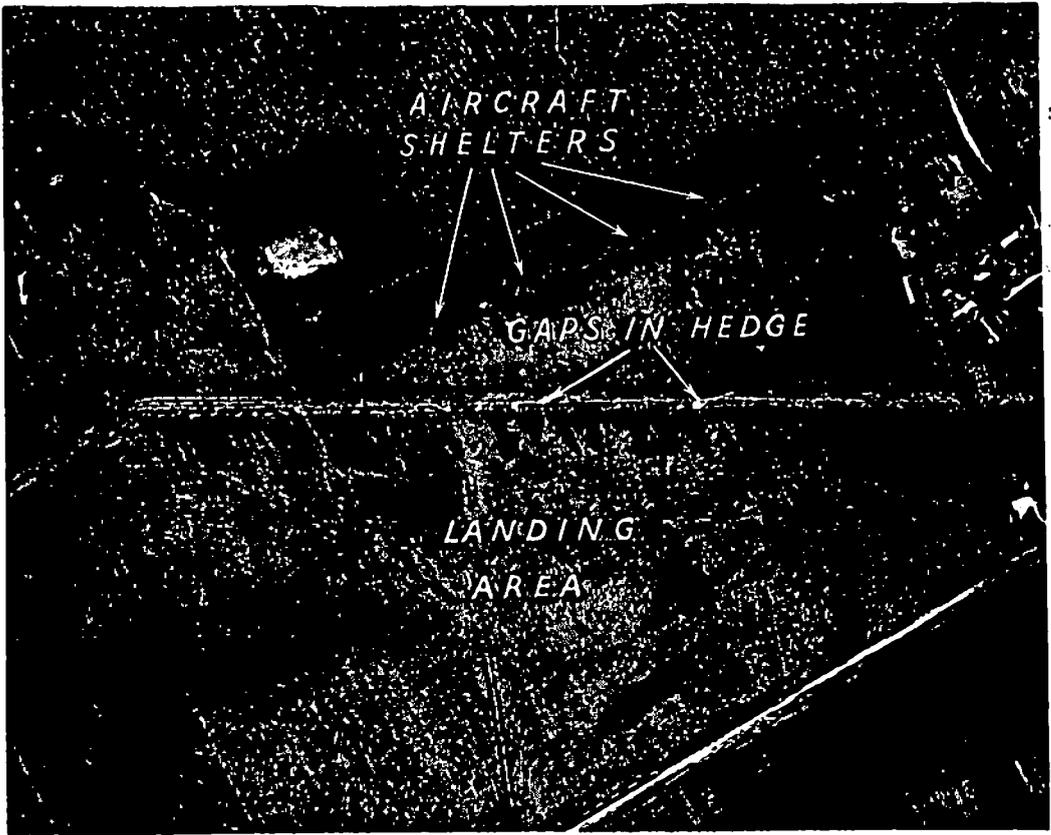


Plate I.

--An illustration of a landing ground, at Bogense, Denmark, which might not easily be detected were it not for the aircraft shelters hidden under trees.

There are already four Plate I's in this Chapter!

Para 2



Para ~~57~~ 57

Two stages in the construction of an airfield at Kerlin/Bastard, France, are shown in these photographs. The top photograph was taken in June, 1941, while the print below shows the airfield in an advanced stage of construction in April, 1943.

Para 3



Para ~~57~~ 57

Handwritten notes at the top of the page, including "H. ..."

Handwritten notes at the top right of the page, including "1822 ..."



Para 87
59

Plate 4. -- Widespread dispersal (arrows) at Montelimar, France.
The airfield is at A.

Smalls

ENEMY AIRCRAFT AND AIRCRAFT INDUSTRY

62-87. A ^{constant} watch was maintained on the enemy's air power throughout the war. Use of ^{large} ~~storage~~ cover and shadows to reveal the third dimension enabled the interpreter to report accurately on the measurements and design characteristics of enemy aircraft. Additional data about known types and their development was also recorded, while new types were detected and closely followed to operational status.

63-88. An outstanding example was the discovery of the Me 262. From the beginning of 1943 reports were received that Messerschmitt was producing a new twin-jet aircraft, and jet marks seen at the Messerschmitt Factory airfield at AUGSBURG tended to confirm this suggestion. It was not till February, 1944, however, that definite proof of the aircraft's existence was obtained.

"A medium twin-engined aircraft of unusual design has been photographed twice at LECHFELD airfield, and an aircraft of the same type was also seen recently near the Messerschmitt experimental hangars at AUGSBURG. There are indications that this aircraft, which will be known for the present as the 'Lechfeld 42', may possibly be jet-propelled."

(Extract from A.C.I.U. Report No. L. 145 27.2.44)

64-89. A clear and authoritative piece of ground intelligence following up this report enabled the "Lechfeld 42" to be identified as the Me 262 and the aircraft was carefully watched as it began to appear in increasing numbers - first at the centres of Messerschmitt development, then at the receiving stations and O.T.U.'s., and finally at the operational airfields (Plates 1 and 2).

65-90. Tactically important information was sent out as soon as possible. Tell-tale jet marks at HOPSTEN, which revealed that this front-line base was being used by Me 262s, were reported immediately. As a result, the airfield was at once attacked and put out of action for several days (Plate 3).

A significant development - the appearance of 27 composite aircraft at PRAGUE airfield - was also reported within 24 hours (Plate 4)

66-91. In the autumn and early winter of 1944 intelligence departments were given strong indications that the assembly of Me 262 was being planned at a site dispersed from REGENSBURG/OBERTRAUBLING. All indications were that dispersed production was to take place in woods South of REGENSBURG/OBERTRAUBLING airfield, and the region of KOFERING was specified in ground reports.

67-92. Special photographic cover was flown, but on examination showed no signs of significant activity. Renewed suggestions that an Me 262 project was indeed operative in the area directed continued photographic search. Unfortunately, unfavourable weather severely restricted photographic reconnaissance at this time, and only fragmentary cover was obtained. One routine cover on 14th February, 1945, showed the construction of a new taxi track at REGENSBURG/OBERTRAUBLING linking the airfield with the bed of a projected Autobahn leading to the East and through the woods at ELTHEIM. One Me 262 could be seen on the corner of the newly constructed taxi-track. Large-scale cover did not extend to the ELTHEIM woods, but very small-scale cover of the area showed suspicious track activity near the Autobahn and fire-breaks in the woods. This photographic intelligence, although an area rather far removed from that suggested by ground reports, at least provided a basis for further investigation. Large-scale photographs of the ELTHEIM woods were not obtained until 21st March, 1945, when the opinions previously held were definitely confirmed. Facilities in the woods, netted and exactly resembling installations already known at EILKHORN and LEIPHEIM, could be seen on these photographs.

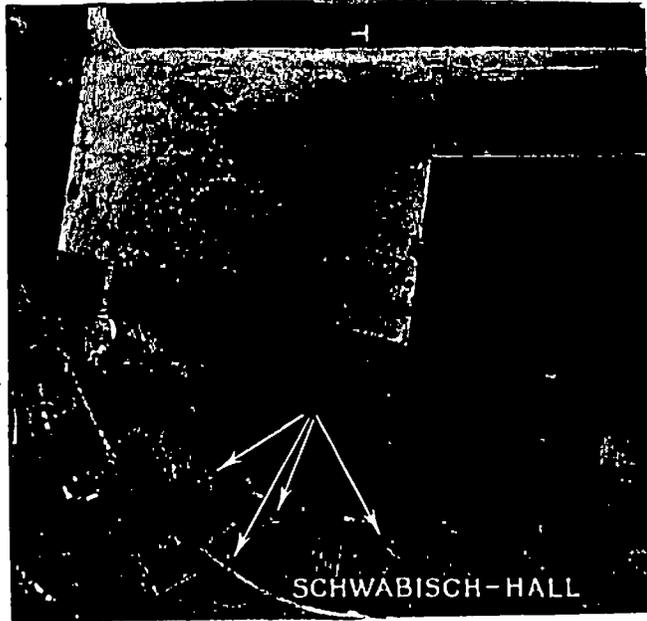
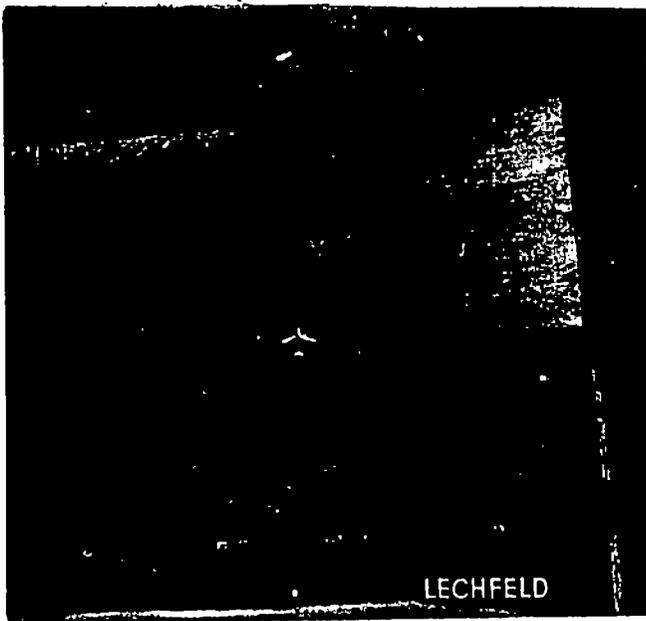
This established the presence of a dispersal near REGENSBURG/OBERTRAUBLING, and justified a directed search (Plates 5, 6, and 7)

ENEMY AIRCRAFT INTERPRETATION

STRATEGIC

(Para 64)

(Para 64)

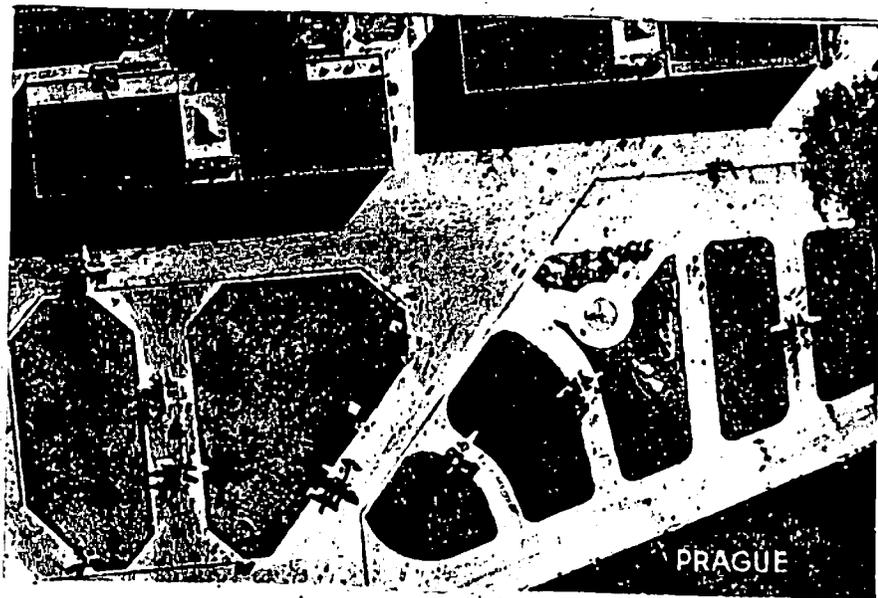
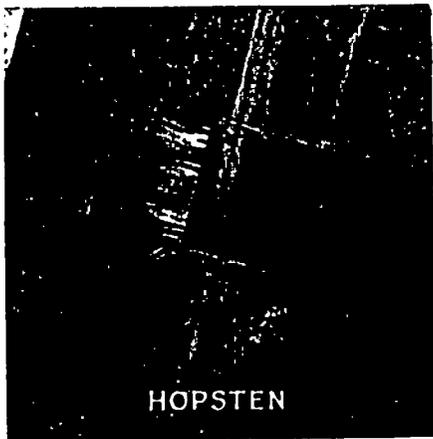


- Para 1. The first Me262 at LECHFELD ^{Para} 2. Increased numbers of Me262s appear at SCHWABISCH-HALL.

TACTICAL

(Para 65)

(Para 70)



- Para 3. Jet marks indicate Me262 activity at an operational base. Para 4. Seven of the twenty-seven composite aircraft seen at PRAGUE/RUZYNE.

*

Railways and Inland Waterways

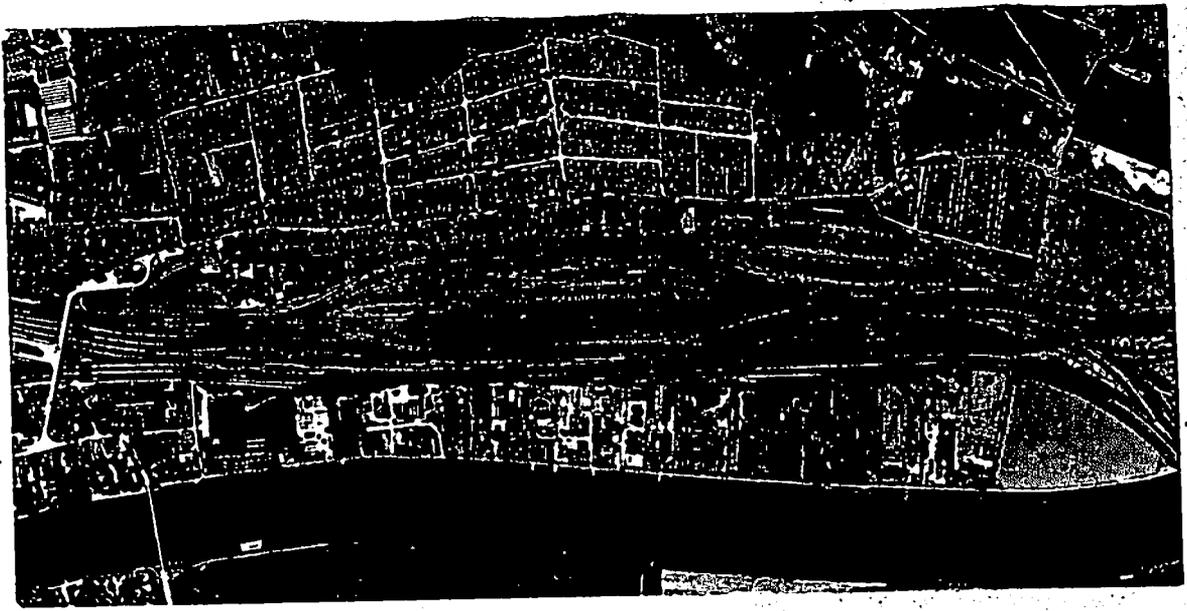
- 68 95. Aerial photographs were extensively used to supplement the limited available ground intelligence concerning enemy transport facilities. As photographic cover was obtained, illustrated descriptive reports were issued, so that the value of different rail centres could be assessed for purposes of bombing attacks and also for operational use in the future. This method was later modified and elaborated to include reports providing details of all rail facilities and engineering works along certain important stretches of line.
- 69 96. With regular cover, fluctuations in traffic movements could be observed and these provided a basis for determining the main lines of movement. A specialised study was made of the various types of military train formation used by the enemy and a close watch kept on methods of supply and reinforcement. Standard train formations included the "I" or Infantry train, and "K" and "S" trains for the conveyance of armoured fighting vehicles (Plate 1). Valuable information was also obtained as to locomotive activity, concentrations of various types of rolling stock, etc. Routine examination of rolling stock disclosed vehicles of specialised types, of which the most significant were the many kinds of flak wagons; petrol and oil tank wagons; camouflaged wagons for the conveyance of flying bomb parts; and the large composite rocket-carrying units and liquid oxygen wagons used in connection with this V.2. weapon.
- 70 95. Following bombing attacks on rail centres photographic cover was needed to assess the amount of damage which had been inflicted and the extent to which through working and servicing facilities were still available. The results of a particularly effective attack of this type are shown in Plates 2A, 2B, and 2C, and in this and other comparable cases the damage inflicted was so severe that little or no effort was made to repair the marshalling yards, only the through running lines being restored.
- 71 96. Interdiction of strategic rail routes was carried out by means of bombing attacks on selected bridges, viaducts, tunnels, embankments etc. An example of this type of attack, which put out of action one of the main rail approaches to the Ruhr from the East, is shown in Plate 3. Regular photographic cover was again necessary in order to assess the progress of repairs to the target.
- 72 97. By means of a daily interpretation report showing maps, by countries, all railway facilities covered by photographs on any particular day, all information of immediate value was provided in summary form. Inland waterways were also studied and an interdiction programme prepared in a manner similar to that for the railways. Plates 4A and 4B show an important canal target before and after such an attack.

* Note: See also Chapter 14 (ii) para. 94-100.



69
Page 74

Plate 1. (A) Loaded and (B) empty "I" trains at CASTELNAUDARY, France.



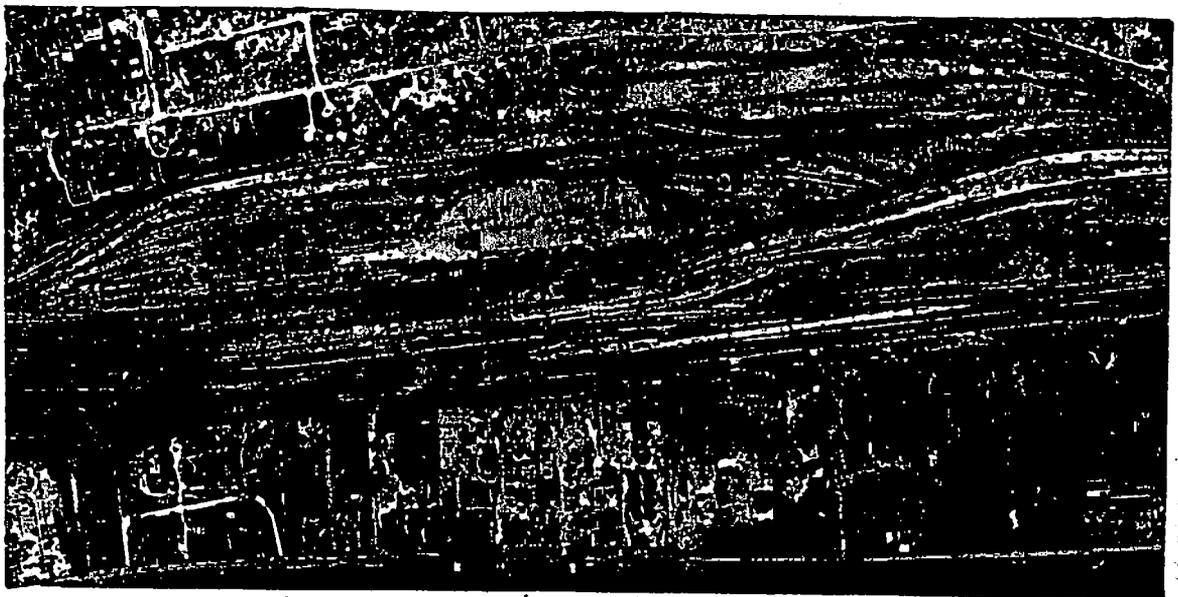
Paris 70
1945

Plate 2 (A) PARIS/JUVISY Marshalling Yard before attack by Bomber Command.



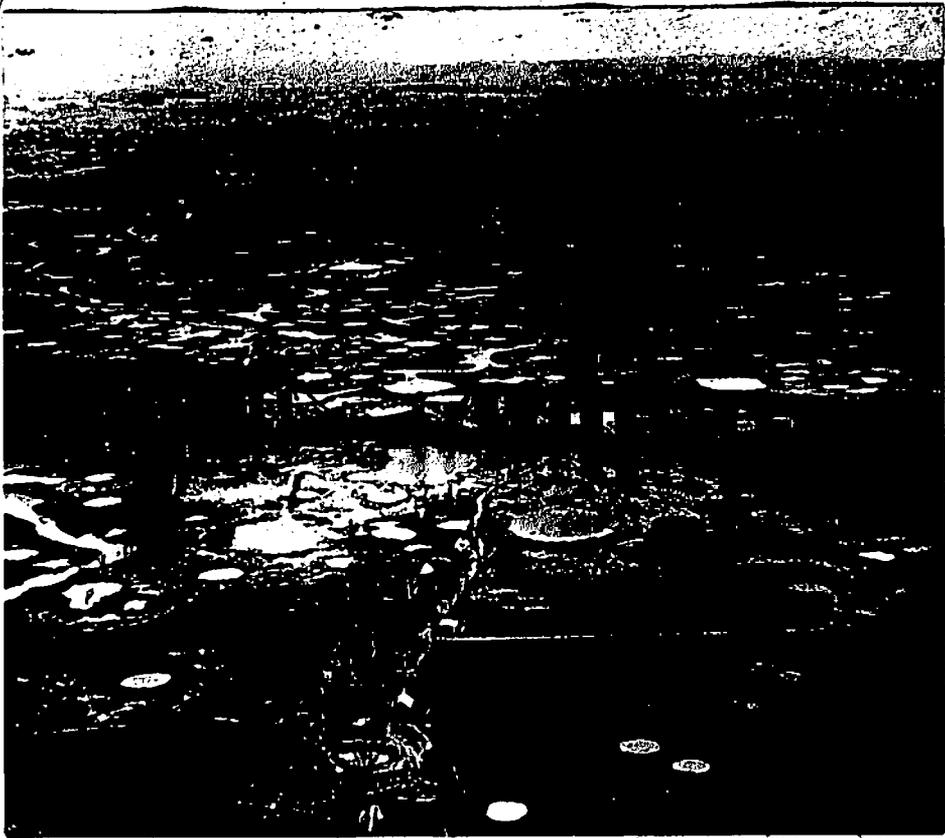
Paris 70
1945

Plate 2 (B) The same yard, after attack by Bomber Command, April, 1944.



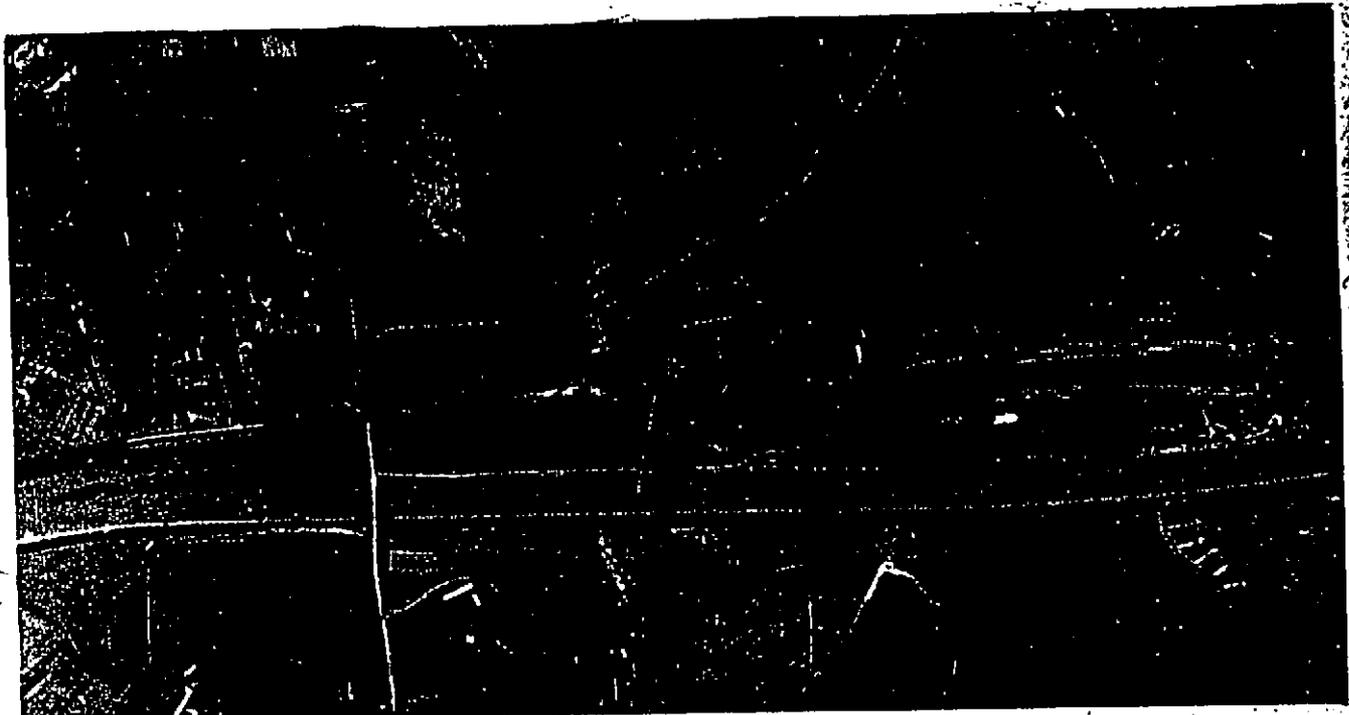
Paris 70
1945

Plate 2 (C) The same yard, showing extent of repairs achieved by end of June, 1945.



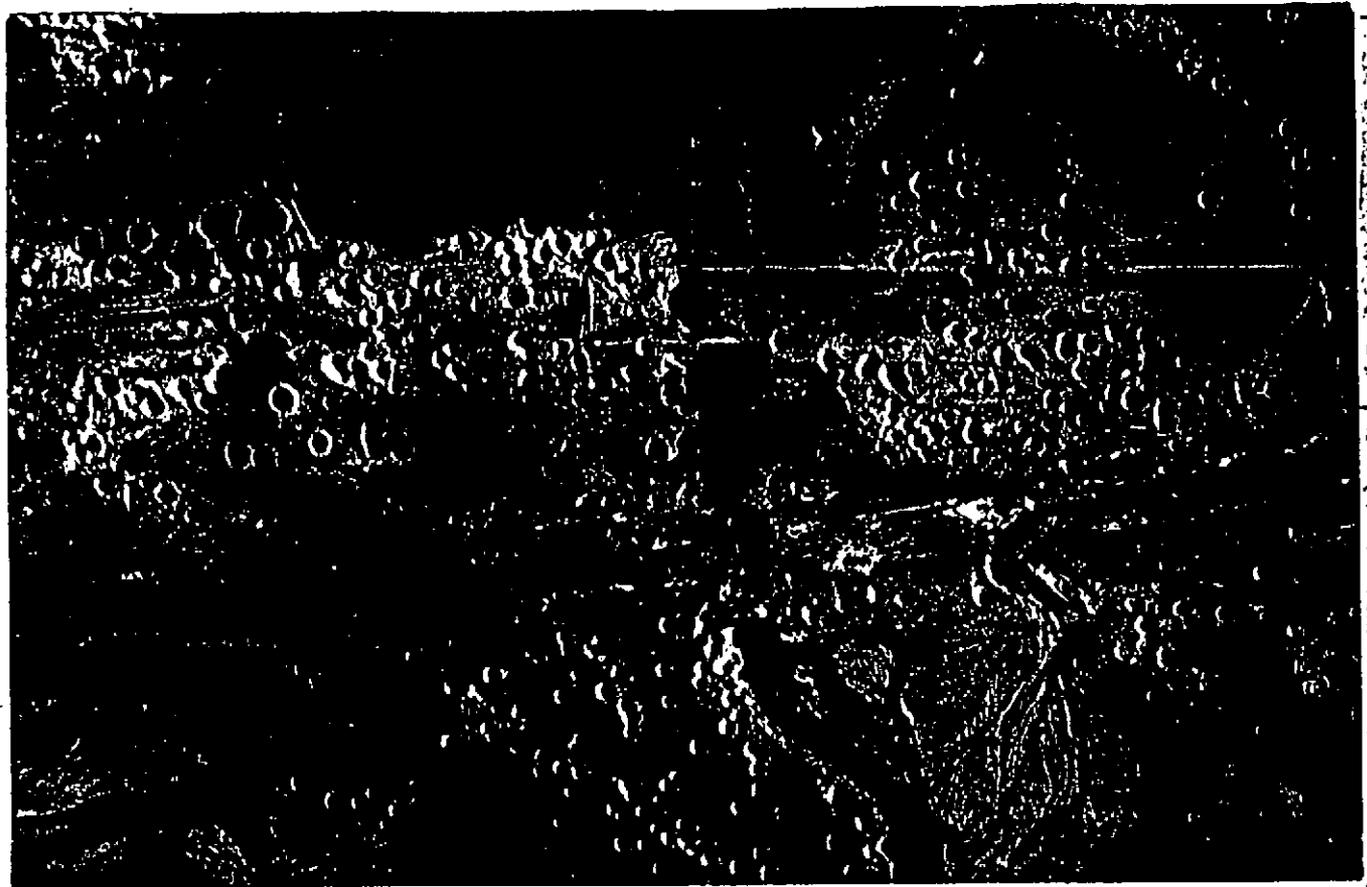
Para 31

Plate 3. Damage to the important 4-track railway viaduct at BIELEFELD, Germany.



104-4-36
97
12

Plate 4 (A) The Dortmund-Ems Canal at LAIBERGEN before attack by Bomber Command



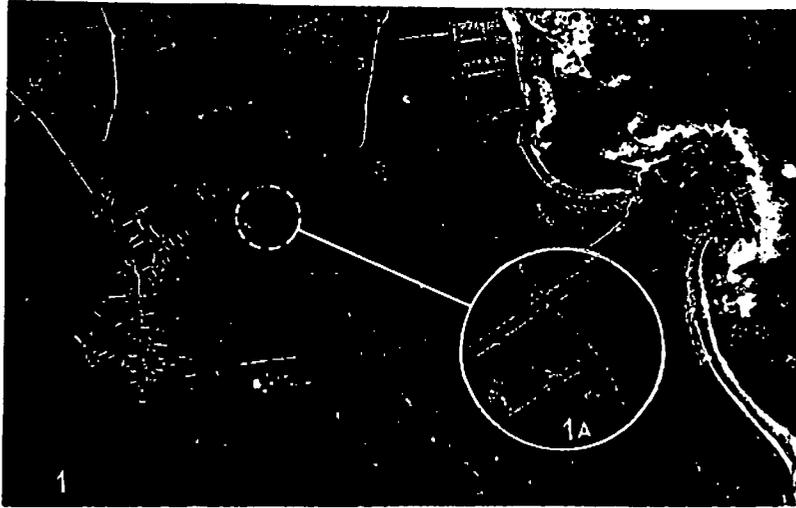
104-4-36
97
12

Plate 4(B) The Dortmund-Ems Canal at Ladbergen after attack by Bomber Command, November, 1944.

SECRET
45

Radar and Radio.

- 73 98. Without Photographic Interpretation it would have been impossible to obtain such a complete picture of the enemy Radar and Radio network as was produced. Indeed, a survey of the apparatus existing at the end of the war with Germany showed that little had been missed.
- 74 99. The first proof that the enemy was using Radar was obtained when an Interpreter noticed a change in the thickness, on two consecutive photographs, of a shadow cast by an object, afterwards confirmed as an aerial array. This discovery was made at a time when the possibility of German progress in this direction was exercising the minds of our Chiefs of Staff.
- 75 100. The photographs on which this interpretation was done were small-scale prints covering the Cap de le Hague peninsula. Plate I is reproduced at the same scale as that at which interpretation was done. It is from a sortie flown on 22nd November, 1940, and revealed two circular objects which aroused suspicion. (See inset 1A, an enlargement from the same negative showing details). It was also noticed that in the nine seconds interval between two exposures the shadow thrown by some form of superstructure had slightly changed in shape, indicating movement, most probably around a vertical axis. It was thought at the time that the site was not unlike a flak position, though the nearness to each other of the objects and the lack of the usual track activity on a flak site ruled out this possibility.
- 76 101. Previous cover was inspected, and a photograph of the same area taken a few weeks earlier on 5th October, 1940, showed no trace of the objects. The unusual appearance of the site, together with the fact that this was considered an area to be concerned with radio research, resulted in a report being sent to A.D.I. Science, the Air Ministry Department which dealt with the technical side of enemy electronics. They at once considered it to be of sufficient importance to request, though with diffidence in view of the obvious hazards involved, that special low-altitude obliques be taken. This was done on 16th February, 1941, when, in spite of a gallant effort on the part of the pilot, chance robbed it of the success it deserved. The aircraft was, in fact, travelling too fast for the camera, so that no overlap of exposures was possible and the objective appeared only partially on the extreme edge of the print. Six days later a magnificent low oblique was obtained (Plate 2) giving adequate proof that the enemy was employing Radar.
- 77 102. Besides data on probable frequencies used, etc., obtainable by measurements of the aerial arrays on the oblique photograph, vertical photographs were used to produce a contour map of the area so that study of the land formation made it possible for experts to deduce the characteristics of the wave forms transmitted.
- 78 103. The majority of Radar sites were photographed by chance when other subjects formed the primary target, but in a certain number of cases special sorties were flown as the only means of obtaining information required by A.D.I. Science (Plate 3)
- 79 104. Apart from searching for and reporting all new sites and equipment, the Radar Section at A.C.I.U. reported changes at sites whenever they were photographed. Many stations grew from modest beginnings, perhaps only one or two pieces of apparatus being present, to extremely complicated and extensive lay-outs comprising many large instruments.
- 80 105. Vertical photographs formed the bulk of those handled by the section, and nearly all of the required detail regarding aerial arrays could be obtained from the shadows on good-class pictures. Oblique photographs, however, if of large enough scale, give detail as no others can, so that occasionally a low oblique photograph would be taken of a specific target, sometimes at great risk to the pilot. One of the finest examples of these is that of the Jagdschloss in Denmark, of which an illustration is given (Plate 4).



Para 100
75

Plate I. -- First photograph, with inset enlargement, of the suspicious site.



Para 100
76

Plate 2. Adequate proof was obtained from this oblique photograph of the site shown in Plate I that Radar was being used by the enemy.

Para ~~78~~
75

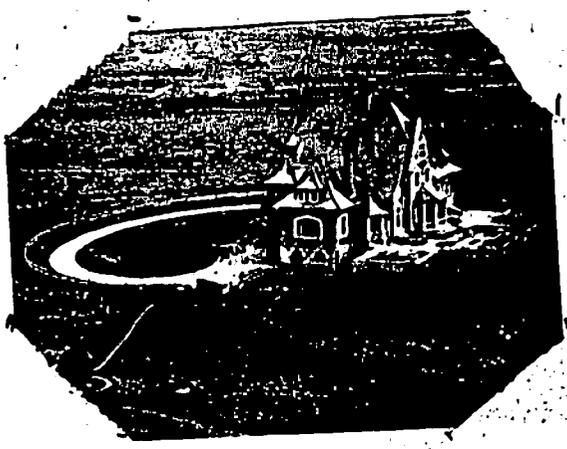
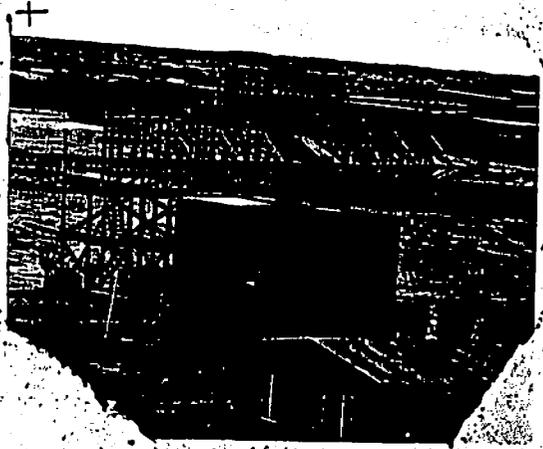


Plate 3. Specially taken low oblique photograph of the Bruneval Witzburg -- objective of the famous Commando raid.

Plate 4. Forward facing oblique (one of a stereo pair) of the Jagdschloss, Denmark, specially taken to ascertain details of a new aerial array.

Para ~~75~~
80



Small INDUSTRIAL PLANTS

81 105. Against an enemy so highly industrialised as Germany it was clearly of the first importance to know exactly how his industrial machine was functioning. Accordingly, one P.I. Section was exclusively devoted to the interpretation of enemy industrial plants of all kinds. In the early days of P.R. every sortie was examined, all works that could be identified were scrutinised, and an extensive card index system was compiled.

82 107. This basis for detailed work having been established, attention was turned to the production of reports on specific plants. These embraced iron and steel, light metals, oil (including synthetic oil plants, refineries, and oil storage), coke ovens, benzol plants, and electric power. All types of engineering works, including M/T and A.F.V. plants, and such industries as textile and cellulose manufacture, were also dealt with. Another group included chemicals, explosives, and synthetic rubber.

83 108. For all these types of industry the principal buildings for the larger plants were identified and detailed plans produced. After the preparation of the detailed reports and plans, which were utilised for target selection and damage assessment, the next stage was the production of short activity reports on specific plants which had been attacked. In the case of concentrated attacks on enemy oil production, activity reports were issued on every photographic cover obtained. After each attack cover was flown and examined for activity. If the plant was still active, an estimate of the percentage of activity was given; if inactive, it was stated when the plant was expected to resume production. Cover was examined as soon as possible after the landing of the aircraft and the information obtained from the photographs signalled and telephoned to the Bombing Commands. In this way the day-to-day state of all the plants was known and a priority for attack could be set up.

84 109. One of the accompanying illustrations (Plate 1) shows the operations board on which was kept a record of the day-to-day changes in the state of synthetic oil plants and refineries (Plate 2.)

In regard to electric power installations,

85 110. The other illustrations show the type of detailed interpretation that was carried out. The information on voltage was obtained from photographs by the measurement of the pylons (Plate 3). In the case of iron and steel works (Plate 4), it was possible not only to identify the major parts of the plant but to assess approximately the output by means of the number of blast furnaces and steel furnaces. By measuring the length of a battery of coke ovens, deducting 50 feet for the buttress walls at either end, and dividing the remainder by 3.5 feet, it was possible to estimate the number of ovens per battery. Thus, it was possible to estimate fairly accurately the output of coke and benzol from each plant.

* Note. Experience has shown that too great reliance should not be placed on evidence of industrial plant damage to production suggested by P.R. Damage to structures may be clearly shown, but P.R. cannot be relied upon to indicate the extent of damage to plant and equipment within a given structure (vital machinery may be protected by blast walls etc.). The function of certain structures may have been misinterpreted, and instances occurred when action was taken on the basis of continuing under cover employment of plant debris (in the case of aircraft factories cf. Chapter 14 (iv), para 17 & 59.)

No	NAME	TYPE	MAXIMUM GASOLINE RATING	DATE LAST ATTACK	DATE LAST COVER	PRESENT GASOLINE RATING	DATE NEXT COVER WANTED	REMARKS
1	LEUNA	B	106	15-9-44	14-9-44	0	20-9-44	OUT
2	BRUX	B	100	12-9-44	23-8-44	0	D/A	ACTIVE - I/A
3	PÖLITZ	B	74	25-8-44	13-9-44	0	20-9-44	OUT - I/A
4	GELSENKIRCHEN	B	70	13-9-44	17-9-44	0	D/A	OUT - I/A
5	SCHOLVEN	B	59	12-9-44	13-9-44	0	20-9-44	OUT - I/A
6	ZEITZ	B	42	16-8-44	11-9-44	0	30-9-44	OUT - I/A
7	BOHLEN	B	42	12-9-44	11-9-44	20	D/A	ACTIVE - I/A
8	MAGDEBURG	B	36	12-9-44	14-9-44	0	20-9-44	OUT - I/A
9	WESSELING	B	36	12-9-44	18-8-44	0	15-9-44	OUT - I/A
10	HARBURG (A+B)	Cd	20	4-8-44	13-9-44	0	20-9-44	OUT
11	RUHLAND	FT(M)	15	12-9-44	14-9-44	0	20-9-44	OUT - STARTING REPAIRS
12	LUTZKENDORF	FT(M)	14.5	13-9-44	16-9-44	0	30-9-44	OUT - REPAIRS IN PROGRESS
13	BOTTROP	B	14	17-9-44	17-9-44	7	20-9-44	50% ACTIVE
14	HOMBERG	FT(L)	10	27-8-44	1-9-44	0	15-9-44	OUT - I/A - RESUME AT 25%
15	MISBURG	Cd/Ck	9	12-9-44	13-9-44	0	30-9-44	OUT - INACTIVE - 100%
16	CASTROP-RAUXEL	FT(L)	6	11-9-44	12-9-44	0	20-9-44	SYNTHESIS INACTIVE
17	KAMEN	FT(L)	6	11-9-44	12-9-44	0	10-10-44	OUT
18	STERKRADE HOLTEN	FT(M)	5	12-8-44	16-9-44	1	A/A	3 ACTIVE AT 25%
19	WANNE FICKEL	FT(M)	5	12-9-44	13-9-44	0	20-9-44	OUT - FOR REPAIRS
20	HEIDE/HEMMINGSTEDT	Cd/Ck	5	13-9-44	17-9-44	0	24-9-44	OUT
21	ROSITZ	Cd	4.5	16-8-44	21-8-44	0	30-9-44	OUT - SEVERELY DAMAGED
22	HAMBURG 'Eurotank'	Cd/Ck	4	20-8-44	13-9-44	0	25-9-44	OUT - SEVERELY DAMAGED
23	DORTMUND (HOESCH)	FT(M)	3	12-9-44	13-9-44	0	20-9-44	OUT - INACTIVE - 1-2 WELLS
24	MERKWILLER	Cd/Ck	3	3-8-44	26-8-44	0		DEVASTATED
25	HAMBURG D	Cd	3	4-8-44	13-9-44	1	A/A	17 ACTIVE
26	LIEVIN	B	2		25-8-44	0		CAPTURED
27	BETHUNE	B	2		25-8-44	0		CAPTURED
28	HARNES	FT(L)	2		6-8-44	0		CAPTURED
29	REISHOLZ	Cd	2		21-7-44	2	A/A	18 ACTIVE - 100%
30	DOLLBERGEN	Cd	1.2	5-8-44	6-8-44	0	6-9-44	OUT
31	BREMEN	Cd	1	4-8-44	13-9-44	0	30-9-44	OUT
32	SALZBERGEN	Cd	0.8	26-8-44	13-9-44	0	20-9-44	OUT - TEMPORARY
33	BLECHHAMMER (S)	B	53	27-8-44	2-9-44	0	20-9-44	OUT - REPAIRS
34	BLECHHAMMER (N)	B	22	11-9-44	2-9-44	0	D/A	OUT - STARTING SOON
35	DESCHOWITZ	FT(M)	5	22-8-44	2-9-44	0	7-9-44	OUT - SIGHT DAMAGED

Paralyt

Plate 1 - Operational Board showing the state of the oil targets as ~~at 18th September, 1944~~ at 18th September, 1944. The information in the Remarks column is a summary of the photographic interpretation reports issued on the activity of the plants. The column immediately preceding the Remarks shows the priority for attack, which changed from day to day.

Plate 4. — Herman Göring Iron & Steel Works:

One of the largest German plants producing iron and steel.

The works has eight blast furnaces.

- | | |
|--|----------------------------|
| 1. Blast furnaces. | 2. Hot air stoves. |
| 3. Coke ovens. | 4. Stocks of ore and coal. |
| 5. Dry gas holders. | 6. Cooling towers. |
| 7. Bessemer ^{SS} steel plant. | 8. Gas main. |
| 9. Open hearth furnaces. | 10. Soaking pits. |
| 11. Cogging mill. | 12. Rolling mills. |

Para 10



Small DAMAGE ASSESSMENT

96 141. ~~and~~ Damage assessment as developed at A.C.I.U. played a vital part in the planning of air operations by providing information on the day-to-day condition of the enemy's war potential. It served two primary purposes-- first, it indicated the moment at which the forces of attack might profitably be diverted from one target to another and, secondly, it showed the precise moment when a target previously attacked and damaged or put out of action should be re-attacked. Assessment of the results of an attack, based on detailed examination of photographs taken before and after the attack, was thus of high importance in formulating bombing policy. In addition, detailed analysis of damage to industries, ports, and shipbuilding yards was indispensable to the conduct of economic warfare.*

87 142. The development of damage assessment from air photographs was, of course, closely associated with the growth and intensification of the bomber offensive. Interpretation tended to become more and more detailed and specialised in its application despite the enormous increase in the amount and variety of the damage inflicted. In the closing stages of the war in Europe the information supplied not only included the detailing of damage resulting from strategic and tactical bombing but also embraced clearance, repairs and reconstruction, bombfall plotting, detailed industrial damage analysis, weapon behaviour, confirmation of ground reports, damage from causes other than bombing, and reports on specified installations of particular interest to Military Intelligence.

88 143. The system of reporting on damage assessment remained substantially unchanged throughout the war. An "Immediate" Interpretation Report was issued within a few hours of photographs being received. This was followed by a "Detailed" Report a few days later, but sometimes one or two "Supplements" were issued in lieu of, or before, the Detailed Report. An increasing use was made of illustrations, at first in the form of photographs, annotated or unannotated, but more often, especially in the later stages of the war, of photo-lithographed illustrations. These were of two types -- Damage Plots of towns and cities at a scale of ~~1/25,000~~ 1/25,000 (Plate 1) and Damage Illustrations of specific targets at a scale of about 1/6,000 (Plate 2) and they accompanied the usual photographic print. The damage illustrations were based on town plans and industrial maps prepared by other sections at A.C.I.U.

* See, however, note to page ~~144~~⁸³, on the limitations of such assessment.



(Para ⁸⁶ +++)

in this case, Darmstadt.

Plate 4. Hardly had the last bomber left the target before the P.R. aircraft was photographing the damage. Often the smoke pall, although evidence of a successful attack, prevented accurate damage assessment, so that only a provisional report was issued until such time as good cover could be obtained (see next page)



86
Para 11

Para 5. Devastation, by fire and H E, in Darmstadt, photographed a week after the attack. (see previous page).

Night Photographs

- 89 ~~125~~ The great majority of night photographs were taken as an adjunct to operational attacks by aircraft of Bomber Command, but night photography was extensively used by the Tactical Air Force after D Day, and to a smaller extent in the shipping strikes of Coastal Command.

- 90 ~~115~~. From the point of view of Bomber Command the original aim was that an aircraft should take a photograph showing its own bombs bursting. This ideal was abandoned in favour of photographing the area where the bombs were about to fall, but taking the photographs just before their impact. Thus a single night photograph provided evidence on the success of the crew in navigation and to a less extent in bomb-aiming. By plotting on a map or mosaic the centres of all the photographs, a rapid (albeit incomplete) assessment of the probable success of the raid was obtained.

- 91 ~~116~~. Interpretation of Bomber Command night photographs, as distinct from plotting, as directed towards the images produced by the numerous sources of light which came within the field of vision of the camera -- bomb flames, incendiaries, searchlights, fires, photo-flashes, flak muzzle flames and shell bursts, tracer, flares, target indicators, even aircraft in flames. These light sources -- momentary, transient, or relatively continuous -- could be distinguished from one another, and the correlation of evidence from many films told what happened during an attack. Much work was devoted to
 - i. The course and development of Bomber operations.
 - ii. The success achieved in target marking.
 - iii. The areas in which incendiaries fell.
 - iv. The reaction of enemy defences -- flak, searchlights, and decoys.

- 92 ~~117~~. Concurrently with this work many aircraft which had not obtained photographs of the ground were "plotted by fires" -- that is to say, patterns of fires, incendiaries, or lights whose situation was known were recognised on their films and indicated where their "bombing photograph" had been taken just as surely as pictures of the ground. -- In addition to giving this information night photographs provided a basis for a great deal of research into weapon efficiency, aircraft manoeuvres, and the use of Kodacolor film.

- 93 ~~118~~. Three illustrations are taken from Bomber Command attacks:-
 - 1. The first successful operational night photograph (31.5.40). Reported position ROULERS, plotted position COURTRAI. The white patches to the left of centre are due to the aircraft's own bombs exploding shortly after the photoflash had taken the picture of the ground. They do not mark the exact spot where the bombs fell, but indicate that they were somewhere near the middle of the photograph.

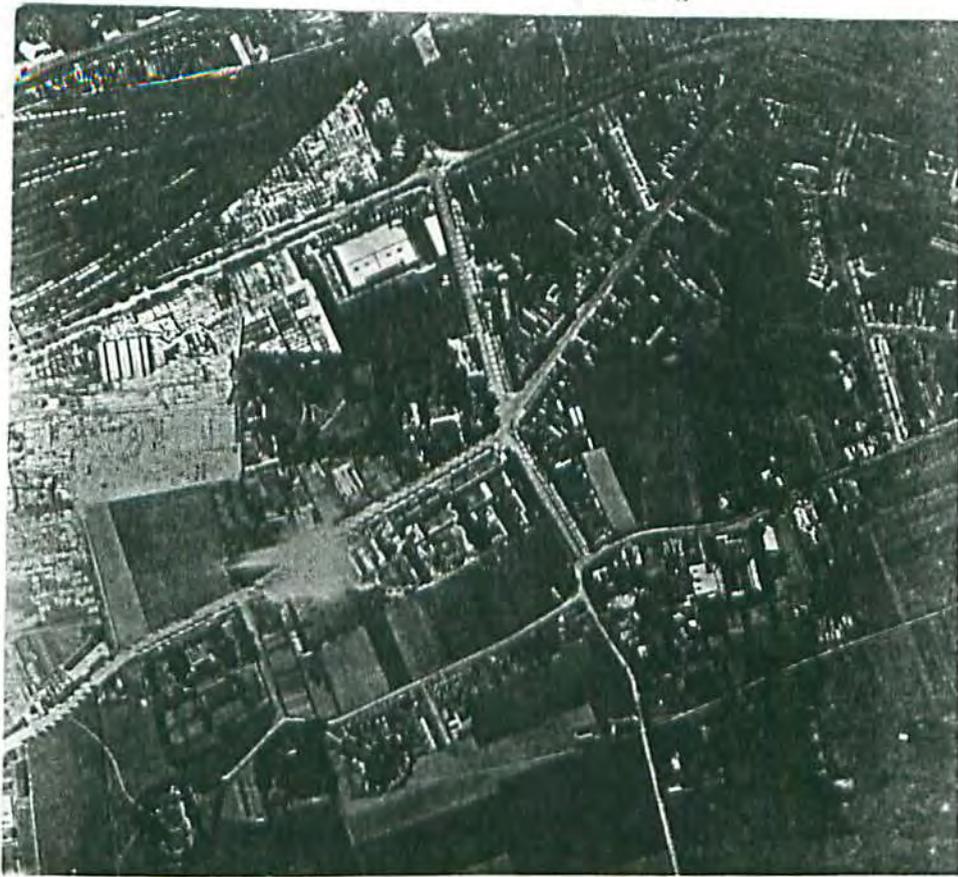
 - 2. MUNICH 24/25.4.45. An early stage in an incendiary attack. The shutter was open for 4 secs. during which the photoflash exploded and took an instantaneous picture of the ground. The incendiaries which were burning all the time, are recorded as tracks, not pin-points. There is a searchlight just above the middle of the picture.

 - 3. ESSEN 26/27.4.45. The climax of a successful raid on Krupp's Works. On an instantaneous exposure clouds of smoke cover the greater part of the works while thousands of incendiaries are seen all around.

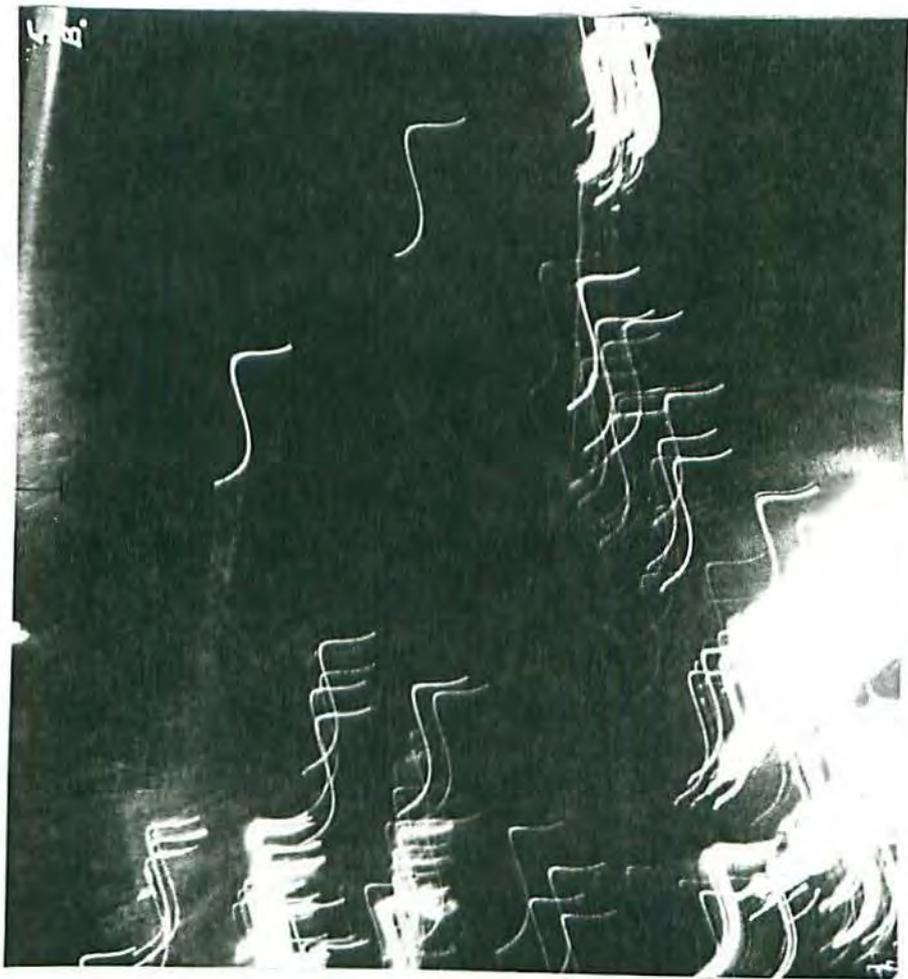
- 94 ~~119~~. Night reconnaissance was much used by the Tactical Air Forces in order to detect enemy activity during the hours of darkness. Photograph 4 was taken during a low level reconnaissance in the PAIATSE area.

SECRET

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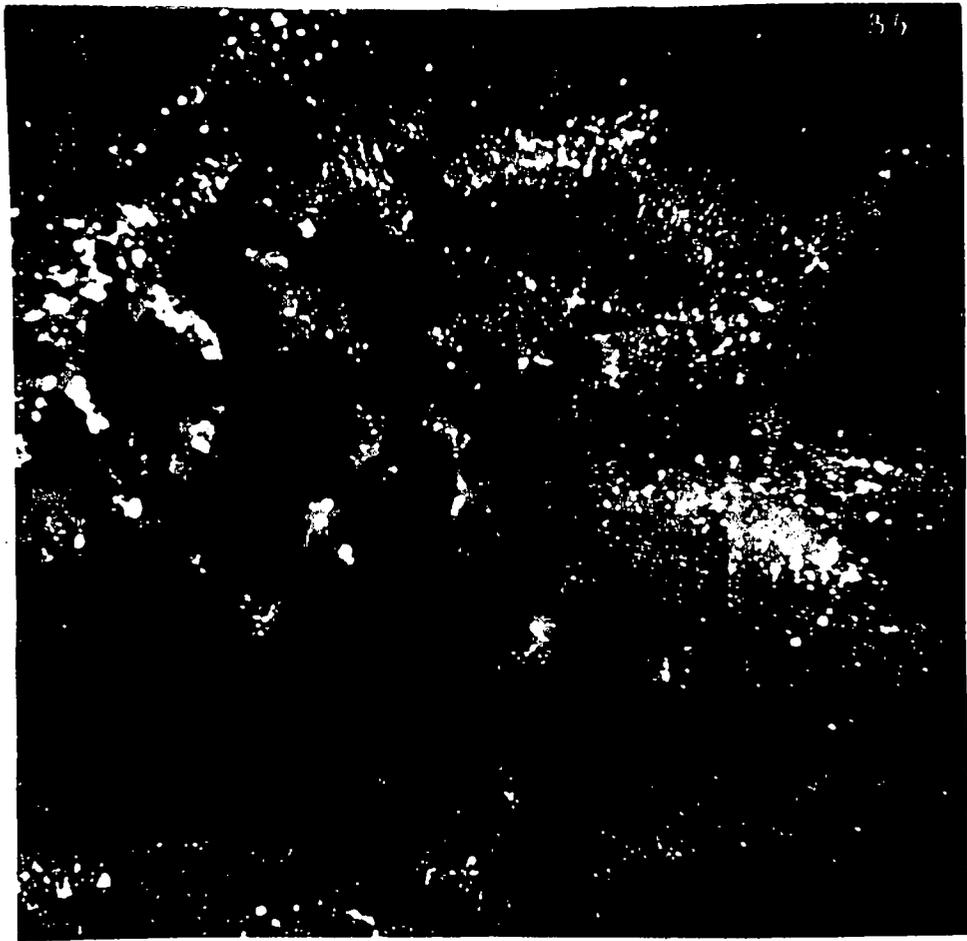


Para 93
48



Para 93
48

Captions



Para 93
H8



Para 94
H8

Smaller MATHEMATICAL INTERPRETATION

95 120. The varied nature of work undertaken by the Photogrammetric Section was divided into three main headings :

1. The provision of photogrammetric intelligence from air photographs, including any measurements needed in all three dimensions.
2. The production of maps, plans, profiles, or diagrams required for intelligence purposes either as bases for operational planning, determination of scale measurements, or as illustrations to accompany and simplify interpretation reports.
3. The provision of basic data for the production of models.

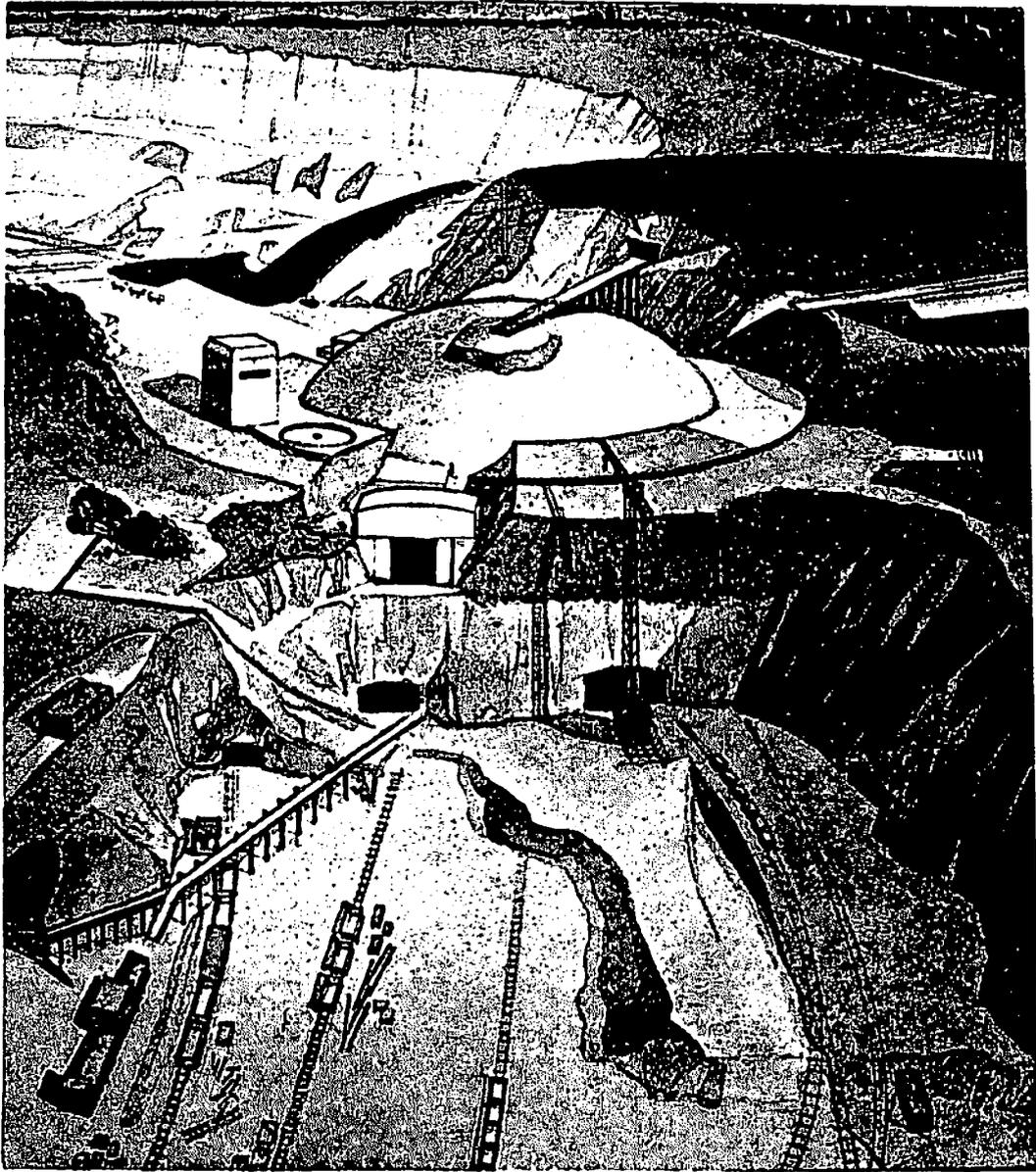
96 121. Photogrammetric intelligence might well be called "mathematical interpretation" since it calls for data of the highest possible accuracy. The following examples illustrate the range of requests that were dealt with :

97 122. The determination of water levels in the Mölme, Eder, and Bissorte Dams; determination of angles at which V.1 launching ramps were constructed; depths of water at entrance to submarine pens; computation of minimum turning circle of Tirpitz while under aerial attack.

98 123. Approximately 500 town plans of Italy and the Mediterranean area, Far East area, France, Belgium, Holland, and Germany were produced for the Directorate of Military Survey, G.S.G.S., who had received their requests from the various operational theatres. In the compilation of these plans, a "style through rectified enlargements" method and the Wild Autograph A.5 plotting instrument were used. Speed of production was essential for operational planning, and results - for example, ~~maps~~ town plans of Berlin and Rome, of which 15,000 copies were produced, in three weeks, and a town plan of Ohrdruf in twelve hours - were achieved with consistent regularity. (Plate 1).

99 124. In the preparation of diagrams and illustrations to accompany interpretation reports a combination of mathematical interpretation, detailed photo. study, and topographical experience enabled accurate representations to be made.

100 125. Basic data for model production entailed the selection of the best available photographic cover, provision of contours from which land forms were built, and the computation of all height data for the construction of model surface detail. (Plate 3).



Paras 100

Plate 4 - Perspective sketch of secret weapon installation, ~~cutted from~~ based on vertical air photographs used for briefing low-level oblique flying.

505
40000000

Smalls

MODEL MAKING

101 426. As early as August, 1940, models were constructed and used as a form of intelligence. At first they were used for the production of simulated aerial or ground photographs. Very soon the actual models were being used as three-dimensional intelligence, and the photographs were issued as a form of wider distribution of selected information. Finally, with the production and availability of facsimile model copies, the demand for photographs became negligible.

102 427. The models were either three-dimensional map, or detailed topographical statements, and the technique employed in their construction ensured that they were a carefully considered and as accurate as possible presentation of all the information available. The best available map, maps, or photogrammetrically produced plans were used, and to the control so provided the information contained in vertical and oblique aerial photographs was added. When available, data contained in ground photographs, information or reports, text books, C.B. plans, or other sources of reference were assessed and used, either as additional data or for cross checking.

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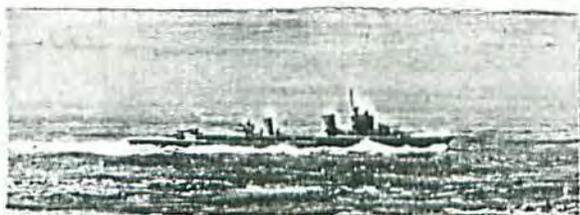
103 428. Models in these categories were used in planning and briefing the North African, Sicilian, Italian, and Normandy landings, by the Royal Navy, Combined Operations H.Q., the Airborne Army, H.Q.C.G., H.Q.B.C., and the Special Services.

104 429. The objective type of interpretation employed and the particular abilities of personnel making models were also used in the production of measured and scaled drawings and models. In this category can be included every item of German Army equipment from A.F.V.s to machine guns, enemy naval units, and aircraft, which were in most cases produced from odd ground photographs. Similarly scaled reconstructions of enemy engineering or scientific installations were produced, including the V1 and V2 installations at Bois Carre, Peenemunde, the special heavy sites in the Pas de Calais area, Radar and hydroelectric installations, and enemy rolling stock, including the special trucks for transporting V2s and liquid oxygen.



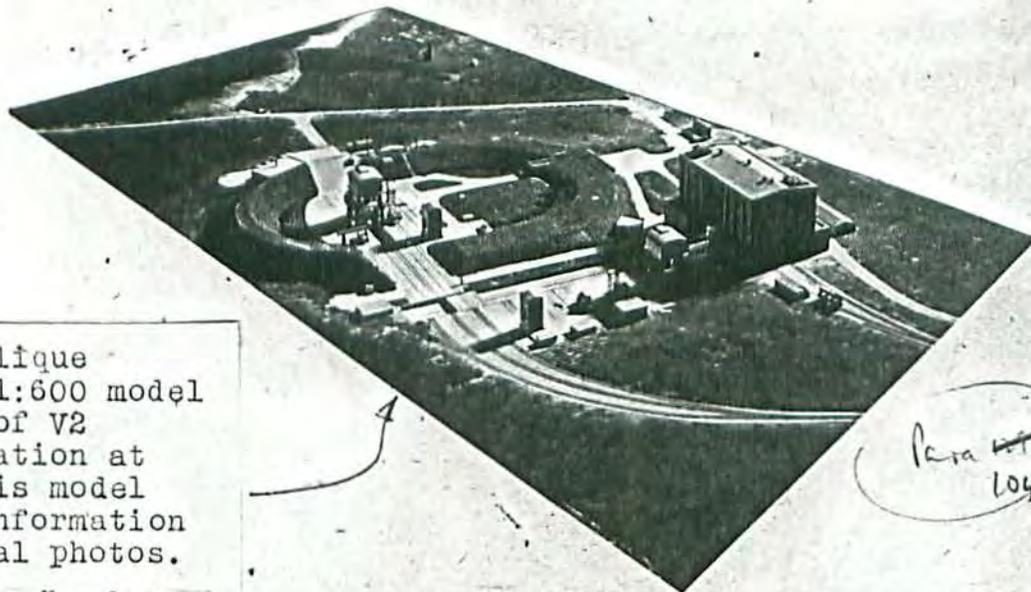
Para 104

Oblique photograph of 1:5,000 topographical model of the Knapsack Power Station used for planning and briefing low-level bombing attacks.



Oblique photograph of 1:1,200 model of Regolo class Italian cruiser made from information taken from aerial photographs. Photographs of this model were distributed a few weeks before the trials of the original.

Para 104



Vertical and Oblique photograph of 1:600 model reconstruction of V2 experimental station at Peenemunde. This model was made from information taken from aerial photos.

(See Plates 1 and 3 of article on the A-4 Rocket)

Para 104

WORK OF NAVAL SECTION

Sketch

- 105 130. The Naval or "A" Section was originally formed for the purpose of obtaining information from air photographs of enemy ports and shipping for the benefit of the Admiralty. In addition to the first and second phase interpretation sections already established, it was felt that a section which could go into the question of enemy ports and shipping in greater technical detail would be of value to the N.I.D. and later on, as the scope of the war developed, to Coastal Command, which was being greatly expanded.
- 106 131. Among the first work put in hand by "A" Section was the production of port plans of German and Western European ports, followed by recognition plans and silhouettes of enemy naval units, with emphasis on the special needs of photographic interpreters. Similar recognition material was then produced on enemy merchant shipping, while a further development was the preparation of silhouettes and plans of new types of German and Italian warships or reconstructed warships in enemy ports or at sea, entirely from air photographs, such plans serving as the only existing recognition material until oblique or ground level photographs became available.
- 107 132. As the German U-Boat building programme was being considerably expanded, adequate information on this matter was demanded by the N.I.D. and, with the improvement in photographic cover of German shipyards, accurate estimates of constructional details and building times of U-boats were obtained. Eventually a separate sub-section was formed which dealt entirely with enemy shipbuilding - both U-boat and surface ship.
- 108 133. Other branches of enemy naval and shipping activity dealt with by the Section were - shipping under repair, the construction of docks and other port facilities, the location and types of equipment used in minesweeping, booms and blocking devices in ports, the location of wrecks, preparations for demolition, the anti-aircraft armaments of merchant ships and naval auxiliaries, and the development of new types of small naval vessels such as midget submarines, explosive motor boats, and other experimental craft.
- 109 134. The construction by the Germans of large and elaborate shelters for U-boats in their home and occupied ports introduced another element into the work of the Section, one of the members going into this subject in detail. A photograph and a drawing prepared from it are given among the illustrations.
- 110 135. A further development was the production of special reports on landing beaches and port facilities before Allied invasion operations, and subsequently, very detailed reports on the facilities of enemy ports that Allied forces might require to use and occupy. "A" Section also co-operated with "K" Section on the question of bomb damage assessment, particularly damage to shipping, docks, U-boats, shelters, and other port equipment, as well as damage to shipyards.

SECRET

EARLY DISCOVERY OF GERMAN RADAR

The first evidence of the use of Radar by the enemy was gained from these photographs covering the Cap de la Hague peninsula. It is interesting to note the scale of the photographs from which this first information was obtained. Plate 1 is a photograph reproduced at the same scale as that at which interpretation was done; it is from a sortie flown on 22.11.40 and revealed two circular objects which raised suspicions (see inset 1A an enlargement from the same negative showing detail). It was also noticed that in the nine seconds interval between two exposure of the objects that the shadow thrown by some form of superstructure had slightly changed in shape, indicating movement, most probably around a vertical axis. It was thought at the time that the site was not unlike a flak position, though the nearness to each other of the objects and the lack of the usual track activity on a flak site ruled out this possibility. Previous cover was inspected and a photograph of the area (Plate 2) taken a few weeks earlier on 5.10.40 showed no trace of the objects. The unusual appearance of the site together with the fact that this was considered an area to be concerned with radio research caused a secret report to be sent to the radio experts of the Air Ministry. They at once considered it to be of sufficient importance to request, though with diffidence in view of the obvious hazards involved, special low altitude oblique to be taken. This was done a few days later on 16.2.41, when, in spite of a gallant effort on the part of the pilot, chance robbed it of the success it deserved. The aircraft was, in fact, travelling too fast for the camera so that no overlap of exposures was possible and the objective only appeared partially on the extreme edge of the print. The pilot reported that flak, from the position, seen to the right in Plate 3, was in action against him without success. Six days later on 22.2.41 a magnificent low oblique was obtained (Plate 4) giving adequate proof that the enemy was using radio detection of our aircraft.

- 111 136. As has already been explained, after the fall of France in 1940 all sources of information ceased and air photographs provided the only means of assessing the enemy's intentions. The Army Interpretation Section's primary function at that time was to watch the enemy's military preparations for the invasion of this country. At the same time, however, the enemy was preparing the defences of the Channel coast to which the sobriquet "Festungs Europa" was later applied (Plates 1, 2, 4, & 5).
- 112 137. From the first these defences were carefully plotted on maps, and recorded in dossiers, and gradually a complete picture of them as seen on photographs was built up. Then, as the range of P.E. aircraft increased, German territory was dealt with in the same way, (Plates 3, 6, & 7), so that at any time a report could be produced immediately on the state of the defences in any given area. This proved its value, particularly during the first half of 1942, when the Army Section provided a large proportion of the intelligence for the Commando raids at Bruneval, Le Touquet, Boulogne, St. Nazaire, and Dieppe. The work done for Planning Staffs for these operations served to give the Section the necessary experience for the major operations which were then envisaged. The landing in North Africa on 8th November, 1942, was the first large-scale landing planned in this country, and a vast quantity of intelligence from photographs was supplied for the operation. Only the early planning for the Sicily and Italy landings was done in the U.K., as by that time other A.P.I. Sections had been formed nearer the scene of operations.
- 113 138. It was the Normandy landing which provided the culminating point of four years' work, and the basic information for that gigantic operation was obtained from the carefully maintained records. Thus as complete a picture as was possible was provided up to the last minute from the long-term study of growing defences to the eleventh hour measures taken by the enemy, such as the beach obstacles which sprang up along the French Coast a few weeks before the invasion of Normandy and also the flooding in coastal regions.

Para 136 III



Plate 1



Plate 2

Para 136

A three-gun super-heavy ~~casemated~~ casemated coastal battery near Calais. The growth of this battery was watched on photographs from its beginning.

Para 136 III

137 III

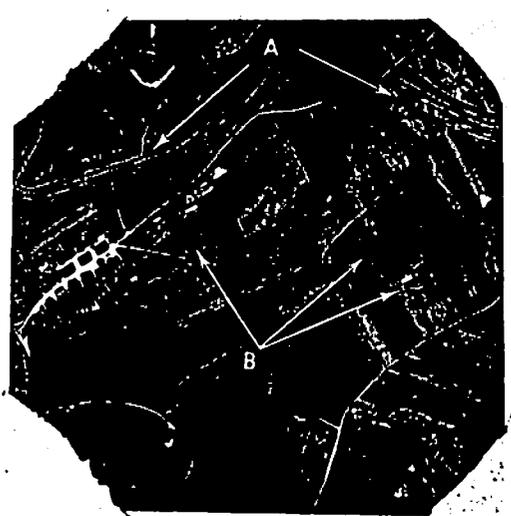


Plate 3

Dragon's teeth (A) and casemates (B) in the Siegfried Line near Saarbrücken

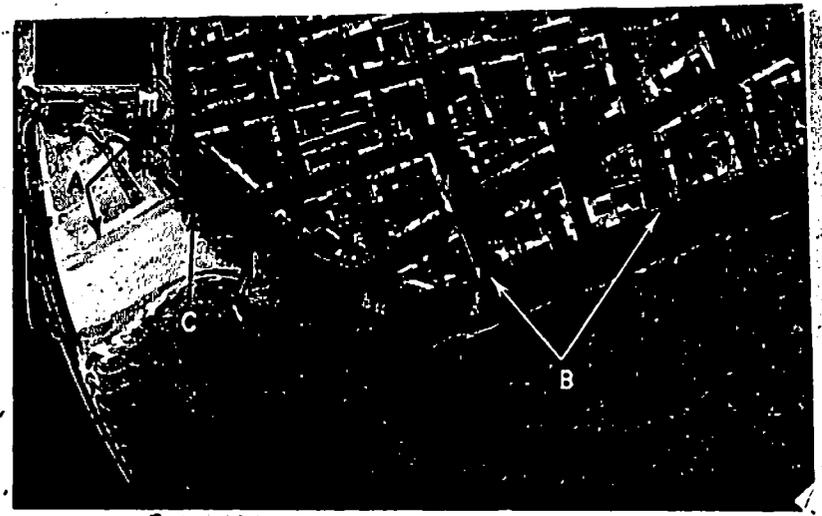


Plate 4

Coastal defences at Ostend. Dragon's teeth (A), road blocks (B), A wall (C) has been built between the dragon's teeth and the promenade.

Post Hostilities

Page 19/17

114 ~~I30~~ Not all the intelligence from air photographs produced at A.C.I.U. was the work of the sections whose activities have been described in some detail in Paras ~~154~~ et seq. In July 1944, a section, H2, was formed to deal with requests for information on various subjects and installations in relevant areas of Germany received from the Control Commission, Military Section. In September, 1944, another section, H1, was formed to deal with requests from the Air Forces Division of C.C.M.S. H2 was concerned mainly with supplying information on Defences, Barracks and Hutted Camps, Storage Installations, and Special Accommodation, while H1 supplied information, in the form of reports and annotated mosaics, of military installations under the control of the German Air Force. Special emphasis was laid on P.O.L. depots, ammunition dumps, and certain airfields. H1 ceased to exist in May, 1945, but the fortifications sub-section of H2 continued to issue reports even after the invasion and occupation of Germany.

Combined Operations

115 ~~I40~~ In March, 1942, a special section known as R1 (Combined Operations) was formed to provide information for Commando operations. It dealt with relevant requests for cover and issued, or obtained from the ~~relative~~ sections, special reports, mosaics, plans, models, etc., needed for such operations. A similar section, R2, was formed in August, 1942, to produce photo. interpretation reports on the coastal areas of North Africa required for the landing operations there in November of that year. Both these sections were on a Most Secret basis. R2 included at various times R.A.F. and W.A.A.F. Officers, R.N.V.R. Army, Canadian Army, and U.S.A.A.C. interpreters. Between the date of its formation and September, 1944, when the section was dissolved, reports were issued on the North African landing area, Mediterranean islands, the mainland of Southern Europe, certain Far Eastern areas, and special targets in Norway, France, and Germany.

Strike Attack

116 ~~I41~~ The Strike Attack section was not officially formed until May, 1944, when it was established at Pinetree and manned by American interpreters, but Strike Attack interpretation had been done since the first photographs were taken during early daylight bombing attacks. At that time S.A. reports were the responsibility of Second Phase, which issued reports describing where bomb-bursts were seen together with, in many instances, annotated prints and a plot mapping the position of bomb-bursts. The photographs were also interpreted in the ordinary way. When daylight raids, especially by the U.S. 8th Air Force, increased in scope and number, S.A. sub-section of Second Phase was formed, and from this sub-section developed the separate section later established at Pinetree.

like

Decoys

117 ~~I42~~ Of the other interpretational sections at A.C.I.U., Q Section, which dealt with decoys, was formed in the summer of 1941, when decoys were recognised for the first time, and continued its activities until May, 1944, by which time no fewer than 550 decoys had been located and described. All current sorties, and eventually all Library sorties, were examined for decoys, and this organised search, though laborious, yielded results useful to H.Q. Bomber Command and D.B.Ops. When N Section (Night Photographs) was formed a close liaison with Q was established which became the more necessary when T.I. (Target Indicators) were introduced. When the enemy began using decoy T.I. the investigation of these from both day and night photographs became the most important work of the Section.

Camouflage and Smoke Screens

118 ~~I43~~ Also closely associated with Q Section was E Section (Camouflage and Smokescreens) which was formed in April, 1941, to co-ordinate camouflage on all types of target, to issue reports on camouflage, and to deal with requests from British camouflage designers. In September of the same year the section was affiliated to Q Section, which had by that time started issuing Smoke Screen reports. In March, 1942, smoke screens became the responsibility of E Section which, with the more extensive use by the enemy of this protective device, produced plots showing the complete lay-out of installations as well as reports and photographs of the screens in action. Data for these plots was obtained from smoke residue marks seen on day photographs and, of course, from day and night photographs of screens in action. Towards the end of the war

/ the Smoke Screen

the Smoke Screen section of E was transferred to Pinetree and became the responsibility of the Americans.

The Importance of Special Sections

119 Most of the foregoing examples have shown the types of elaborate, valuable research intelligence gained from interpretation - not in answer to a specific query (the questions could not be framed until the information was available), but rather gained from meticulous, long-term study and observation. It should, therefore, be noted that although initially this research work provides long-term or strategic information, over a period of time such information progressively becomes tactical; hence, to maintain up-to-date tactical information, research interpretation must always be kept in progress.

120 The second role of interpretation, i.e., "directed" interpretation, provides vast amounts of intelligence either on a routine basis or on an isolated "specified query" basis. In both cases, this type of information is in the nature of a short, quick answer to questions framed by the requesting authority. For examples:- "What types of, and how many, aircraft are present on this airfield?" "What visible damage was caused by a bombing attack, by a new weapon, by a shipping strike, by new tactics, by naval or artillery bombardment, or by a specific piece of sabotage?", or, "Is there an ammunition dump, or specific type of factory, or wireless station, or railway in a certain neighbourhood?" The fund of such directed queries is obviously without limit, but for almost any such query interpretation can provide an answer.

Non-Interpretational Sections

121 Other sections at A.C.I.U., which were not actually producing intelligence from photographs were yet of high importance to the working of the unit because their activities were closely associated with those of interpretational sections and were complementary to them.

122 The Duty Intelligence Office, for example, was manned day and night for the purpose of accepting all requests for information, allocating priorities, and actioning work to appropriate sections. This included actioning and following through all Jobs accepted by J.P.R.C., for flying once the sorties reached A.C.I.U., The D.I.O. compiled a Daily Information Summary, primarily for internal distribution, and, in collaboration with Z (Coverage), issued a Coverage Letter twice or three times a day (according to the weight of the flying programme) which informed Flying Control, Benson, and A.D.I.(Ph), together with the various sections at A.C.I.U., whether or not cover obtained of tasks on the flying programme was satisfactory.

123 Z Coverage, a sub-section of Second Phase, was formed in Feb. 1944, to take over the work done by the shift coverage officer of Z Section. The function of Coverage was to examine all sorties immediately they reached the unit to decide whether the objectives claimed by the pilot of the P.R. aircraft had been covered, and if so whether the interpretational requirements were satisfied. The flying programme was arranged on the basis of this information. The work of the section involved maintaining master target maps showing tasks to be flown, ascertaining from initial inspection the results obtained from sorties, and subsequently completing the information from the plot of the sortie. The information was passed on to J.P.R.C., via the Coverage Letter or, as frequently happened when the flying programme was heavy, by telephone immediately results were known. To assist interpreters, Coverage officers also compiled, while doing the initial inspection, locality sheets for each sortie on which were noted the print numbers covering principal airfields, marshalling yards, ports, towns, and such installations as ammunition dumps, oil depots, etc.

124 Plotting section, which, as explained in Para ²³ 23, received the sorties immediately on their arrival at A.C.I.U., had to make Master Plots on maps of every sortie, thus ensuring that a permanent record was kept of all cover obtained. By working a shift system it was possible to plot during the night the sorties taken by the various P.R. Squadrons during the day. The aim was to get photographed copies of the plots to Benson by 0800 hrs. the next morning. This enabled the Intelligence Officer briefing the crews to see which of the previous day's sorties were successful and in that way to assess which areas still required to be flown. The Section received a copy of the Form Orange and the trace made by the pilot on landing. Both of these

/were ...

Take in plot attached

were extremely useful to the plotters and the accuracy of the trace invariably determined the speed with which the sortie could be plotted. Many tasks required cover of large areas, and the only satisfactory method of recording the progress of such jobs was to maintain a map outlining the area required to which could be added all cover as it was obtained. Photographic copies of the maps showing total cover were forwarded to Benson every morning on the early D.R. To assist plotters in locating contacts great use was made of mosaics, while dossiers from other sections, such as Airfields, Communications, and the Army Section, were also found extremely helpful.

150. Ground Intelligence Section was responsible for the receipt, registering, card-indexing, and distribution throughout the Unit of all reports from ground sources; the maintenance of a library of guide books, technical books, and dictionaries and the filing and indexing of all P.I. reports. A monthly summary of the Unit's activities was issued by G.I. publication in the Air Ministry Weekly Intelligence Summary. L for

154. Target section, sub-divided into T.F. (Targets France) and T.G. (Target/Germany), prepared target illustrations and collected other information in accordance with instructions received from day to day from A.I.3(o)1. This material was issued by A.I.3(o)1. in the form of target folders to all bomber stations. After 'D' Day the Section also produced tactical target folders. These T.T.F.'s consisted of many hundreds of mosaics covering selected areas corresponding to the 1/25,000 series of German map sheets. For each map sheet there was issued an annotated mosaic and a category schedule giving details of the annotations.

152. J Section, which was formed in May, 1940, to deal with press and publicity, included among its activities the production of "Evidence in Camera", a magazine of 20-24 pages of photographs covering various aspects of the war in the air. The first issue appeared in September, 1942, and publication, at first weekly and later fortnightly, continued until March, 1945, when such material as had been used in "Evidence in Camera" was incorporated in the Air Ministry Weekly Intelligence Summary. Special editions of "Evidence in Camera", which appeared in all 103 times, covered various individuals subjects as 'D' Day, the Flying Bomb, and the Artificial Harbour (Mulberry 'P'). The final number was one of 48 pages dealing with the development of P.R. and P.I. during the war. J Section also helped to produce photo exhibitions for display, educational, and training purposes within the Service.

Stage V - Delivery of Information

153. From study of Stages III and IV, it will be realised that the ability to produce the photographs and intelligence quickly, accurately, and in greatly varying volume and form, is of little value unless they can be delivered to the customers with speed. This necessitates an efficient "delivery of information" service.

154. This service must be sufficiently flexible to despatch completed small or or large photographic orders, plus interpretation, simultaneously to several formations or Commands, all of whom are interested to varying degrees for operational or intelligence purposes. This flexibility is achieved by the extensive use of "direct" speech and teleprint land-lines to the main customers and by W/T facilities. The photographs are delivered, dependent on the urgency of the requirement, by routine or special despatch rider services, directly under the control of the P.R. and P.I. Group.

155. With the move of our armed forces to the Continent and the necessary close link and correlation of effort between the P.R. organisation in Britain, on the Continent, and in the Mediterranean, it became necessary to form and operate a special air Courier Service for the main customers in Europe.

156. It is to be noted that this speed and accuracy could be achieved only when the above communication facilities were made directly available to, and operated by, the P.R. and P.I. organisation. Every step where such facilities were obtained through other agencies led to inevitable delays or confusion.

457. As a result of a sudden marked increase in the demands reaching A.C.I.U., from combatant formations and Units, in particular 1st Allied Airborne Army, for cover of the areas in which operations were planned, a Cover Search Section was formed at A.C.I.U., in September, 1944. This section was responsible for the co-ordination of all searches for cover carried out in A.C.I.U., the undertaking of all routine cover searches not involving interpretation; the ordering of prints on areas flown as a Job, when the Job did not call for interpretation. Appendix IV gives an indication of the large quantity of photographs and requests dealt with by Cover Search from the date of its formation to "V.E.Day".

NOTE: It will be observed that this summary of the organisation of photographic reconnaissance applies entirely to the requirements of a Government at War; no mention is made of the potentialities of photographic reconnaissance in peacetime. The potentialities are, however, enormous and have hardly yet been considered. Their application is, however, clear in such fields as mapping, town planning, forestry, agriculture, mining, etc.

TRAINING, PREPARATION, DEVELOPMENT, AND LIAISON.

458. Having dealt with the five stages of the Photographic Reconnaissance and Intelligence organisation, it is necessary to discuss briefly the following subjects:-

- (a) The training of crews, interpreters, and model makers.
- (b) The preparation of aircraft and their despatch overseas - IP & IP (see para. 68)
- (c) The Photographic Reconnaissance Development Unit.
- (d) The nature of the liaison with the United States Strategic P.R. Forces (325 Wing).

Training Units

159. 106 Group was responsible for the provision of "P.R. trained" crews for all R.A.F. P.R. Squadrons both tactical and strategic, whether based in U.K., Europe or Overseas theatres. In order to meet this requirement, a special photographic reconnaissance O.T.U., was provided within the Group. This was known as No.8 (C) O.T.U., and was located at R.A.F. Station, Dyce.
160. The candidates volunteering for P.R. training (experienced pilots with approximately 1,000 hours or more) were carefully interviewed as to suitability and underwent decompression tests. O.T.U. courses lasted 6 to 8 weeks, and concentrated mainly on long-distance navigation under difficult conditions, high-altitude flying, meteorology, photography, and the correct handling of aircraft and engines to obtain maximum air miles per gallon.
161. On a similar basis, 106 Group was responsible for the provision of trained and experienced photographic interpreters and model makers for all theatres for R.A.F. purposes (and frequently for Navy and Allied purposes as well). Interpretation and model-making schools were provided within the Group and were located at Nuneham Park, which was a satellite of R.A.F. Station, Medmenham. Candidates were carefully selected with particular reference to scientific and research qualifications, and underwent extensive training. Interpreters and model makers (who were known as Pattern Makers, Architectural, a Group I Trade) were not considered fully trained until they had completed 9 - 12 months at their trade. The numbers of personnel per subject on 24th March, 1945, are listed at Appendix V. A report has been collected from each section on the qualifications or peacetime occupations most suiting personnel to its own type of photographic interpretation. A statement summarising the information contained in these reports is included as Appendix VI.
162. The equipment used by the individual interpreters consisted of two simple stereoscopes, an ivory ruler marked in millimetres and 1/50 inches, a slide rule, a magnifier with a scale of 1/10 mm. engraved on glass, and a book of photogrammetric tables (A.P.1936). In addition, certain sections employed special equipment varying from simple gadgets evolved to help in some particular task, to elaborate optical machinery such as the Wild Autograph. This special equipment is listed in Appendix VII.

liaison was maintained between all sections of 325 Wing and 106 Group.

LIAISON

The Allied Aspect

175. 133. The British-American liaison at higher levels was ~~also~~ maintained at A.C.I.U. Somewhat naturally, the emphasis of this chapter has been upon the activities of A.C.I.U. from the R.A.F. angle, but the Allied and Inter-Service aspect of A.C.I.U. must not be overlooked. A study of Appendix VI will give an indication of the large part played by U.S.A.A.F. personnel. U.S. Army P.I. officers were in almost every Section, and the S.A. (Strike Attack) and E (Smoke Screens) Sections were staffed entirely by Americans. In addition, T.F. (Targets France) Section had a mixed R.A.F. and U.S.A.A.F. staff with an American Officer in charge. The other sections were in the charge of ~~R.A.F.~~ officers, but there was one sub-section of Z (Second Phase) and, for a time, a sub-section of K (Damage Assessment) that were entirely staffed by Americans. The routine work of K Section, one of the largest at A.C.I.U. was shared by R.A.F. and U.S.A.A.F. officers. On 24th March, 1945, there was a total of, approximately, 122 U.S.A.A.F. Photographic Interpreters at A.C.I.U. That figure did not include photographic or administrative personnel. British

176. 134. There were also always two or three Norwegian Officers and often one or two Poles and Czechs attached to A.C.I.U. The diversity of Services and nationalities proved not the slightest obstacle to co-operation, which was invariably of the highest order.

The Inter-Service Aspect

Naval Liaison with A.C.I.U.

175. 135. Early in the war it became increasingly obvious that one of the main tasks of the long-range photographic reconnaissance unit of the R.A.F. would be discovering the disposition of the enemy fleet. Many of the early sorties were flown over the enemy's naval bases with this purpose primarily in view. In June, 1940, the Director of Naval Intelligence decided that this source had become so important as to merit the full-time employment of a Naval Liaison Officer at the Central Interpretation Unit, then situated at Wembley. As a result, a pilot of the Fleet Air Arm was appointed and took up his duties early in June. He was, unfortunately, killed flying a Spitfire on 3rd August, and his place was filled by an Intelligence Officer from N.I.D. From that date, there was always an officer of Lieutenant-Commander or Commander's rank holding the appointment of Naval Liaison Officer. It was his duty to see that all information derived from photographs was sent to the appropriate department in N.I.D. This information ranged from the immediately operational to the long-range planning; from the hour-to-hour movement of enemy warships (eg., the Scharnhorst and Gneisenau at Brest) to the early planning of beach gradients, position of Mulberries for D-Day, etc.

176. 136. The earlier interpretations of Naval subjects were all carried out by R.A.F. officers but, as the work increased, the Director of Naval Intelligence asked if he could help with the provision of interpreters at A.C.I.U. This was done, and, at first, three Naval interpreters were employed entirely on photographic interpretation duties. Eventually this number increased and on V.E. Day, as shown in Appendix V, was as high as 16.

177. 137. In all, the R.A.F. School of Photographic Interpretation at

Nuneham passed through its courses some 70 Naval officers; the large majority of these were required in the closing stages of the war when an effort was made to have at least one photographic interpretation officer in every carrier.

Army Integration with A.C.I.U.

178. 138. The idea that Army photographic interpreters should work with the R.A.F. did not, so far as is known, originate until after the evacuation of the British Expeditionary Force from France. It was then adopted, not as the fulfilment of a theory of co-operation, but because the dependence of the Army on R.A.F. facilities made it inevitable. Until June, 1940, only four Army officers were carrying out interpretation duties, three at General Headquarters, British Expeditionary Force, and one at the War Office, working independently at their respective headquarters. It had always been necessary, however, for the War Office interpreters to co-operate regularly and closely with the R.A.F. interpreters at Harrow and the Aircraft Operating Company at Wembley, and this liaison was naturally made more necessary and more intense during the time the enemy were planning the invasion of England.
179. 139. After the Headquarters of the British Expeditionary Force had been evacuated, two of the photographic interpreters were posted to Intelligence Staffs of other formations, but the third and senior interpreter was attached to P.I.U., the newly formed R.A.F. interpretation unit at Wembley. It soon became apparent to the Director of Military Intelligence at the War Office that the amount of military intelligence being extracted at Wembley warranted the use of personnel more familiar than R.A.F. officers with the military installations being reported, and that the facilities at Wembley made it extremely advisable that this section should be in close contact with P.I.U. Accordingly, a small Army section was established there in September, 1940. Numbers inevitably increased, and at the end of the war in Europe there were approximately 60 Army P.I. officers at A.C.I.U.
180. 140. Since the reason for the creation of an Army Section was that it should deal with any military interpretation required, it was natural that a fairly clear division of responsibility should arise. The Officer commanding the Army Photographic Interpretation Section (A.P.I.S.) realised, however, the necessity for harmonious co-operation, and, largely as a result of his attitude, no hard and fast divisions were allowed to evolve. Whenever the nature of the work did not dictate exclusively army interpretation, joint R.A.F. - Army sections were formed, with the most suitable officer from either service in charge.
181. 141. Originally, the military reports formed part of the R.A.F. report, but the volume of work produced by A.P.I.S. became so great that to avoid distributing military information to uninterested Air Force recipients, separate Army reports were issued and distributed independently.
182. 142. There can be no doubt that the policy of integration increased the efficiency of all three Services both by sharing knowledge and effort and by reducing duplication. Moreover, since the Army Section lived with and was dependent on the R.A.F., the general harmony and sense of unity was a great asset, and the complications would have been tremendous had those responsible fostered a partisan spirit.

AIR MINISTRY INTELLIGENCE IN WARPART II : CHAPTER 6D.D.I.4.'Y' SERVICEINTRODUCTION

1. 'Y', or Signal Intelligence as it has been called since 1943, is intelligence obtained by intercepting the enemy's wireless signals. Broadly speaking these can be divided into three categories; W/T or morse, R/T or speech, and "noises" or non-communication signals such as radar or navigational beams. Each type of signal is covered by the R.A.F. Signal Intelligence Service and each has made its contribution to intelligence.
2. At the outbreak of War, the R.A.F. 'Y' effort at home consisted of one main station at Cheadle, Staffs., and four out-stations. Overseas, interception was being carried on at Cairo, with outstations at Malta and Aden. Gradually the organisation was expanded to keep pace with the growth and variety of German Air Force signals; the number of fixed stations was increased at home and abroad, mobile units for field interception were introduced and 'Y' operators or observers took their receivers into Allied shipping and aircraft.
3. As a source, signal intelligence has three outstanding qualifications; depth, reliability and speed. The contribution of 'Y' to the general pool of G.A.F. intelligence covered almost every angle, including Order of Battle, serviceability, production, targets and results, casualties, airfields, aircraft reporting organisation, training, transport activity, and G.A.F. reaction to Allied raids. In addition, signal intelligence provided the Allied Air Forces with a great deal of immediate operational information.
4. This unique intelligence function developed to an extent never envisaged in the early months of the War. When the American VIII Air Force were waging their biggest battles against the G.A.F., the fighters were controlled almost entirely on the basis of 'Y' information, whilst Supreme H.Q. Allied Expeditionary Force (S.H.A.E.F.), Signal Intelligence field units alone were officially credited with supplying information resulting in the destruction of many hundreds of German aircraft.
5. Two further functions of the R.A.F. Signal Intelligence Service are technical in character and concern signals rather than intelligence. The first is the supply of information on G.A.F. signals for the planning and operation of Allied countermeasures. The second is the provision of information on enemy navigational aids to enable them to be used by Allied aircraft.

6. Radio countermeasures played an outstanding part in depriving the enemy bomber of his navigational aids, upsetting the German radar reporting organisation and handicapping the enemy night fighter. None of this could have been achieved without the assistance of signal intelligence. For five years, the 'Y' Service maintained a constant flow of information to 80 Wing, Bomber Command Signals and 100 Group, and in some cases, the actual countermeasures themselves were operated by 'Y' Service for Bomber Command.

7. In assessing 'Y' as a source of intelligence, it is necessary to appreciate its possible limitations. These can be summarised briefly as:-

- (a) Lack of enemy signals.
- (b) Adoption by the enemy of efficient security measures and the transmission of 'spoof' messages.
- (c) Use by the enemy of V.H.F. to restrict range of interception.

8. All these handicaps played their part from time to time in limiting the results of 'Y' but they never prevented the R.A.F. Signal Intelligence Service from making a substantial contribution to the various intelligence problems which arose. Fortunately for the Allies, the G.A.F. made prolific use of wireless during the War, each signal transmitted helping to build up the general picture.

9. Although the G.A.F. made strenuous efforts to restrict signalling and improve their signal security measures, each technical signals development by the G.A.F. brought its own signal security problem for the enemy. An outstanding example of this concerned the German long-range Bomber Force; noises emanating from these aircraft in 1944 (I.F.F., Radio Altimeter or backward-looking A.I.) provided similar intelligence to the frequent W/T messages passed by the German bomber in 1940/41.

ORGANISATION AT HOME

10. The R.A.F. Signal Intelligence Service during the War was controlled by a Deputy Director at Air Ministry, who was responsible for overall planning, training, equipment, as well as dissemination of the resultant intelligence. Until early in 1941, this Officer was on the Staff of D. of S. and was known as D.D.S. 'Y'. For the remainder of the War, Signal Intelligence was transferred to A.C.A.S.(I) and the Deputy Director concerned became known as D.D.I.4.

11. In September, 1939, the problem of R.A.F. Signal Intelligence was the interception of G.A.F. H/F. and M/F. W/T. signals, for which purpose a nucleus organisation existed. By 1940, it was confirmed that the enemy was using R/T. and V.H.F. and it became obvious that an additional network of intercept stations would have to be set up in Southern England to obtain satisfactory reception of these short-range signals.

A main site was therefore selected at West Kingsdown (near Sevenoaks) and smaller stations were opened at Hawkinge, Beachy Head and Strete (near Dartmouth). In 1944, the West Kingsdown station was transferred to a site near Canterbury. All were manned by linguists (largely W.A.A.F.) and equipped with V.H.F., H/F and M/F receivers.

13. Meanwhile the question of non-communication signals or "noises" had not been neglected and had been the subject of special investigation since 1939. In August, 1940, beam type signals on 74 mcs. were intercepted at Hawkinge and subsequently identified as originating from G.A.F. stations on the Continent used for highly accurate blind bombing of the U.K. From then on, the West Kingsdown organisation became responsible for all ground noise investigation in the U.K., the results being collated by Air Ministry with the information obtained from airborne interception.

14. Apart from expansion, the general plan adopted in 1940, continued throughout the War. Cheadle and its outstations remained responsible for enemy air W/T. signals on H/F. and M/F. The Kingsdown organisation looked after all air R/T. traffic, irrespective of frequency, with the additional V.H.F. commitment of W/T. and "noises".

ORGANISATION OVERSEAS

15. The general principle evolved progressively throughout the war in Western Europe and in the Mediterranean was that Commands had a smaller staff replica of that existing at the Air Ministry, who were responsible to the Command Intelligence Officer for the efficient working and correct tactical disposition of Signal Intelligence units in that particular Command or Theatre, whilst at the same time interpreting and applying broad R.A.F. Signal Intelligence policy as defined by the Air Ministry Staff. [Post-war requirements have now dictated a slight re-organisation in that Command Signal Intelligence staffs are now subordinated to the Command Chief Signal Officer, at the same time remaining responsible to the Command Intelligence Officer for purely Command Signal Intelligence requirements.]

16. This system did not apply equally to the Far East Theatre where early in the Japanese War it was decided to invest responsibility for the S.E.A.C. (India Command as it was then) Signal Intelligence organisation in an Interservice staff. This resulted in Army officers attempting to manage the tactical organisation and disposition of R.A.F. units (and vice versa) with a resultant loss of efficiency and general chaos due to the lack of understanding of each others requirements. Later in the war the R.A.F. tactical or Field units largely broke away from this interservice 'control' with a resulting marked improvement in all round efficiency.

17. In the Autumn of 1941, a post for a Signal Intelligence Wing Commander was established on the Staff of the C.I.O. at Headquarters, R.A.F., Middle East. He

was responsible for planning signal intelligence facilities in his theatre and advising the C.I.O. on all 'Y' matters. He quickly discovered that conditions in the Desert necessitated completely mobile and self-contained R/T 'Y' units for feeding operational intelligence to forward R.A.F. Groups. The original unit of this type was therefore formed locally and further units formed in the U.K. soon followed.

18. Expansion of signal intelligence facilities in the Middle East was rapid and by the end of 1942 had necessitated the formation of a Wing. This consisted of a headquarters W/T. unit near Cairo with field units at Alexandria, Benghazi, Malta, Aleppo, Habbaniya, and two R/T. units in the Desert. Meanwhile, the Allied invasion of North West Africa had taken place and two 'Y' units, later reinforced by a third, had landed in that theatre. As the North African Campaign progressed, it became obvious that certain 'Y' units operating with the Desert Air Force could no longer be controlled from Cairo. In the months that followed, the balance of 'Y' effort in the Mediterranean gradually shifted westwards.

19. The year 1944 saw the formation of an air Signal Intelligence organisation in S.H.A.E.F. based largely on the lessons learnt during the previous years in the Middle East and North Africa. By this time, the pattern for overseas 'Y' had become clear-cut. In each theatre, the need for a Signal Intelligence Officer on the Staff of the C.I.O. had proved essential. The normal set-up for 'Y' units required a main W/T. unit located near the Command Headquarters plus a number of field units attached to Groups and engaged mainly on fighter R/T. interception. In certain cases, where considerable distances were involved, subsidiary W/T. units were also required. All units had to be completely mobile and self-contained with their own W/T. equipment for point-to-point working with the Headquarters unit.

20. This formula was followed in the provision of 'Y' facilities for S.H.A.E.F. On the Staff side, Air Signal Intelligence was organised and directed by a Group Captain R.A.F., assisted by his American Deputy, a Lieutenant Colonel. 2nd Tactical Air Force and IXth Air Force were each provided with one W/T. interception unit at Headquarters and one R/T. unit for each of their R.A.F. Groups or U.S. Tactical Air Commands. These units were under the control of Signal Intelligence Officers at 2nd T.A.F. and IXth Air Force who were also responsible for feeding all Signal Intelligence to their respective Chief Intelligence Officers.

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COMMUNICATIONS

21. No story of R.A.F. Signal Intelligence would be complete without some reference to the important part played by communications. In the case of fixed stations in the U.K., satisfactory contact was maintained by telephone and teleprinter channels to Air Ministry, Commands and Groups. Overseas, it soon became apparent that the 'Y' units in each theatre needed their own independent W/T. network controlled by the main unit. These communications were used for passing forward crypto-graphic and callsign/ frequency information and for passing back summaries of traffic intercepted. Forward Field Units were normally sited within a short distance of the Groups to which they were attached, and minute-to-minute reporting was accomplished by landline.
22. Equally important was the provision of communications between the 'Y' organisation overseas and the 'Y' organisation in this country. For this purpose, special W/T. channels were allocated and used exclusively for passing 'Y' information. These served the dual purpose of keeping overseas units fully up-to-date with the latest intelligence and ensuring that material required for cryptographic and other research was available in this country without delay.
23. In view of the intended landings in North Africa, plans were made in 1942 to inaugurate a high-power broadcast from Cheadle to feed 'Y' units in that theatre and certain small Signal Intelligence parties which were being carried in H.M. ships. This broadcast contained all available 'Y' information regarding German bomber and reconnaissance activity. It proved a great success and a similar broadcast was later set up in the Mediterranean area. Until 1944, however, these broadcasts carried only technical 'Y' information of interest to units engaged in W/T. interception.
24. With the formation of the S.H.A.E.F. Signal Intelligence Organisation, it became obvious that a similar broadcast to feed field units engaged in the interception of German fighter R/T. would be essential and this was operated by Canterbury. In addition to technical 'Y' information regarding callsigns, frequencies and code-words, it was decided to include periodical summaries of 'Y' intelligence regarding all types of G.A.F. activity.

25. This innovation proved very welcome to the small forward field units which were thereby enabled to supply their local Groups with up-to-date signal intelligence far in excess of their own interception facilities. So rapid was this system of dissemination that a request was received from U.S. IXth Air Force to extend it to cover the daily Airfield report put out by Air Ministry Intelligence.

Airfield Int

INFORMATION OBTAINED FROM "Y"

26. As already explained, one of the outstanding qualifications of signal intelligence is the speed with which it is available. This varies from a few seconds in the case of operational 'Y' to a few hours or days in the case of signal intelligence for planning or research purposes. In the following paragraphs, it is proposed to deal first with some of the types of information it was possible to contribute to the general intelligence pool. At a later stage, detailed particulars are given of the value of operational and medium term intelligence to Allied Strategical and Tactical Air Forces.

27. Pre-War Period. In 1935, the interception of secret callsigns from German aircraft and associated ground stations suggested the possible development of an Air Organisation separate from the existing Civil Air Lines. From then onwards, the W/T. activities of the G.A.F. became the subject of continuous investigation by R.A.F. Signal Intelligence, resulting in the identification of the majority of the ground stations concerned. In collaboration with other sources, it was discovered that G.A.F. potentially operational aircraft were using as W/T. callsigns the Unit markings painted on the fuselages and wings. As a result a fairly comprehensive Order of Battle was available in 1939 of those Units which employed W/T. as a means of communication. In addition, several schools had been located and intelligence derived concerning the type of training carried out.

28. G.A.F. Unit Markings. The use by the G.A.F. of Unit markings as W/T. callsigns resulted in a large amount of reliable information being made available to Air Ministry Intelligence with comparative ease. Until early 1941 when this compromising procedure was dropped, the 'Y' Service provided an important part of the material on which Air Ministry Intelligence based their Order of Battle reports. During the earlier years of the War, it was

not in every case however.

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possible to follow the movements of Units, when the Unit markings were known, almost as quickly as they were made. The records kept of individual aircraft also provided a basis for estimating the strengths of the various Units.

29. The scope of this work was, of course, limited to those Units which used W/T. as a means of communication. These included the long-range bombers, long-range reconnaissance, twin-engined fighters, coastal aircraft and transport Units. Such Units as single-engined fighters, army co-operation, dive-bombers and ground-attack were very rarely heard using W/T. as R/T. provided a means of communication much better suited to their activities.

30. Just prior to the outbreak of war the G.A.F. adopted a new method of marking their aircraft and, as a consequence, the type of W/T. call sign changed. Considerable research was required to elucidate the significance of the new markings but thanks to previous knowledge of the Units, their bases and types of activity, it was possible to supply Air Ministry Intelligence by the end of 1939 with the new markings of a considerable proportion of the operational Units.

31. From the beginning of the war until the end of March 1943, the 'Y' Service published a monthly report containing all the individual aircraft heard using Unit markings as W/T. call signs during the month, together with the names of the bases with which the aircraft had been chiefly associated. As this work developed, a system of recording the activity was evolved whereby possible corrupt call signs, always a source of trouble to the 'Y' Service, could be eliminated. As a result, the report presented a most valuable and on the whole reliable Order of Battle of the G.A.F. as obtained from W/T. sources.

32. Reliability. Some conception of the value of this work may be gained from the fact that the number of individual aircraft recorded monthly normally exceeded 3000. In the report for March 1943, the last of its type published, the number recorded was 3502 sub-divided into aircraft categories as given hereunder. To indicate amount of cover then being given by 'Y', particularly when it is remembered that at this time the G.A.F. was spread out over the Western, Russian and Mediterranean Fronts, the current A.I.3(b) estimates and actual G.A.F. strength as disclosed by official German documents are shown for comparison as follows:-

March 1943

	<u>A/C heard on 'Y'</u>	<u>A.I.J.b. Estimate</u>	<u>Official G.A.F. Records</u>
Long-range bombers	1358	1380	1494
Long-range recon.	273	410	462
T.E. fighters	184	640	692
T.E. night-fighters	404		
Dive-bombers	19	360	589
Coastal	125	140	194
Bomber R.T.U.	602	500/550	?
Transport	502	1200	?
Unclassified	35	-	-
Total	<u>3502</u>		

33. 'Y' As a Basis for Strength Estimates. The continuous records of Signal Intelligence provided Air Ministry Intelligence with an excellent basis for estimating the actual strengths of the various G.A.F. units. The other alternative was to estimate on the known establishment such as 9 long-range bombers to a Staffel, 30 to a Gruppe and so on. Analysis showed that over a period of a month, Signal Intelligence would hear almost all the aircraft in any given Unit and that whilst a day-to-day assessment was liable to errors an estimate based on a longer period of time would give a comparatively true picture. It was therefore possible, by means of monthly reports, to show which Units were over or under the normal establishment strength.

34. Location of Units: The basing of the units depended entirely upon the correct identification of the G.A.F. ground stations callsigns. These were changed with increasing frequency as the war progressed and from 1943 onwards, the changes were made twice weekly. The number of stations involved in April 1943, was approximately 700. Throughout the whole of the war the work of identifying these stations was well maintained and the majority of the possible identifications were always known. Occasional captured documents containing callsigns were of assistance in confirming that the identifications being obtained by 'Y' methods were correct.

SECRET
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SOME EARLY EXAMPLES OF 'Y'

-19/1

35. During the campaign in Poland in 1939, the 'Y' service was able to render very little assistance. This was due to the change in callsigns which had just occurred and to the fact that very little activity was heard. One Unit only ~~KG.26~~ was identified on operations in the Bialystock area on the 12/13 September. Towards the end of that month, however, it was possible to show that some of the long-range bomber Units had returned to their normal bases in Germany.
36. Between this period and the opening of the Norwegian campaign in April 1940 most of the G.A.F. operational activity was carried out over the North Sea and off the east coasts of Britain. During the earlier stages of this activity, although no certain Unit identifications were made, the bases from which the Units were operating were recognised and towards the end of the year the identifications of the Units chiefly concerned were finally established. The raid on Scapa Flow, for instance, on the night of 16/17 March 1940 was carried out chiefly by KG.26 of which 23 aircraft were heard on W/P.
37. Early in September 1939, a daily North Sea meteorological flight commenced to operate and continued almost daily throughout the War. The Unit concerned was quickly identified as ~~KG.26~~ ^{a long range recon unit} based at Munster. During subsequent stages it was always possible to indicate the bases from which this and other regular meteorological flights were made, even though there were sometimes delays in the identification of the Units involved. It was also possible to give details of the areas covered by these aircraft. ~~There was an indication of the possible future association of the Italian Air Force with the G.A.F. on the Western Front when Italian long-range bomber aircraft were identified training at Brussels/Melsbroeck in October 1940.~~
- SOME EARLY EXAMPLES ON 'Y'.
38. An outstanding example of the infringement of neutral rights and a possible pointer to future events was noted on 21st November 1939 when German aircraft were heard carrying out reconnaissance flights and announcing positions over Holland. These positions, which taken alone might have been considered as part of normal training routine, were confirmed by D/F. plots on the aircraft themselves.

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39 ~~37~~. On the night of the 30th April, 1940, there was suspected minelaying by German aircraft in the area of the Thames Estuary. Although nothing was heard on W/T. of the actual operation, several aircraft of an unidentified Unit, unidentified because they were using the unknown Unit marking of "1T", were heard returning to Marx from a southwesterly direction at a time which rendered it very possible that they were the aircraft concerned in the operation. Suggestions to that effect were submitted to Air Ministry Intelligence. When, on a later similar occasion, the same kind of activity was heard, the association became a certainty and, although some period elapsed before the Unit was finally identified, ~~as 1T~~ the aircraft carrying the marking "1T" were recognised as belonging to a Unit which specialised in minelaying.

Post Sept 1940.

40 ~~38~~. A third example concerned the operation of the Italian Air Force with the G.A.F. on the Western Front. Italian long-range bomber aircraft were identified by 'Y' as training at Brussels/Melsbroek in October 1940. This was a preliminary indication; immediately prior to the first attack on 11th November, a precise warning was given by signal intelligence to Fighter Command. Eleven fighter squadrons were despatched to patrol an area indicated by 'Y' and in the ensuing air battle, nine enemy aircraft were destroyed.

41 ~~39~~. The foregoing have been quoted as examples of incidents occurring during a period in which the 'Y' service, while rendering valuable assistance to Air Ministry Intelligence by presenting a fairly continuous picture of the current activities, was itself assimilating information, compiling records and gradually evolving methods of approach to the various problems arising.

METHODS AND TECHNIQUE

42 ~~40~~. During the campaigns in Norway, Denmark and the Low Countries, France and for night activities during the Battle of Britain, (very little W/T activity was heard by day during this period), estimates were given of the number of aircraft operating and the nature of their operations; it was also possible to name the bases being used and to report on such outstanding matters as the large number of transport aircraft employed during the battles in Norway. The year 1940 was, however, nearly over before it was found possible to identify with certainty the actual units engaged. One of the chief reasons for this difficulty is outlined in the following paragraph.

/M-

- u341. Generally speaking, the use of Unit markings as W/T. callsigns by aircraft was confined to M/F. activity on non-operational cross-country flights and to return flights from operations when within 100 Km. of their home bases. This activity, which was known as Safety Service activity, was, in the case of non-operational flights, sufficient in itself to establish the bases of the Units. On return flights from operations a rather higher level of W/T. security was observed, although the standard of this varied as between different Units, and the Safety Service organisation was, in theory, only used when necessary to the safety of the aircraft. It was therefore possible, when weather conditions were good, for entire operations to be carried out without any W/T. activity being heard on M/F.
- u42. During December 1939, it was realised that operational messages were being transmitted by aircraft on H/F. and that the aircraft and ground stations controlling the operations were using secret or tactical callsigns for the purpose. Each Unit was found to use its own H/F. frequency and set of tactical callsigns, both of which were changed ^{approximately} every 24 hours. The tactical callsigns themselves contained no clue to the identification of the Units concerned but merely provided a basis for an estimate of the number of aircraft engaged. Fortunately, however, operating errors and compromises were occasionally made, particularly when changing from H/F. to M/F. Safety Service working, which divulged the Unit markings of the aircraft.
- u643. As time went on and operations became more frequent it was noticed that individual Units possessed their own signalling characteristics and that several used tactical callsigns the construction of which was peculiar to themselves. All these differing characteristics were noted and applied so that by the end of 1940, it had become possible to identify with certainty the majority of the Units taking part in raids. A document captured later gave valuable information concerning the use of tactical callsigns. This, used in conjunction with the material already obtained from the previous study, brought the task of Unit identification to an almost exact science.

46. As a further result of this work it was found that once an identification was established, it was possible in the majority of cases to transpose an aircraft's tactical callsign into its Unit marking thus rendering possible a much more accurate estimate of the actual number of aircraft engaged on any particular operation.

SIGNAL INTELLIGENCE DURING THE "BLITZ".

47. Throughout the whole of the war, reports were rendered daily, and more frequently if the circumstances warranted, to Air Ministry Intelligence giving details of aircraft heard on operations, Unit identifications where possible and the number of aircraft involved. The standard of this report reached a very high level during the latter part of the "Blitz" ~~era~~ when 'Y' figures for the numbers of aircraft involved in ^{night} raids on Great Britain, as compared with figures submitted by other authorities, were accepted as being the most accurate.

48. On the few occasions on which it was possible to obtain confirmation from ~~other~~ ^{enemy} sources it was found that 'Y' estimates were almost exact. One instance can be quoted; on the night of 13th December, 1940, 'Y' estimated that 95 aircraft from ~~RAF~~ ^{Fliegerkorps} II were engaged against this country. A document captured shortly afterwards showed that 97 aircraft ~~from RAF~~ ^{operating under the Comanch} were detailed for operations on that night. During the latter part of the war, ^{however,} it was found impossible to maintain this high standard owing to a greatly increased sense of W/T. security on the part of the enemy which resulted in W/T. communications being reduced to ^{an} the absolute minimum.

49. Towards the end of the "Blitz" period in April and early May, 1941, R.A.F. Signal Intelligence showed that in order to maintain their scale of effort, the enemy were finding it necessary to despatch aircraft on second sorties during a single night's raid. On the night of 16/17 April about 60 aircraft made double sorties and on the night of 10/11 May, the occasion of the last big raid on London, a considerable number made two sorties and a smaller number made three.

50. Similar strained efforts were noticed during the "Baedeker" raids on York, Norwich, Exeter and other cities during the latter part of April and early May, 1942. In addition to making calls on aircraft for double sorties,

/several

C.S. Bomber Harris's decision as the Kohn 1000 Bomber unit

several aircraft from the long-range bomber R.T.U's were called in to assist. On the night of 25/26 April, W/T. evidence showed that 105 sorties were made by 78 aircraft proving that at least 27 operated twice and on the night of 26/27 April out of 67 aircraft identified, 27 came from the R.T.U's.

51 49. Signal intelligence regarding the disposition of the G.A.F., the nature of its operations and the numbers of aircraft involved had by this time become a routine matter. An equally important contribution was the provision of information regarding specialised Units such as ^{K. Gr} Kgr.100, III KG.26 and KG.40. In view of the important part played by the latter Unit in the German anti-
shipping campaign, further details may be of interest.

THE ACTIVITIES OF KG.40

52 50. KG.40 was based in France (Bordeaux) or Norway (Trondheim or Gardemoen) and was equipped with the long-range FW.200 aircraft during most of its existence. Signal Intelligence was able to provide detailed information regarding the unit's activities and the areas reconnoitred. From an endurance point of view, it was shown in May, 1941, that their aircraft were making reconnaissance flights from Bordeaux out over the Atlantic well to the West of Ireland and landing in Norway, a distance of about 2400 miles.

53 51. The gradual expansion of the Unit was also observed and reported. At the end of September, 1940, 8 individual aircraft had been identified, all belonging to Staffel 1. By the end of February, 1941, this number had increased to 29 divided into Staffeln 1, 2, and 3. By a close analysis of the activity, taking into account known and suspected losses and the fact that 2 aircraft because of their continual activity overland were known to be transport aircraft, it was possible to show that the Unit possessed approximately 16 operational aircraft and that the average intake of new aircraft was approximately 5 per month.

54 52. During 1941, W/T. information indicated that a second and third Gruppen had been added to KG.40 but that these were equipped with normal long-range bombers and were based at Soesterberg. It was not until March, 1942, that Gruppe III, re-equipped with FW.200, moved to bases on the Atlantic seaboard to implement the activities of Gruppe I. The activities of these two Gruppen at one period provided a distinct pointer to the strained position of the German Air transport organisation.

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55. At the end of 1942, a large proportion of the aircraft of Gruppe III, then based at Bordeaux, were sent to the Mediterranean theatre to assist in the transport work rendered essential by the campaigns in Libya and Tunisia. Similarly, during January and February 1943 several aircraft from Gruppe I, based at Trondheim, were sent to the Russian Front to assist with transport there. All these moves were disclosed by Signal Intelligence. By the end of March, 1943, the situation had apparently eased somewhat as W/T. evidence showed that the aircraft, or replacements for them, were back at their Atlantic bases, thus bringing the Gruppen back to strength once more.

GERMAN "INTRUDER" ACTIVITY

56. Early in 1941 the G.A.F. commenced "Intruder" activity against our returning bombers. The Unit concerned was identified as ~~KG.54~~ ^{a night fighter unit (NIG) (Holland)} based at Gilze-Rijen and the methods of operation were the subject of a particular study by R.A.F. Signal Intelligence. It soon became clear that the enemy "Y" service were obviously using signal intelligence to direct their aircraft to the most profitable targets.

57. As a counter-measure, Bomber Command ground stations transmitted spurious signals simulating operational activity at various aerodromes. It was possible to prove that these steps were, on the whole, most successful and enemy aircraft were frequently directed to aerodromes at which no activity was taking place. This general lack of success was no doubt ^{one of} the reasons for the cessation of this type of operation later in the year. NB

ATTEMPTS BY THE G.A.F. TO MISLEAD

58. Following the two heavy London raids in May, 1941, a short period of comparative W/T. silence occurred. This was broken in the middle of June when an elaborate attempt was made by certain G.A.F. Units to create the impression that normal scale raiding was taking place by the transmission of spurious W/T. traffic. This attempt to mislead the British and probably the Russian "Y" service was noted by a W/T. operator who maintained that all the traffic emanating from KG.54, one of the Units involved, had been transmitted by one ground station and that the whole "Operation" had in fact been carried out by two ground stations.

British sources confirmed that there had been no aircraft over the alleged area of operations and it was clear that the whole series of "operations" was a hoax by the G.A.F. It seemed probable that the aircraft were withdrawing to another area under cover of the spurious activity and this was confirmed when the majority

of the Units involved were heard operating on the Russian Front.

59 ~~57~~. A further large scale effort to mislead was carried out between June and August, 1942. Activity started on 13th June when ten "aircraft" using a hitherto unheard series of callsigns landed at Chievres. Developments followed until a considerable number of "aircraft" representative of approximately six Gruppen from two Geschwader~~n~~ were involved, the additional places concerned being Bourges, Avord, Chateaudun and Bretigny. The nature of the activity was very quickly recognised and reported. The reason for this spurious activity was never made clear but its quick identification prevented any possible waste of effort on decoy targets by intruder aircraft of Fighter Command.

G.A.F. REACTION TO DIEPPE

60 58. An interesting analysis was carried out following the Allied landing at Dieppe on 19th August, 1942 to ascertain the effect on the enemy long-range bomber forces employed against the raid. W/T. information showed that a minimum of 86 long-range bombers, consisting of 69 Do.217's and 17 Ju.88's from most of the long-range bomber units available at that time on the Western Front were engaged. ^{At the time,} Though it was ~~impossible to estimate at the time,~~ from ^{to estimate} W/T. sources, the number of aircraft lost or damaged, as several aircraft which were unsuccessfully called for long periods by the controlling ground stations, usually an indication of possible casualties, were heard operating again within a very few days. ^{however,} A study of the activities of the Units during the following 30 days, gave a very clear indication of the heavy losses which had been sustained. Offensive operations carried out were almost negligible and a month elapsed before a stage had been reached when an intensive course of re-training could be undertaken. The speed of replacement and repair of aircraft could almost be followed as the following table shows:-

	<u>A/c active</u> 19/8	<u>Heard within</u>					<u>Still missing</u>
		<u>3 days</u>	<u>7 days</u>	<u>14 days</u>	<u>21 days</u>	<u>30 days</u>	
Do.217	69	19	28	37	44	58	11
Ju.88	17	4	4	5	8	9	8
Total	86	23	32	42	52	67	19

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IDENTIFICATION OF NEW UNITS

61. On the 8th March, 1943, a new Unit was heard operating with three aircraft at Stade. After a fairly quiet period which lasted until the middle of May, the Unit began to expand rapidly and by the end of May a minimum of 23 aircraft representative of three Gruppen had been heard. These aircraft, which were based at Stade, Juvincourt, St. Trond and Rheine, were frequently heard operating at night in the G.A.F. night fighter defence belt and off the Dutch coast. The probability that a new night fighter Unit had been added to the front line strength and had become operative was suggested to Air Ministry Intelligence and this suggestion was subsequently confirmed when the Unit was identified as NJG.4.

62. Similarly, changes in the functions and titles of Units could be noted. An example of the former was the disappearance for a time, very early in the war, of the coastal Unit 106 and its re-appearance operating from land aerodromes which, taking into account the nature of its activities, suggested that it had been re-equipped as a long-range land-based bomber Unit.

MAJOR CHANGE IN G.A.F. CALL-SIGNS

63. On the 1st April 1943, the system of Unit marking W/T. callsigns was changed for a system of 4-letter or tetragram callsigns. Up to this date, the types of callsigns used by G.A.F. aircraft had, generally speaking, fallen into three distinct classes, i.e. Unit markings, 5-letter International Civil callsigns and tetragrams. The first have already been considered and the second require no description. The tetragram callsigns had proved, for a considerable period, a source of difficulty in the assessment of their true significance.

64. During the latter part of 1941 and early 1942, an intensive research was carried out by Air Ministry Intelligence in association with the 'Y' Service which resulted in the discovery that only eleven initial letters were used in the compilation of these tetragrams and that, as a general rule, the first three letters constituted a trigram base associated with the type of aircraft. The fourth letter was added as the individual aircraft letter. In other words all tetragrams of the same trigram belonged to the same type of aircraft. There were, of course, minor exceptions to this rule.

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It became obvious that these tetragram markings were allotted by the manufacturers and they were therefore given, for general usage, the name of "factory markings." Aircraft proceeding to Units used this marking as a W/T callsign until arrival at the Unit when the factory marking would be replaced by the Unit marking. Aircraft allotted to schools, which did not as a rule use a Unit marking, would continue to use the tetragram callsign and similarly with transport aircraft which were not attached to any definite transport Unit.

66. Lists of aircraft identified with operational Units, transport Units, R.T.U's, schools, air-sea rescue Units and other categories were issued periodically and kept up to date by frequent supplements. In order to keep these lists reasonable in size and as up to date as possible, the policy was adopted of deleting all aircraft of which nothing had been heard over a period of three months.

67. To carry out this work efficiently it was necessary to maintain a card index system in which every individual aircraft was allotted a card where its W/T activity was recorded together with occasional information received from other sources. At the end of the war the system contained individual records of approximately 100,000 aircraft. Although the use of tetragram callsigns proved a handicap to that section of Air Ministry Intelligence most interested in the locations and movements of G.A.F. Units, compensating advantages accrued to those sections mostly concerned with the figures of aircraft production.

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PRODUCTION ESTIMATES

- 68 73. The tetragram system, using 11 initial letters only, allowed for the issue of 7,436 trigrams or 193,336 tetragrams. As previously stated, the 'Y' Service had compiled records of approximately 100,000 of the latter, the vast majority of which had been heard on W/T. As the system also applied to those aircraft which did not use W/T. it became evident that by the end of the war the majority of available tetragrams must have been allotted. In spite of this there were no definite indications, apart from about 5 trigram series which were heard during the last few weeks of the war, of any series being re-allotted or used twice. Hence, every new tetragram recorded, after making due allowance for possible corruptions, represented a new aircraft. A study of its subsequent activity would, in numerous instances, provide an indication of the type of aircraft concerned.
- 69 74. Signal Intelligence accepted the responsibility of publishing, and keeping up-to-date a list of trigrams with the associated types of aircraft. At the end of the war this list contained approximately 3500 trigram identifications. The policy adopted of deleting from the published records the identifications of aircraft which had not been heard for a period of three months provided the material for a possible analysis of the speed of replacement of aircraft into Units and the types of aircraft involved. Such an analysis was made by Air Ministry Intelligence on information provided by 'Y' in respect of G.A.F. night-fighter Units for the period 1st March, 1943 to 30th March, 1944.

ANALYSIS OF REPLACEMENT RATE

- 70 75. Between 1st March and 17th June, 1943, 269 aircraft had been identified in ~~the~~ ^{night fighter} Units. Of these 151, or 56%, were Me.110's and 50, or 19%, were Ju.88's. The balance of 25% consisted of Do.217's, Me.210's and unidentified types. By the end of March, 1944 the number of identified aircraft had risen to 488 consisting of 220, or 45%, Me.110's, 183, or 37.5%, Ju.88's and the balance of miscellaneous types. The picture thus presented indicated that the ~~the~~ ^{night fighter} force had expanded by approximately 80% over a period of 12 months and that there was a definite trend towards the replacement of Me.110's by Ju.88's.

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71 76. Furthermore, an analysis taken of the aircraft removed from the records over the same period showed that of the original 269 aircraft identified as at 17th June, 1943, only 35 remained operational on 30th June, 1944. Similarly, of the 243 new identifications made between 17th June and 8th September, 1943, only 60 remained operational on 30th June, 1944. It therefore appeared that the apparent wastage in night-fighter strength was such that the total strength was replaced in the course of approximately 9 months. A similar analysis made of a long range bomber R.T.U. (~~IX 49 53~~) showed a wastage of about 15 aircraft per month or approximately 25% of the average total strength of 60 aircraft. These figures were later found to be almost identical with those supplied by a prisoner-of-war who had been trained in this Unit.

G.A.F. TRAINING

- 72 77. The foregoing paragraphs have dealt at length with the operational Units of the G.A.F. Throughout the war, a large proportion of the W/T. traffic intercepted originated from aircraft engaged on School Training, as apart from R.T.U.'s, Transport, Ambulance duties, Local Meteorological flights, Air-Sea Rescue and other minor activities.
- 73 78. From early 1942, periodical reports were issued covering this training activity and their scope gradually increased until March, 1944, when the activities of 1100-1200 aircraft from 71 schools engaged on nine different types of training were recorded. The activities of the schools provided a sensitive indicator of changes in G.A.F. policy and of the various strains inflicted upon the whole organisation. As previously stated, the closing down in July, 1942, of all the long-range bomber schools was reflected in the increased activities in the long-range bomber R.T.U.'s.

~~79. Major operations had the effect of causing aircraft to be withdrawn from schools for transport duties. In March, 1943 they were rendering assistance on the Russian Front and in February and October of the same year temporary transfers were made to the Italian and Balkan Fronts. An early indication of a possible petrol shortage was given by the great reduction in training which occurred during the first half of 1944. In March 1130 aircraft were heard; by June the figure had fallen to 695 and a few weeks later all training had ceased completely. One valuable result of all this~~

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~~research was that information in sufficient detail concerning bases used, average times of activity, and the areas of operations enabled Fighter Command to carry out successful intruder operations.~~

TRANSPORT

- 74 80. The callsigns used by Transport aircraft, apart from those aircraft using International Civil callsigns, fell generally into two classes; unit markings used by certain Transport Geschwader~~s~~, and tetragrams. The former were dealt with on similar lines to those of the operational units and all references made earlier concerning intelligence of moves, bases, strengths and activities of operational Units refer equally to these Transport Units. Until March, 1943 they were included in the monthly W/T. Order of Battle issued by Signal Intelligence.
- 75 81. The tetragram callsigns were a source of trouble as they were used by school and transport aircraft and difficulty was experienced in separating the two. By late 1941, however, several schools had been identified and their aircraft extracted; the greater part of the remainder were then identified as Transport. Great accuracy was not an essential as most school aircraft were available for use as Transport when the need arose.
- 76 82. The Transport Report issued by Signal Intelligence enabled Air Ministry Intelligence to determine the bulk-movement into or out of an area and thus assess the importance attached to any particular operation. For instance, by watching the level of transport activity in Norway it was possible to determine the likelihood of an invasion of North Britain. During the evacuation of the Balkans about April, 1944, Signal Intelligence was able to report large transport moves into that theatre; later the aircraft were heard assisting on the Russian front. The last major lift was the evacuation of Konigsberg in East Prussia.

G.A.F. FIGHTERS

- 77 83. During the War, intercepted ground-to-air R/T, and W/T, traffic furnished a great deal of information regarding enemy fighters. A gratifying amount of point-to-point communication bearing on fighter movements and scale of effort also became available in the latter stages. Although this information was pre-eminently of a kind which enabled it to be exploited by the Commands, there were aspects which contributed directly and indirectly to the general intelligence picture.

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78. The callsign system of single-engined fighters was not designed with any reference to individual units; consequently no details of the Order of Battle were available from this source. On the other hand, it was found possible, in time, to provide a reliable guide to the strengths and basings of single-engined fighters on the Western Front and as from July, 1942, Air Ministry received a weekly summary of information gained from the study of fighter callsigns.

79. During 1943, Air Ministry Intelligence estimated that 75% of their information on single-engined fighter operations was being obtained from signal intelligence. In addition to the summaries of strengths and bases, a weekly estimate of the enemy's fighter scale of effort on the Western Front was also supplied. Both these weekly appreciations continued until June, 1944, when conditions of R/T. reception in this country and of G.A.F. fighter control no longer enabled an adequate picture to be reconstructed from the available R/T.

80. A very substantial compensation was, however, speedily available in the shape of point-to-point traffic which provided daily returns of sorties made by named units during the preceding 24 hours. Although limited to the area of Jagdkorps I (the Tactical Command in ^{Northern} ~~N.W. Germany~~, France and the Low Countries), a remarkably complete record of G.A.F. fighter activity in that area was available to Air Ministry Intelligence during the latter half of 1944.

81. During the last six months of the War, this source disappeared and was succeeded by a less detailed but still informative point-to-point service which gave particulars of fighter movements for the benefit of German Flak. This traffic was intercepted until April, 1945, and provided a valuable indication of the overall scale of effort in Jagdkorps 2 apart, of course, from its operational value.

SIGNAL INTELLIGENCE AS AN AID TO DEFENCE

82. The potential value of signal intelligence as an aid to defence was realised some time before war commenced, and arrangements were made for H.Q. Fighter Command to receive this information direct from Cheadle. When war broke out, therefore, Signal Intelligence was able to contribute immediately to the R.A.F.'s early warning system.

83. North Sea Area 1939-40

During the enemy's first serious attempt to attack our Naval shipping in the Firth of Forth it became clear that specialist personnel were necessary to handle signal intelligence at Fighter Command. Enemy aircraft engaged on this operation were despatched from Westerland and were plotted fairly continuously by the R.A.F. Signal Intelligence Service shortly after taking off until they reached the target area.

84. No early warning of the attack was received from other sources and Fighter Command were unwilling to accept 'Y' plots and intercepted messages without confirmation. It was not until enemy aircraft commenced to drop bombs in the vicinity of the Forth Bridge that the reliability of signal intelligence was appreciated.

85. Sea reconnaissance missions, occasional bombing attacks against Naval units in Scottish anchorages and a daily routine weather flight were carried out over the North Sea. The information obtained from this activity by taking D/F fixes on the enemy's W/T transmissions, was used in two ways. Firstly, to supplement the Radar chain which was weakest off the east coast of Scotland where the enemy was then operating. Secondly to vector our defensive patrols. As the enemy aircraft usually transmitted W/T messages soon after leaving base, the plotting of these transmissions provided an early picture of how the raid was most likely to develop and enabled controllers to despatch fighters to the most favourable position to effect interception.

86. After the occupation of Norway signal intelligence from W/T expanded significantly owing to the enemy's disregard for security. On most occasions when an enemy striking force was despatched to attack our coastal shipping detailed instructions concerning the operation were contained in W/T messages intercepted several hours in advance of the attack. (Source) - ~~ident~~

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87. After the fall of France, attacks against Allied convoys in the English channel were carried out for the most part by Ju.87's, whereas convoys on the East Coast were attacked by long-range bombers. The advent of this large scale anti-shipping campaign, however, produced two new factors in the enemy signals organisation which were of great assistance in forecasting the enemy's intentions.

88. The first, and most important, was the methodical way in which the enemy obtained his information by air reconnaissance missions. In the early stages of the battle it was quite clear that the enemy seldom attacked shipping or harbour installations without first obtaining information of the weather conditions in the target area, and such messages containing the target area and cloud cover were transmitted back to base by W/T.

89. Strangely enough, the second factor was the direct result of the enemy's desire to improve his signal security and reduce air-to-ground communications to the minimum. This took the form of dummy messages, or a series of V's, both types of transmission being made at approximately half hourly intervals, enabling aircraft to maintain contact with their controls without breaking W/T silence. Intelligence information obtained from both these sources enabled Group Controllers to be kept advised of the probable purposes of enemy activity.

90. At a later stage in the war, the practical application of this information attained a high standard of perfection, particularly in the case of low flying aircraft, which seldom appeared within the Radar screen. In addition, there were many instances where the presence of fighters patrolling a convoy as a result of 'Y' information deterred the enemy from making an effective attack.

91. The Battle of Britain. In order to inflict the greatest possible damage on the G.A.F. and reduce its destructive power to a minimum, Fighter Command during the Battle of Britain decided to disregard the fighters escorting the bomber formation and to concentrate its efforts against the main bombing force. This policy presented the early Raid Reporting Organisation with a major problem for although Radar gave advanced warning of the attack, the same medium could not differentiate between fighter and

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bomber formations. Secondly, the successful deployment of our fighters now depended a great deal more on intelligent anticipation of the enemy's tactical plans, in view of the diversionary raids carried out by the G.A.F. which tended to confuse and draw our defences from the main attack.

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92 102. Owing to the enemy's almost complete disregard of signals security during this period, signal intelligence was able to assist materially in the solution of these two problems. The enemy's habit of making frequent use of R/T. during the flight to the target was an obvious method of distinguishing figures ^{W/Ts} from bombers, as the latter were at this time relying entirely on W/Ts for communications. In order to identify the enemy fighter formations, it was ~~therefore~~ only necessary to co-relate D/F plots supply^{ied} by the Kingsdown organisation with radar plots appearing in the same position on the Operations table. The value of this information to our defence system was immediately appreciated and in order to save time, arrangements were made for Kingsdown and its outstations to have direct landlines to their nearest Fighter Groups. This new organisation began to function in 1940 and became in every way a definite part of the defence system.

93 103. As a result of the methods used in carrying out these mass raids, much information concerning the enemy's intentions was disclosed to Signal Intelligence by the bomber formations. ~~In order to use this fighter force to the best advantage the final details of the tactics to be employed was left to the discretion of the senior enemy officer flying with the bombing force, and such details, based on the amount of opposition met on the way to the target, were communicated to the complete attacking force by radio.~~ Messages intercepted by the R.A.F. Signal Intelligence often contained instructions regarding the point to which the fighters would escort the bombers, the area in which the fighters would sweep, the area in which the bomber and fighter forces would rendezvous for the return flight, and the point of crossing out over the English coast.

~~Jamming of Enemy Navigational Aids~~
94 104. L By the end of September, 1940, the enemy had reduced his scale of effort during daylight in favour of concentrated night attacks. For this purpose, Knickebein beams were employed for precision bombing by ordinary aircraft whilst specialised crews of K.Gr.100 made use of the X-Gerät. This system was considered at that time to be the most accurate method of blind bombing in existence. From June onwards, the R.A.F. Signal Intelligence Service had been intimately connected with the investigation of these navigational aids and radio countermeasures had been devised.

95 105. By the end of October, the Germans realised that their Knickebein beams were being jammed or deviated and that some change of policy was necessary.

In looking for a substitute, they found that Kgr.100 had been employing the X-Gerat, since August without any interference from Allied countermeasures and they decided to utilise this specialised unit as pathfinders for the main German bomber force. From November onwards, Kgr.100 sacrificed accuracy in order to become fire-raisers and the technique first ^{used} based in the Coventry raid was so successful that it became their standard method of night attack.

96 106. Indiscreet tuning signals, usually intercepted some thirty minutes before the aircraft left the ground frequently disclosed the intended take-off time of the pathfinding force. During most operations, R.A.F. Signal Intelligence received W/T. traffic from the pathfinding aircraft and as special ^{R.A.F.} patrols were airborne from dusk onwards, this information was of ^{particular} special value. It also enabled Fighter Command to identify the pathfinder force as soon as it appeared in the Radar screen.
Intruder Operations.

97 107. The despatch of R.A.F. night fighters to patrol enemy bomber airfields, was planned almost entirely on information obtained from 'Y'. These operations, called "Intruders", were first carried out towards the end of November, 1940, and continued throughout the war. In the early stages, there was an abundance of signal intelligence on which to plan "Intruder" operations, but the enemy soon took steps to reduce this source of information. Even so, it was estimated by Fighter Command that 'Y' forecasts throughout the period of these operations maintained an accuracy of about 90 per cent.

98 108. In order to despatch "Intruder" aircraft so that they arrived over enemy airfields at the time the first bombers were returning, Fighter Command relied on Signal Intelligence to identify the units operating and ^{to} obtain D/F. plots on the aircraft and control stations concerned. In addition, intelligence was obtained from monitoring all enemy airfield beacons and homing traffic on the enemy safety service organisation.

Defence against Minelaying.
99 109. Towards the summer of 1941, the scale of overland bombing by night was reduced, and although sporadic raids continued to take place, the main enemy effort was shifted to minelaying in the Thames Estuary, and later in the Humber Mouth and off Newcastle.

100 110. Minelaying operations in the Thames Estuary introduced a new problem for Fighter Command's early warning organisation as enemy aircraft flew direct from Holland to the target area at about 1,000 ft, thus considerably reducing the chance of detection. In addition, the complete operation was carried out in wireless silence. So effective was this method that enemy aircraft were often on the flight back to base before they were detected.

101 111. In searching for a source of information which would provide some form of early warning, it was found that a good deal more use was being made of radio navigational beacons than had been the case in the past. An analysis of the way in which these beacons were used by the enemy resulted in the complete system being broken down, and from then until the end of the war, observation of the enemy's beacon organisation provided considerable intelligence regarding the enemy's intention and the routing of his aircraft.

102 112. ^{Ref. Fighter Sweeps} In the Spring of 1941, Fighter Command commenced offensive sweeps over the Continent and intelligence from enemy R/T traffic played its part in keeping Group Controllers advised of G.A.F. fighter activity. As time went on, however, Signal Intelligence did more than provide essential information about the position and movements of enemy fighters. In June, 1942, a new type of signal intelligence summary, later known as the BMP report, was introduced.

103 113. This was produced by specialist personnel [redacted] and summarised the reaction of the enemy's fighters and raid reporting organisation to specific Allied operations. Unlike previous 'Y' reports, this series made use of all available signal intelligence including R/T from German fighters, W/T from German Observer Corps and radar stations, and any other R/T or W/T traffic which became available. Produced in two parts, the night version included details of enemy beacons ^{activities} and landing traffic originating from twin-engined fighters.

104 114. The writers of the BMP reports had before them complete details of all Allied operations and were fully versed in the latest Battle Order of the G.A.F. Although it was never physically possible to produce and distribute these reports in less than two days, they proved of considerable value to Allied Air Forces. During the three years of their production, several improvements in arrangement were introduced, including the provision of sketch maps showing the enemy's fighter reaction in graphical form.

ENEMY
INCREASING IMPORTANCE OF/NON-COMMUNICATION SIGNALS

105 115. During the first four years of the War, the bulk of signal intelligence regarding the activities of enemy bombers was derived from W/T or R/T transmission. From 1943 onwards, non-communication signals played an increasingly important part. In April, 1943, airborne signals were intercepted from German raiders on 335 Mcs. with a ^{pulse recurrence frequency of 2800 cycles per second} [redacted]. These were subsequently identified as emanating from backward looking A.I. (Page 214) fitted by the G.A.F. for the protection of their bombers and radiations from this equipment enabled early warning of approaching raids to be given to Fighter Command.

116. Two months' later, frequency modulated signals from radio altimeters (Fuge 101) carried in enemy aircraft were heard on 350 Mcs. This was a further source of early warning from signal intelligence and was of particular value in the case of low flying raiders as a supplement to the information being obtained from the study of enemy beacons. (See para. ¹⁰¹~~111~~).

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107 117. During October, 1943, a new form of warning equipment (Fuge 216) was adopted by the G.A.F. as a protection for their bombers against fighter attack. This did not supersede the earlier type of backward-looking AI (Fuge 214) as signals from both types of equipment were often heard together. The frequency involved was 167 Mcs. with a P.R.F. of 1,500 c.p.s. and again the interception of these transmissions enabled the R.A.F. Signal Intelligence Service to give early warning to the area defences, as aircraft could often be heard ^{at} distances of 100 miles or more.

INTRODUCTION OF "EGON" CONTROL

108 118. At the end of 1943, R/T traffic was intercepted indicating that some new form of navigational aid was being used for the remote control of aircraft, in which Freya Radar Stations and Fuge 25A (I.F.F.) equipment were involved. Transmissions from the latter on 158 mcs. had been intercepted some months earlier and had been used by Signal Intelligence for early warning. By February, 1944, it was clear that the enemy was employing these signals for aircraft control. Each raider was fitted with a Fuge 25A carrying a separate identification letter and ground control stations plotted the aircraft by means of a Freya or Hoarding, vectors being given by R/T. or W/T.

109 119. This system which was known to the Germans as "Egon", was first used in attacks on the United Kingdom. At later dates, its use became more widespread and it was employed by the G.A.F. for the control of fighter bombers and night fighters. In addition to ^{radio countermeasures} ~~W/T~~ against the "Egon" channels of communication, a Fighter Command operation known as "Red Queen" was devised. This consisted of a G.C.I. Station utilizing the Fuge 25A transmissions from the enemy aircraft and I.F.F. Mark III responses from Fighter Command's night fighter. To achieve this, special arrangements were made for 'Y' information to be passed direct to the "Red Queen" station as soon as any "Egon" signals were heard.

Air launched FLYING BOMBS

110 120. Towards the end of the War, the movements of nearly all German operations aircraft were communicated by W/T. or R/T. to the Flak sites on or near the route over which the aircraft intended to fly. These signals proved a most reliable

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and constant source of intelligence for the planning and execution of defensive operations. Fighter Command were particularly interested in the movements of aircraft employed for launching flying ^{bombs} bombers, as these He.111's seldom appeared on the radar screen owing to the low heights at which they operated.

111 121. To meet the threat of air launched flying bombs, Fighter Command planned two types of operations, both being based on signal intelligence. The first consisted of dispatching defensive patrols, to the most likely area of operations. As the enemy frequently changed the launching area, it was necessary to study all past 'Y' information regarding the coastal points which the carrier aircraft crossed and recrossed on their way to the target and collate this information with the Radar tracks of the flying bombs, themselves.

112 122. This analysis of the enemy's past behaviour coupled with current signal intelligence enabled Fighter Command to build up an accurate picture of the enemy's intention, and No.12 Group, who, due to its geographical position had the most favourable chance of interception, despatched all their available night-fighters on information provided by the 'Y' Officers at ~~the~~ Fighter Command.

THE VALUE OF SIGNALS INTELLIGENCE TO R.A.F. BOMBER COMMAND

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113 123. The contribution of Signal Intelligence to the Bomber Command offensive covered three different functions:-

- (a) The supply of intelligence on the enemy's defences for planning purposes.
- (b) The supply of technical information regarding enemy radar and communications for the planning and operation of radio counter-measures.
- (c) The provision of information on enemy navigational aids to enable them to be used by Bomber Command aircraft.

The two latter functions concern signals rather than intelligence and are outside the scope of this handbook. It may not be inopportune, however, to record that the supply of information for planning radio countermeasures was a contribution by Signal Intelligence of far greater value to Bomber Command than any other function. Radio Countermeasures played an outstanding part in upsetting the German radar reporting organisation and depriving the night fighter of his ground-to-air communication. None of this could have been achieved without 'Y'.

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114 124. The first R/T, from G.C.I. controlled night fighters was intercepted in the autumn of 1940 and was later christened "Little Screw" traffic owing to the frequent occurrence of the words "Kleine Schraube". Although during the next two years there was no lack of material, the problem of unravelling the German night fighter defence system proved a formidable task. This was due to a variety of reasons including excellent R/T discipline in the G.A.F., a highly specialised vocabulary and the fact that no reliable indication of area could be obtained.

115 125. By the end of 1942, Bomber Command had an accurate picture of the enemy's G.C.I. system and it was soon realised that the only tactical expedient which provided a chance of penetrating the G.C.I. barrier was saturation by a closely packed bomber stream. Throughout these early years, the Kingsdown organisation supplied Bomber Command with a constant flow of intelligence based on intercepted R/T traffic but its value was problematical apart from the research aspect.

116 126. All this changed in July, 1943, when the introduction of "Window" put the Kamhuber Line, *(a continuous belt of G.C.I. controlled defence areas)* out of action and secured for Bomber Command some three *3 days!* months of relative immunity from night fighter attack. In facing up to the new situation the enemy adopted a freelance system of night fighting in which attempts were made to bring packs of fighters into contact with the bomber stream under a loose control system involving preliminary assembly over radio beacons. This method had certain significant weaknesses which Bomber Command was able to exploit; in particular, it was now possible to mislead the fluid defence as to target and route in a way which had been impossible against the original static defence line.

117 127. These altered conditions afforded considerable scope for the exploitation of signal intelligence as it was possible for 'Y' to show not only how the German night fighters were handled but also to assess whether or not Bomber Command's evasive tactics had been successful. Research by specialist Signal Intelligence Officers made it possible to suggest the most effective means of causing the enemy to misuse his fighters which were at all times numerically strong and a source of enormous danger whenever they succeeded in contacting the bomber stream. Attempts to mislead the G.A.F. had to be carefully worked out in the light of its previous reactions under varying conditions. Crudely conceived feint attacks stood little chance of success and wasteful over-elaboration had to be avoided.

118 128. By presenting an analysis of the effect of Bomber Command's tactics, R.A.F. Signal Intelligence was able to ensure that unsuccessful experiment was reduced to a minimum. For this purpose, the nightly output of intelligence from Kingsdown became of vital importance, enabling Bomber Command to be in possession of a full preliminary report within a few hours of their operation. More detailed analysis of all available signal intelligence was provided by night EMP reports (see para. 113) which now became as valuable to Bomber Command as the day EMP reports were to ^{the American} VIII Air Force. From the beginning of 1944, Air Ministry, Bomber Command and No. 100 Group received by 14.30 a preliminary EMP report and sketch map showing the enemy's reaction to the previous night's operation.

119 129. At the same time, it became obvious that the night EMP reports were producing a mass of intelligence which would benefit from summarisation. A series of periodical reports, known as the Tac/N reports, were therefore distributed throughout 1944 at approximately monthly intervals. In addition to analysing the cumulative effect of Bomber Command's tactics, these reports provided detailed intelligence on the G.A.F.'s night defences including methods of control, activity of different Units, communications, beacons etc., all reports being copiously illustrated with sketch maps.

THE VALUE OF SIGNALS INTELLIGENCE TO AMERICAN VIII AIR FORCE,
VIII AIR FORCE

120 130. In the following paragraphs, a full description is given of VIII ^{Air Force} ~~Air Force~~ operations and the use made of operational signal intelligence. This is dealt with at some length as it is by far the best example of the value obtained from 'Y' by a Strategic Air Force during the German War.

121 131. On 17th August, 1942, a target near Rouen was bombed by 12 B.17's of VIII Bomber Command; this was the first operation by American bombers in the European theatre. By January, 1945, missions were being flown almost daily by 1,200 B.17's and B.24's to all parts of the Reich, with little or no opposition from the G.A.F. Having no 'Y' Service of their own, the VIII Air Force relied on the R.A.F. for signal intelligence throughout their operations from this country and they proved themselves adept at fully exploiting the 'Y' facilities which were rapidly put at their disposal.

122. Fortunately the R.A.F. Signals Intelligence Service was able to supply 'Y' information of a type particularly suited to the requirements of the VIII Air Force at successive stages of its development. It must be emphasised, however, that VIII Air Force and in particular, VIII Fighter Command during their existence as a separate unit, displayed from the beginning, a gratifying awareness of the potentialities of signal intelligence and a persistent determination to extract the maximum benefit from its use.

123. From the outset, VIII Bomber Command took the keenest interest in the short-term reaction reports prepared for them by Kingsdown based on intercepted fighter R/T traffic. When navigation was sometimes faulty, it was possible for Signal Intelligence to supply details of the route actually flown as opposed to the route prescribed and to indicate the most satisfactory routes for unescorted bombers, having regard to the bases and tactics of G.A.F. fighters.

124. At that time, intelligence regarding enemy fighter bases and strengths was derived mainly from 'Y' and this increased considerably when hitherto unidentified fighters were stirred into activity by VIII Air Force penetrations. Reports of sightings by bomber crews were subject to serious duplication and a most misleading picture of the enemy's scale of effort would have resulted but for 'Y' - and the confidence in its reliability which its findings came to inspire.

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125. 'Y' Reports on Enemy Fighter Activity. As in the case of the night B.M.P. reports (see para. 119), it soon became clear that a summarised day B.M.P. report would be of value. In November, 1943, a new report, known as TAC/D1 therefore appeared; this covered six major operations by the U.S.A.A.F. and analysed the enemy's defensive tactics in considerable detail. Altogether five TAC/D reports were produced at varying intervals, each carrying a number of sketch maps.

126. One further EMP report was produced to meet the specific needs of the U.S.A.A.F. This was the EMP Digest which started in December, 1943 and was produced whenever an American Strategic Mission took place. Intended primarily for Bomber Divisions and Fighter Wings, the EMP Digest consisted of three parts; estimated scale of enemy effort (according to intercepted R/T. traffic), sequence of events in the enemy's reaction, and conclusions and main points of interest. Although this report was not so detailed or comprehensive as the ordinary EMP report, the layout proved immensely popular with certain formations where a rapid report combined with an easily understood story was required.

127. Exploitation of 'Y' by VIII Fighter Command. Although from the outset, VIII Bomber Command always took great interest in signal intelligence, it was VIII Fighter Command which was able to profit by operational 'Y'. Controllers at headquarters and at the three Fighter Wings were linked by telephone to the Kingsdown organisation and received continuous 'Y' intelligence whilst operations were in progress. From details of German fighter movements passed to them, the American Controllers were able to vector their own fighters to counter interception attempts during the bomber penetration or withdrawal. 'Y' information proved of particular value in showing when the bombers were withdrawing off course and it was frequently possible for the withdrawal cover to be re-directed to meet straying boxes of bombers which would otherwise have failed to make rendezvous and have become an easy prey for German fighters. Once the bombers were over the Dutch Coast, there was little chance of obtaining their position from Allied radar and 'Y' was the only source of information.

128. In the early days of VIII Fighter Command, the correct assignment of escort relays was a factor of great importance and Signal Intelligence played its part by supplying valuable details of the main rendezvous points of G.A.F. fighters. Later on, when an increasing force of P.51's made possible a system

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of modified freelance escort, the 'Y' Service assisted the successful planning of fighter sweeps ahead of the Bomber stream which resulted in the opposition being broken up before it could deliver its attack on the bombers.

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146. An interesting example of the successful exploitation of signal intelligence by VIII Air Force occurred on 27th November, 1944. On that occasion a force of 500 heavies was despatched to targets on the Lower Rhine, whilst approximately the same number of fighters, mostly with bombs up, were scheduled to undertake an independent mission against targets in the general area of Brunswick and Stendal. R/T. traffic from G.A.F. Raid Reporting Stations made it clear that the enemy were mistaking the fighter force for heavy bombers. The mistake persisted and a Flak warning on W/T. indicated that a large number of fighters were taking off to attempt interception. Shortly afterwards, Signal Intelligence Units on the Continent heard German fighter R/T. traffic which confirmed that the enemy were attempting to intercept the fighter bombers, which had incorrectly been plotted as heavy bombers. All this information was made available to the Controllers of VIII Air Force at their advanced ^{micro-wave early warning (NEW)} Station in Belgium. In view of its unmistakeable implications, orders were passed to the fighters to jettison their bombs and alter course to ensure contact with the enemy. The resultant encounter was most successful, American fighters claiming 98 ^{enemy aircraft} destroyed.

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147. ~~Difficulties encountered~~ No account of Signal Intelligence and VIII Air Force Operations would be complete without some reference to the difficulties encountered in intercepting the available enemy traffic. As long as German fighters operated within a radius of about 200 miles from the English Coast, their V.H.F. air-to-ground communications could be satisfactorily received by intercept stations in the U.K. As bombers of VIII Air Force penetrated deeper into enemy territory, however, fighter opposition operated further back. In March, 1943, single-engined fighter R/T, reflecting activity in the Hamburg /Bremen area, could not be heard by the Kingsdown organisation and by January, 1944, the overall signal intelligence picture was suffering appreciably from lack of traffic. In March, 1944, fighters based in Holland withdrew eastwards and from then onwards, very little V.H.F. air-to-ground R/T. of significance to VIII Air Force could be intercepted in the U.K.

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Airborne Interception.

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148. 148. It was quickly realised in 1943 that airborne interception was the only solution if adequate cover on the communications of German single-engined fighters was to be maintained. Tests were carried out to investigate the possibility of carrying airborne recorders on a fixed frequency in Fortress aircraft but for several reasons this scheme proved impractical. A number of German speaking American operators of VIII Air Force were therefore trained by Kingsdown and three of them were carried on each mission as from April, 1944. By July six operators were being carried and this was increased to twelve by October; this number was considered adequate for providing full cover and involved maintaining a pool of 100 Operators in training and on operations.

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149. 149. As explained in paragraph 139, the R.A.F. Signal Intelligence Service supplied VIII Air Force with a short-term reaction report after each mission; this was sent by teleprinter a few hours after the raid had taken place. In order to take advantage of the valuable material intercepted by the airborne operators, arrangements were subsequently made for their traffic to be teleprinted to Canterbury so that an Appendix could be prepared and distributed during the night following the operation.

Land-based Interception

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150. 150. Although airborne interception was of great assistance in preparing reaction reports for planning purposes, it was of no immediate operational assistance to the Fighter Controllers of VIII Air Force. Land-based interception with adequate facilities for interpretation was the only solution. Once the Allied Armies had advanced through France and Belgium, such a proposition became possible and steps were taken to set up an advanced 'Y' Station on the Continent, manned by Canterbury personnel.

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151. 151. Delayed by the Ardennes Offensive, the unit did not become operational until early in 1945 and it was therefore unable to make any substantial contribution. Meantime, however, during the period from November, 1944, onwards, Signal Intelligence field units of S.H.A.E.F. had been connected by landline to the VIII Air Force Fighter Control Station near Aachen. This temporary arrangement was of value in supplementing other 'Y' information supplied from the U.K. organisation.

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135. There remains little more to say regarding the contribution of 'Y' to VIII Air Force operations. It will always remain a remarkable example of Anglo-American co-operation. On the one hand, the VIII Air Force, despite their immense reserves of personnel and equipment were satisfied to rely on the R.A.F. for their signal intelligence and made no attempt to set up their own organisation; on the other hand, the R.A.F. Signal Intelligence Service found their Allies probably the most astute and appreciative exploiters of 'Y' that the war produced. The results achieved fully justify the policy adopted.

~~Signal Intelligence for Tactical Air Forces~~

PREPARATIONS FOR THE ALLIED LANDING IN NORMANDY (operation "OVERLORD")

136. ^{The Task,} At the end of 1943, Signal Intelligence was asked to provide facilities for the American IXth Air Force and the British 2nd T.A.F., the two Tactical Air Forces to take part in the invasion of Europe (operation "Overlord"). The task was divided into three main phases:

- (a) The institution of an intensive watch on the enemy's reaction to Allied invasion preparations.
- (b) The provision of immediate operational information during the Assault.
- (c) The provision of operational and long-term intelligence during the ensuing period when both tactical air forces were fully deployed on the Continent and the enemy was progressively being forced back into Germany.

137. During the first phase, it was possible to rely on the interception facilities of the R.A.F. Signal Intelligence Service in the U.K. but as phases (b) and (c) were imminent it was necessary to make arrangements which would meet the difficulties inherent in a moving battle when communications would be best when shortest and when both the enemy wireless transmitters and the Allied operations staffs making use of signal intelligence would be moving steadily further away.

138. ^{Personnel} Past experience had shown the need for having fully trained Signals Intelligence personnel to interpret signals intelligence information to Operations and Intelligence Staffs. This was met by the establishment of a duty Signal Intelligence Staff Officer at

H.Q.A.E.A.F. and of comparable staffs of two officers each at H.Q. 2nd T.A.F. and H.Q. IXth Air Force. Operations rooms at Groups ^{and} Tactical Air Commands were similarly provided with duty Signals Intelligence Officers detached from local field units.

139. Final responsibility for the planning and the working efficiency of all Signals Intelligence units and staffs established inside the Allied Expeditionary Air Forces devolved on a Group Captain (R.A.F) and his deputy a Lt.Col. (U.S.A.A.F.). The Group Captain's Staff included one S/Ldr. responsible for the collation and dissemination of signal intelligence inside the Allied Tactical Air Forces and one S/Ldr. responsible for maintaining a general picture of all enemy non-communication signals developments. The Group Captain was represented at 2nd T.A.F. by a S/Ldr. (R.A.F.) and at IXth Air Force H.Q. by a Major (U.S.A.A.F.) and it was through these officers that the staff work necessary for the administrative control of the Field Units was carried out.

140. The filling of the establishments outlined above presented no great difficulty for the R.A.F. as the rapid decline of German air activity in the Mediterranean had facilitated the release of numerous experienced personnel from that area, and these, together with those trained during proceeding months, formed a considerable pool of trained Signals Intelligence personnel for employment in A.E.A.F.

141. ^{*training of U.S. Personnel*} With the American Forces, however, the situation was otherwise. At the beginning of 1944, very few trained American personnel were available in the U.K. High priority was therefore placed on the establishment, procurement and training of the necessary personnel, and by D-Day all the American units were up to strength, fully trained, and ready to commence operations. The striking success which marked their efforts does great credit to the intelligence and application with which they profited by the training provided for them by the R.A.F. Signal Intelligence Service.

Intelligence from Y Sources

142. L An integral part of the "Overlord" plan was the last-minute jamming and destruction of all enemy radar apparatus in the immediate area of the assault. A special combined Air Force/Naval Signal Intelligence staff was established at Headquarters A.E.A.F. to deal with this plan. Intensive watches were maintained on all enemy Radar on the French coast. After attacks, the Air Staff was kept fully informed as to the state of the enemy's radar defences and appropriate day-to-day action was recommended to meet the current situation. It was later established that the countermeasures undertaken were completely successful.

143. The contribution to Allied Air operations of information derived from the H/F and M/F Flak warning W/T networks represents one of the most striking examples of what Signal Intelligence can supply under favourable conditions. One of the major tasks of the Allied air forces in "Overlord" was the disruption of enemy communications. So effective was this operation that the warnings of coming operational sorties by German aircraft which had hitherto been passed to German Flak mainly by landline were, from the early days of "Overlord" right up to the time of the final collapse of the German Army, passed in low-grade cyphers on H/F W/T networks.

144. The homogeneity of texts and the large number of messages enabled rapid and fairly complete results to be obtained daily. Allied Air Signals Intelligence was thus generally in possession of detailed advance information on nearly all the tactical operation of the G.A.F.

145. The A.E.F. Air Signal Intelligence organisation was the fruit of 4½ years' war experience in a number of theatres. The research background was voluminous and accurate, the personnel were either themselves very experienced or had been trained by highly experienced Signal Intelligence workers. The physical problems of maintaining a flexible but fully informed and highly efficient intercept organisation in the Field had been thrashed out in the Mediterranean. The enemy air forces opposing A.E.A.F. were considerable and no previous tactical 'Y' organisation had had to deal with so many varied problems. It only remains to draw attention to the close

/co-operation ...

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co-operation which existed between the American and British teams
and to underline their joint success.

D.D.Tels.2
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PART II : CHAPTER 7A.D.I.(K)SECRET.INTELLIGENCE FROM INTERROGATION and
CAPTURED DOCUMENTSINTRODUCTION

1. A realisation that prisoners of war were a valuable source of intelligence was strengthened in this country during the war of 1914-1918, but no technique of interrogation had then been formulated, and that source had therefore been given no important place in the general scheme of intelligence. Air interrogation had never existed as such before 1939. At the outbreak of war, therefore, when an Air Ministry branch was set up to provide for the interrogation of German airmen captured in the British Isles, there was no previous experience of organisation - or of method - on which to base the new establishment.
2. The scope and possibilities of prisoner of war interrogation were little known and entirely unpredictable in the early stages of the war and therefore the new branch could not be organised on any firm basis; its officers had to embody a facility for improvisation and adaptability to circumstances which were constantly changing. The fact that by the middle of the war a large and efficient organisation had been evolved which produced intelligence of the highest order, and was certainly unequalled in any country, was therefore not due to any direction from higher quarters but rather to the initiative of the interrogation officers themselves.
3. In any future war a newly formed interrogation unit would certainly be faced with the same lack of a basis for its initial organisation unless it were able to draw upon the accumulated experience of the past. The following account has been written with the object of avoiding such future handicaps, and consequently the whole growth of the organisation with the failures and successes which accompanied that growth are reviewed with that end in view.
4. This account will follow the development of the air interrogation branch from its beginnings as a small section, with an establishment of some nineteen officers for the interrogation of enemy aircrew captured in England, to an Assistant Directorate of the Air Ministry with a staff of 79 officers spread over all operational fronts. It will show how, as new sources of intelligence became available, new specialised sections were formed to deal with that intelligence, how a United States interrogation unit was successfully fused with the British organisation, and how the standard of reliability of intelligence produced came to be regarded as little short of unquestionable.
5. In the light of the wide experience in interrogation gained during the war, this account concludes with a suggested policy for the formation of a future unit and gives recommendations of the type of officer who should be selected for the work.

THE INTERROGATION CENTRE.1 SURVEY OF DEVELOPMENT.Formation

6. Towards the end of March 1939 a conference at the War Office attended by representatives of the War Office, Admiralty, Air Ministry and Home Office decided upon the formation of an intelligence organisation to be charged with the interrogation of prisoners of war. One result of this conference was that a basic charter was drawn up for an air interrogation section of the R.A.F. A combined services collecting and detailed interrogation centre, of which the R.A.F. unit was to form a component, was to be established at the Tower of London and was to be opened within 24 hours of the outbreak of war.

/7. It was

7. It was made clear in this charter that the Army carried the responsibility for the custody and transport of all prisoners of war at all times, and that the War Office would administer all prisoner camps in the United Kingdom and by implication, subsequently in any other theatres of war under British control.

8. It was arranged that when enemy prisoners "arriving by air" were captured in the United Kingdom, the nearest R.A.F. authority would be informed. After a R.A.F. interrogator had seen the prisoners, the Army would convey them either to the Tower of London for detailed interrogation or to a permanent prisoner of war camp. In addition, 200 beds for wounded prisoners were reserved at the Royal Herbert Hospital, Woolwich, and the necessary guards were to be provided by the nearest military unit. Arrangements were made for segregating wounded prisoners so that they could be interrogated as soon as they had sufficiently recovered; the German custom of employing nurses trained in intelligence work was not adopted, and indeed in the light of later experience had no value.

Mobilisation

8. On 28th August 1939, a small number of R.A.F.V.R. officers chosen for their command of the German language and their previous business or professional connections with Germany, was posted to the air section of the combined interrogation centre already planned and then being formed at the Tower of London. ~~On September 2nd, Flying Officer R. E. H. POLLOCK, the first head of the air section, and Flying Officer S. D. FELKIN moved into the Tower of London with officers of the other services. The senior Army representative at the centre was Captain T. E. KENDRICK, whilst the Naval unit was headed by Lieutenant-Colonel B. E. HENCH, R.M., an officer with experience of interrogation in the war of 1914-1918. Accommodation was provided for four R.A.F. interrogation officers in the quarters of the Welsh Guards, and a total of eight to ten rooms was available for prisoners.~~

9. In addition to the officers at the Tower of London, fifteen German-speaking R.A.F.V.R. officers were placed at various R.A.F. stations throughout the country to act as field interrogators on the assumption that Germans baling out or crashing in the country would be more amenable to preliminary tactical interrogation immediately after capture and whilst still under the influence of the initial shock; the ground could thus be prepared for later detailed interrogation.

10. The position of the air section, with its central detailed interrogation unit and its field interrogators scattered over the United Kingdom, was thus from the very beginning different from that of the other two services, who confined their activities to the detailed interrogation centre at the Tower.

C.S.D.I.C

11. On October 26th 1939, the combined interrogation unit which had been known as M.I. 1(h) was renamed "Combined Services Detailed Interrogation Centre" or C.S.D.I.C. ~~At the end of October, however, the R.A.F. unit took on its own individuality and became an Air Ministry section, M.I. 1.(k); on 20th December Squadron Leader POLLOCK was replaced by Flight Lieutenant (later Group Captain) S. D. FELKIN who remained as head of the organisation throughout the war.~~

12. A few months later the Naval section became an Admiralty department, N.I.D. 11, and subsequently, in January 1942, was divided into N.I.D. 1.(P/W) and N.I.D. 3.(P/W) for the handling of German and Italian prisoners respectively. Early in 1940 the Army section became M.I. 9(h) under its controlling War Office branch M.I. 9(a) (on the establishment of D.D.M.I. (P/W); on 1st January 1942, M.I. 9(a) became M.I. 19). A week later, however, the section ceased to be a branch of the War Office and itself assumed the title of the combined centre, C.S.D.I.C.

13. In December 1939, C.S.D.I.C. with its Naval, Army and Air Force sections moved from the Tower to Trent Park, at Cockfosters to the North of London, where increased prisoner and office accommodation was available.

/Somewhat

Somewhat later plans were made for two camps, at Latimer and Wilton Park, near Beaconsfield in Buckinghamshire, to be specially designed and built as interrogation centres, but it was not until July 1942 that those camps were finally completed and occupied.

1245. It happened that between July 1940 and April 1943 very few Army prisoners became available, so that C.S.D.I.C. was in fact maintaining the interrogation centre mainly for the Navy and R.A.F., and had the responsibility for the accommodation and feeding of prisoners, the provision of guards and the working of the microphone service.

Overseas Detachments

1246. Early in 1940 a small air interrogation unit (B.A.F.F.) was detached from A.I.1.(k) and moved to France for work in the field with the British Expeditionary Force. Another independent unit, formed from A.I.1.(k) in August 1940 for interrogation of German and Italian air prisoners in the Mediterranean theatre was attached to a new C.S.D.I.C. at Ma'adi, near Cairo. The new centre adopted the title C.S.D.I.C.(M.E.), and the original centre in the United Kingdom therefore added the letters "U.K." to its title. It was not until three years later that the air interrogation unit at Cairo was subordinated to the parent unit in the United Kingdom, and by that time the shipment of the more important prisoners to England for long-term interrogation under expert briefing had become practicable.

Interrogating Refugees

1247. Early in 1941 an expansion of the activities of A.I.1(k) took place when arrangements were made for some of its officers to be attached to the security control centre at the Royal Patriotic Schools at Wandsworth for the purpose of gathering intelligence from the many newly-arriving refugees whose credentials were being examined. This venture was finally expanded to an important section - A.I.K.(4) - supplying detailed intelligence on German Air Force establishments and on industrial concerns engaged in war production in Germany and the occupied countries, for the benefit of air target intelligence and economic warfare planning.

1248. In May 1941, the activities of this section were divided and another similar section - later to become A.I.K.(5) - was established for the interrogation of refugees from Norway; this section quickly developed into the Intelligence Air Liaison at the headquarters of the Norwegian authorities in London.

Subsequent Expansion

1249. By 1942, A.I.1.(k), now renamed A.I.(K), had considerably expanded its activities. At home it had established a school for interrogators, where R.A.F. officers, and later American officers, were trained for service both at headquarters and in other theatres of war. The local interrogation officers, whose work had decreased owing to the decline of German Air Force activity over England, took part in the interrogation of sailors and others who touched at British ports, and at the same time initiated regular security lectures to British aircrew, an activity which grew to become part of the operational training of all Allied aircrew.

1250. These officers were particularly well qualified to warn aircrew of the uses that the enemy could make of information from prisoners of war, as by now the German interrogation methods were fairly well known besides which the interrogation officers could draw upon their own experiences to strengthen their warnings. Other additional work undertaken was in the form of liaison with the B.B.C. and the Political Intelligence Department of the Foreign Office for the production of propaganda addressed to the German Air Force.

1251. Another activity undertaken by officers at headquarters of A.I.(K) was the interrogation of Allied aircrew escapers from Germany and German-occupied Europe. These interrogations were undertaken largely for extracting all possible intelligence on the German Air Force in Europe. The work was, however, dropped early in 1944 owing to the pressure of other work in preparing for the invasion of Europe.

/22. In July 1942

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~~22. In July 1942 A.I.(K) moved with C.S.D.I.C.(U.K.) to the two new centres at Latimer and Wilton Park, and made its headquarters at the former camp. By this time a large proportion of A.I.(K)'s work was being carried on at places other than at headquarters, but for reasons of convenience and administrative efficiency the headquarters were maintained in one of the buildings of C.S.D.I.C.(U.K.). The association with C.S.D.I.C.(U.K.) continued throughout the war with mutual collaboration to the advantage of both sides.~~

Air-Naval Liaison

19 23. As the Battle of the Atlantic increased in intensity, an A.I.(K) officer was attached to the Naval section of the centre for the watching of the air interest in the interrogation of German Naval prisoners. Up to this time the arrangement had been that naval prisoners, their interrogation completed by the Admiralty section, should be passed over to A.I.(K) for the air aspect. Under the new arrangement dissemination of intelligence of air interest was undertaken by the Navy except in special cases, such as the first appearance of anti-aircraft emplacements on U-boats and the employment of new tactics of surface fighting instead of diving.

20 24. The A.I.(K) officer acted as liaison with Coastal Command and soon brought the latter into close touch with both Air and Naval intelligence sources. This arrangement proved to be exceedingly successful, and was partially instrumental in founding a closer co-operation between the R.A.F. and the Admiralty. From the purely air aspect much valuable work was done for the benefit of Coastal Command in the U-boat war, and for Allied convoys and shipping which were subjected to air attack both by bombing and by torpedoes.

Anglo-U.S. Liaison

21 25. In October 1942 the first American officers joined A.I.(K) headquarters in England, and the successful fusion of the R.A.F. and U.S.A.A.F. air interrogation was founded. At the outset the United States authorities realised that a vast background and experience, such as by now had been acquired by A.I.(K), were essential to an interrogation unit; they therefore decided upon full integration with the existing British organisation. This co-operation was maintained with the highest measure of success until well after the close of the war.

Final Organisation

22 26. In July 1943, A.I.(K) was upgraded to an Assistant Directorate of the Air Ministry (A.D.I.(K)) with five sections in England. In September of that year the culminating point of the organisation was reached in the policy of centralising all air interrogation - except Japanese - under A.D.I.(K). The air detailed interrogation units at Cairo and Algiers, with forward units in Sicily, and later, after the invasion of the Continent, units in Italy, France, Belgium, Holland, Germany, Greece and Austria, were all controlled by the Assistant Director. *Selected prisoners for interrogation on special subjects were sent over to Headquarters in England from these outside posts.*

~~27. Selected prisoners were sent over to headquarters in England from these outside posts. Large numbers came from North Africa, especially at the end of the Tunisian campaign, and members of both the German Air Force and Army were interrogated on special subjects such as ground and airborne radar, tactics in day and night defence of Germany, and V-weapons.~~

23 28. The diagram accompanying this account (Appendix D) shows the growth of the air interrogation unit outlined above up to the time it became fully developed. In the following paragraphs the growth and activity of the various sections of A.D.I.(K) are taken separately and discussed in detail and the methods which were found by experience to produce the best results are emphasised.

INTERROGATION AT HOME.

FOREWORD.

24 29. The work of detailed interrogation is to produce original intelligence /and not to

and not to collate intelligence from other sources. In order that Intelligence may confirm its information it is essential that the various sources should report independently and should have little contact with one another.

25 30. From experience gained during the war it can be said that certain basic methods should be employed if interrogation is to be of the type that will produce intelligence of the first order of reliability. These basic methods are, widely, the employment of microphones and stool pigeons as aids to interrogation, the careful maintenance of a library and records section for the briefing of interrogators and for ascertaining the exact extent of our knowledge of the enemy and finally, the collation of results obtained in objective and readable reports.

26 31. The paragraphs under this section discuss the methods employed in detailed interrogation. It has already been shown how, with the progress of the war and accumulation of more and more experience, the different branches of activity were eventually canalised into various sections of the Assistant Directorate. It must be emphasised, however, that although the wide range of activities of A.D.I.(K) in the United Kingdom were divided for convenience into these sections, complete specialisation by its officers was not aimed at. This proved to be a wise policy, as the individual officers thereby acquired the greater breadth of knowledge so necessary for successful interrogation, besides which pressure of work was rarely distributed evenly over all sections. From 1943 onwards the activities of the Assistant Directorate were divided into the following headings, each of which is afterwards taken separately:-

Home Units:

Overseas Units:

- Preliminary Selection of Prisoners.
- Detailed Interrogation.
- Microphones and Stool Pigeons.
- Records.
- Editing and Publication of Reports.
- Industrial and Refugee Interrogation.
- Norwegian Interrogation.
- Propaganda.
- Security Lectures.
- Documents.

- Mediterranean Theatre.
- Western Front.

Small's PRELIMINARY SELECTION OF PRISONERS.

Field Interrogation.

27 32. From the beginning interrogation officers were placed with R.A.F. airfields or establishments at selected spots throughout the British Isles. These officers, each of whom was allotted a car and driver, were to undertake an immediate and preliminary interrogation of prisoners as soon as possible after an aircraft crash had occurred, and in cases where the enemy aircrew were all killed were to examine the wreckage and bodies for the purpose of extracting all papers and documents. Information obtained from prisoners, together with all papers and documents recovered, were to be transmitted to headquarters with all possible speed.

28 33. It had been envisaged originally that military units would undertake the apprehension and guarding of aircrew prisoners, but in practice it was found that the local police were almost invariably the first to take charge. Since the police had the necessary cell accommodation and the experience in the searching and detention of prisoners, it was arranged that they could undertake the detention of air prisoners until completion of the preliminary interrogation.

29 34. On this basis the procedure evolved was that as soon as a crash occurred in the area assigned to an interrogation officer, the latter was /informed

informed either locally or through headquarters of the rough position of the crash. By the time the interrogation officer arrived on the scene the local military or police would probably already have placed a guard on the crashed aircraft, and live prisoners would have been taken to the nearest place - often a police station - where they could conveniently be segregated for the preliminary interrogation. Prisoners were disarmed and searched, their personal property and papers put into separate envelopes, and upon arrival of the interrogation officer were handed to him for further investigation.

30-35. The interrogation officer visited the crash and searched for documents before commencing the interrogation of the prisoners. The technical aspect of the crashed aircraft was covered by an officer from A. I. 2(g) and he and the interrogation officer at this stage worked in close collaboration. Before interrogation took place, the officer made an inspection of the captured documents and papers in order to be armed with as much preliminary information as possible. The interrogation merely aimed at establishing primary facts such as the unit and base to which the prisoner belonged, an account of the combat and if possible any information on future plans. These details were telephoned to headquarters in the form of a preliminary report; a special form with numbered items was evolved for this purpose and proved its value for rapidity and ease of transmission as well as having the elements of secrecy on an open telephone line.

31-36. Where intelligence of immediate operational value, such as signals code tables and order of battle had been gleaned from assessment of documents or interrogation; the speed with which this information was relayed to Air Ministry was of the utmost importance. At headquarters, as soon as possible after the information had been received, a preliminary report was issued containing non-technical details of the aircraft, its unit, base and a brief account of the combat, together with other information which emerged from the preliminary interrogation and examination of the documents.

32-37. Where prisoners were numerous, as was often the case during the Battle of Britain and other later bursts of activity by the German Air Force, the local interrogation officers would only recommend for detailed interrogation such prisoners as were considered to be promising subjects or who were thought likely to possess information in demand by intelligence, operational or technical formations. After a discussion with headquarters these prisoners would be sent under military escort and by the quickest means available to the detailed interrogation centre. All prisoners' documents and personal property were sent to headquarters, whether prisoners had been selected for detailed interrogation or not, or in cases where all members of a crew were killed.

Forward Cages.

33-38. From 1942 onwards large numbers of prisoners were from time to time captured in large-scale air operations over the United Kingdom, or were brought in from special operations overseas, or from overseas theatres of war. In such cases the accommodation and working capacity of the interrogation centre were strained to the utmost, and therefore cages were set up for initial interrogation and screening of the prisoners. During the earlier stages the Lingfield racecourse was used, and after the ^{Allied Landings} invasion of France ^{in 1944} when the flow of prisoners reached large proportions, another cage was opened at Kempton Park racecourse.

34-39. At these two cages the registration, searching and cleansing of prisoners was undertaken by the Army as had originally been arranged. Between the processes of registration and searching, a rapid preliminary interrogation was conducted by an A. D. I. (K) officer attached for the purpose, and he selected all prisoners who might be of interest for detailed interrogation at headquarters. Prisoners were largely selected or rejected at this stage on the basis
/of their

of their personal documents. At the end of each day this officer telephoned details of the prisoners he had selected to headquarters, who would make the final selection; the prisoners selected would be delivered to the centre on the following day.

- 35 40. After the first collapse of the German forces in France, the intake of prisoners at the main cage in England reached such proportions that the A.D.I.(K) officers available could no longer handle the work, and Army interrogators therefore lent a hand with the preliminary work and passed over any prisoners likely to be of interest; similar co-operation with the Army took place in all overseas theatres.

Small's DETAILED INTERROGATION.

- 36 41. The following section, rather than setting out the organisation and working methods of those sections of A.D.I.(K) concerned with the detailed interrogation of prisoners, is a recommendation of the methods which were found by experience to produce the most successful results.

- 37 42. The interrogation of prisoners of war is permitted under the Geneva Convention, although under this convention the prisoner cannot be expected to divulge more than his name, rank and number. At the outbreak of war the R.A.F. had inherited no traditional methods of interrogation but as it happened this was an advantage in some ways, since new methods were needed. Under the old system, for instance, the interrogator took down in writing anything a prisoner said at the time of the interview, but it was soon found that German Air Force prisoners, who were above the average intelligence in the German forces, were under such conditions discouraged from talking with any degree of freedom.

- 38 43. Interrogation of prisoners is a difficult and delicate task, and it is necessary from the outset to contradict the common belief that an interrogation can be conducted by anybody, anywhere and by no matter what method. It is indispensable, if results of any value are to be produced, that the examination be conducted in a skilled, planned and methodical manner.

The Interrogator.

- 39 44. A good interrogator is a practical psychologist with a capacity for rapid appraisal of character and an understanding of how to deal with the different types of men he encounters. A prerequisite is that the officer should be a reasonably good linguist, although emphasis on an understanding of the language which he is using is more important than an ability to speak the language perfectly. Experience showed that prisoners were generally at ease with interrogators who spoke their language imperfectly; often they tended to become suspicious of perfection in their language. Indeed, an assumed imperfection on the part of the interrogator often produced good results.

- 40 45. The method of approach of the interrogator to the prisoner is vital, and the former must be able quickly to decide whether his approach is to be friendly or strictly official. He must be able to judge whether a man can be won over by discussion and argument, by anger under certain circumstances, or by kind treatment accompanied by small favours such as chocolate, cigarettes or strong drink.

- 41 46. It follows that as a general rule the very young officer is less suited to the work than one of more mature experience. On the other hand the interrogator should not be too old or he is likely to be out of touch with the generation to which the prisoner belongs. It is often an advantage when the rank of the interrogator is higher than that of the prisoner, and that one or more interrogation officers of senior rank should be available to deal with the higher ranking prisoners.

- 42 47. Some prisoners can be bluffed into obedience by an assumption of authority as though it were a matter of course. The Germans, at least, were accustomed to

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accustomed to automatic submission to senior officers and to anybody who claimed authority with any show of justification. This submission was often extended to include the interrogation officer, as prisoners had been told to be polite to enemy officers and some were uncertain as to what were the limits of such politeness.

43 48. The interrogator must be possessed of patience, perseverance, an exceedingly good memory, a strong determination and a cool head. A show of impatience or anger is often necessary, but loss of temper is always fatal; he must therefore also be a good actor. He must, too, be quick and versatile, with a capacity for detecting hints of any new developments on the part of the enemy; salient points often come out in an unguarded utterance, and the interrogator must be capable of thinking quickly and deciding whether he will take up the point immediately, bring it up again later, or apply it as a starting point for interrogating another prisoner.

44 49. Finally, the interrogation officer who, as already emphasised, must be possessed of good memory, must accumulate and maintain a profound knowledge of the enemy air force, its fighting methods, its order of battle, units, personalities, terminology, equipment and the functions and possible functions of that equipment. In this way the prisoner is frequently disarmed by the enemy's extensive knowledge of his air force, and the interrogator for his part is suitably armed to deal with any attempts at untruth on the part of the prisoner, or with any false information given in good faith but based on rumour, lack of knowledge or even on propaganda which has been deliberately injected for the purpose of sustaining morale.

The Prisoner.

45 50. The interrogator must remember that the prisoner is also a man who has his moments of courage, revolt and weakness. Amongst some prisoners are found those who are talkative and blustering, and those who are vain and with little prompting will be ready to make a show of their knowledge. Amongst others will be found the timid people who give information for fear of punishment or to improve their own treatment; other types are those who fall almost unconsciously into confidences, and those who are too foolish to realise that one word may complete some information previously gathered.

46 51. The voluntary liar in the hands of the expert interrogator will confound himself by false declarations, and having confessed his lies will tell the whole story in fear of punishment. Finally there is the intelligent prisoner who is cheerful, polite and firm in his refusals and suspects microphones and stool pigeons; he is the most difficult of all and can only be overcome by perseverance on the part of the interrogator, who sooner or later will find an opening in his armour. The interrogator must be able to recognise the intelligent from the cunning, the quiet from the hostile and the thick-headed from the imbecile.

Interrogation Methods.

52. ~~D.I. (K) Report No. 388/1945, "German Methods and Experiences of Prisoner Interrogation (Dulag Luft)", should also be read in connection with the following paragraphs, as this report reproduces the translation of a very well-worked out document, and shows that the German experiences were in most cases very similar to our own.~~

General

47 53. Taking into consideration the basic principles of procedure already outlined, it must be emphasised that no set of rules can be laid down for the actual interrogation of prisoners; it is obvious that the methods employed depend entirely upon the type of prisoner to be interrogated and the type of information it is hoped to extract from him. There is no doubt that prisoners from the Air Force were in many ways the most difficult of all the German /services to

services to interrogate, for it was considered to be the élite of the armed forces and its members were the most highly trained and educated. In one way, however, this fact implied a certain vulnerability, for the scientific and technical interest of prisoners could be aroused in discussion and guided to the divulging of wanted information.

48-54. The most common method of inducing prisoners to talk was a display on the part of the interrogator of a profound knowledge of all aspects of the German Air Force even to the names, nicknames and idiosyncrasies of officers and air-crew in a prisoner's own unit. The importance of a really efficient records department so that the interrogator can brief himself before the interview is obvious. From the study of such records the interrogator can arm himself with sufficient information to cause the prisoner such surprise that he sees little point in making his confinement uncomfortable by refusing to answer questions on apparently minor matters.

49-55. In the case of capture of two or more members of an aircraft's crew, their segregation at as early a stage as possible is extremely important, as in this way they are prevented from inventing and agreeing upon a story. Should they have invented a story before their capture, the interrogator then has no difficulty in breaking it down. Another advantage in segregation is that one member of a crew can be played off against the others by the use of information gathered from one to impress another with the interrogator's knowledge; similarly, a small point allowed to drop by one member of a crew can be taken to the others, added to, and brought back to the original prisoner for further embellishment, and if necessary the whole process repeated until a piece of intelligence has been built up in all its details.

50-56. The method described above, that of the interrogator leading the prisoner to talk by a display of knowledge was in general that which showed the greatest success. This method did not succeed, however, where the prisoner had received recent and good security briefing at his own base; other methods, therefore, depending upon the type of prisoner had to be employed.

~~57. Occasionally it might be necessary deliberately to lead a prisoner to untruth or impoliteness in order that the interrogation might take on a sterner tone. A little fierceness on the part of the interrogator, with the prospect of stricter camps or less comfortable surroundings, or the legitimate suggestion of handing over to another ally whose methods might give grounds for apprehension, would sometimes achieve a good result. The interrogator, however, should not couch his words in terms that are too definite, partly because he must be left with a loophole in case his bluff is called and partly because if the prisoner is left to use his own imagination the effect is far greater.~~

51-58. It must be remembered, however, that an interrogator can only use words and has little else than his personality, determination and experience to assist him. Obviously some bluff must be employed in interrogation, as most prisoners of war know that they need give only their name, rank and number. On the other hand, the interrogator must be careful to avoid any suggestion of having threatened the prisoner with physical violence, immediate or future. His art, therefore, must consist of suggestions and innuendo rather than the use of threats.

~~59. Another successful method was found to be a double act by two interrogation officers. The one who has failed to induce a prisoner to talk may suggest sterner methods, and call in a senior officer with the implication that the latter will see that they are carried out. The interrogator makes a show of trying to soften the heart of the senior officer and reasons with the prisoner in a kindly way, perhaps even returning later to tell the prisoner that he is doing all he can to avert the fate which is awaiting him. The above is only one example of how the double act may be played and, of course, the play must be arranged according to the circumstances and the type of prisoner, and must be carefully rehearsed.~~

/60. The fact

~~60. The fact that the Army provided the guards gave opportunities for the interrogation officers to show that they had no responsibility for any lack of consideration shown to a prisoner in his treatment or accommodation. This fact could indeed be turned to the advantage of the interrogator, in that the Army guards were ordered to be somewhat inconsiderate in their treatment, thus leaving the Air Force interrogator to ingratiate himself by ostensibly improving the prisoner's lot.~~

5281. Where the more stubborn type of prisoner was concerned, the process of a political deconditioning often proved very helpful. In the case of the Germans, prisoners had been carefully conditioned by their own political propaganda, but once isolated from their own kind the conditioning could be undone by proofs that the prisoner's political beliefs were merely untruthful propaganda that he had been fool enough to believe. If another prisoner was available who was already a doubter or a political unbeliever, it often proved fruitful to place one in the process of political deconditioning in the same cell.

5 62. The problem which frequently arose was the necessity of maintaining the interest of a prisoner who had been persuaded to talk and, having a large amount of intelligence information to give, was kept at the interrogation centre for a long period. Such prisoners were taken to London or elsewhere for a day's outing and were shown the sights, or perhaps taken to a theatre or cinema, and brought back to the camp before nightfall. Their enthusiasm and sense of obligation to the interrogator were thus awakened or increased, with the result that a further period of intensive interrogation could be undertaken with little difficulty.

~~63. The outings to London also proved valuable in many cases as part of the process of political deconditioning; prisoners saw for themselves that London was not lying in ruins as they had been led to believe, they saw private cars on the streets, and all manner of goods displayed for sale in the shops which had long been unobtainable in their own country, and found that a plentiful meal could be obtained without coupons. They compared what they had seen with the stories they had heard through the propaganda department of their own country. With very little persuasion by the interrogator they realised that they had been seriously misled and they resisted interrogation no longer.~~

~~64. Germans in particular were dependent on the society of their fellows that once deprived of the moral support or company they were prone to persuasion. Thus, when it was proved that their government had been deliberately misleading them, they not only changed their views but frequently were even prepared to go so far as to join the other side to work against their government for the good of their own country. Actually, good conditions in camps, and in England generally, greatly helped in the undermining of morale, especially towards the end of the war when German aircrew were being warned to expect ill treatment and starvation.~~

~~65. The results achieved by political conditioning were frequently only temporary, but for the purposes of the interrogator the condition lasted long enough for the extraction of material for intelligence.~~

54 66. It must be emphasised that the time factor is all-important, since in a fast moving war much information that is intelligence on one day soon becomes history; the interrogator must produce immediate results and therefore cannot afford to spend a long time in his efforts to persuade prisoners to talk. In the experience of interrogation of Germans, it was found that there were very few prisoners indeed who did not finally talk, and the time taken was anything between two and nine days.

67. The collation, editing and final dissemination of intelligence from an interrogation were undertaken by an editor, who worked in close collaboration with the interrogator and thus relieved the latter of much research. After each interrogation the interrogator passed his notes to the editor, who followed progress closely and advised where discrepancies occurred or where statements /could be

could be amplified. Either interrogator or editor would obtain briefing from interested outside formations such as the operational commands and Air Ministry sections, and thus built up a coherent picture of the prisoner's knowledge whilst supplying the need for special information.

Microphones and Stool Pigeons.

- 56 68. The interrogation methods outlined above could not be carried through with the fullest measure of success without the aid of an efficient microphone service. With those prisoners whose sense of security is difficult to break down quickly in interrogation, the assistance of stool pigeons, and therefore also of microphones for the recording of the conversations, is an essential prerequisite. At each of the specially built camps at Latimer and Wilton Park, every cell and interrogation room to a total of some 30 at each camp was fitted with microphones, and with the available staff of operators some twelve rooms could be covered simultaneously and continuously, whilst the remainder could be watched as required.
- 57 69. The room in which the microphone listening took place was from its very nature held as Top Secret as was the whole subject of microphone listening and reporting, it being essential that by no possible accident a prisoner could be brought to suspect the presence of microphones.
- ~~70. As already stated, the microphone service was operated by German-speaking army officers, and later also by N.C.O's. Recordings of more important conversations were made at the discretion of these operators, or at the special request of the interrogator, and were transcribed and issued as Top Secret reports. These paragraphs only deal with microphone sources where they supplemented or helped interrogation; their use as a source of intelligence alone is discussed in a later section.~~
- 58 71. Considerable but friendly differences of opinion between C.S.D.I.C. (U.K.) and A.D.I.(K) arose during the war as to the value of recorded conversations as a source of intelligence; certainly when combined with interrogation their value was that they gave the interrogator an opportunity of judging the veracity of the prisoner, that they provided starting points for interrogation of other prisoners, and that they often provided fuller information on subjects briefly touched on in interrogations.
- 59 72. When a particularly valuable prisoner was under interrogation the practice was to hold him in solitary confinement and to subject him to kindly and friendly treatment by British officers, until such a time as a firm impression of the extent and reliability of his knowledge had been obtained. A stage in the interrogation would be reached where it had to be decided whether greater advantage could be gained by continuing his interrogation under those conditions, or by placing him in a room with a companion whilst continuing interrogation and recording his conversations. If he were placed with a stronger personality the danger was that he might be influenced to resist interrogation, and even to suspect microphones.
- 60 73. In the argument in favour of recorded conversations as a source of intelligence, such a prisoner should have been placed with a companion immediately and his utterances recorded without further ado; in the contrary argument this man might never talk under such conditions, whereas direct interrogation could produce all the results required. It is a fact that nearly all major intelligence scoops obtained by A.D.I.(K) were from direct interrogation.
- 61 74. Recorded conversations are valuable when taken solely at their face value, but there is no doubt that their great danger lies in their acceptance as unquestionable intelligence. In the experience of A.D.I.(K), recorded conversations frequently broke off at their most vital point or, not being guided as in an interrogation, pronouncements which were seemingly comprehensive

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in fact lacked many essential details. Key words were often missed on account of extraneous noises such as aircraft passing overhead or the water tap running in the cell; the latter device was indeed often resorted to by prisoners who suspected microphones. Again, prisoners talking amongst themselves frequently exaggerated as to make their whole conversations unreliable, or a prisoner who suspected his room mate of being a stool pigeon might deliberately give unreliable information. Microphone conversations have great value when the prisoner is placed in a cell with a well-briefed stool pigeon who can guide the conversation along the required lines.

~~75. It is obvious that the microphone operators themselves should of necessity have a considerable knowledge of their subject, and should be well briefed on the requirements of individual cases and interrogations. It was therefore customary for the interrogator, as well as the editor, to maintain a close liaison with the operator. Before each interrogation the interrogator would hold a short conference with the operator as to the questions he proposed to put to the prisoner. In the more important cases, where a large amount of detail in names, figures or complicated technicalities was expected, the operator would be asked to record the whole interrogation. Such a recording was only undertaken in exceptional circumstances, however, as transcription of records took up a large amount of time, and a large staff would in consequence have been required.~~

62 76. The main condition in the use of microphones is that the utmost tact and discretion be exercised by the interrogator; above all he must be careful not to raise points in interrogation which have already and initially been raised by the prisoner in the privacy of his cell. In order that the secrecy of the microphone system should not be jeopardised such points, even if they be of primary intelligence value, can only be raised by guiding the conversation in a hope that the prisoner may raise the point anew, or if that fails the point can only be used as a basis for the interrogation of other prisoners.

Stool Pigeons.

63 77. The logical development of the microphone service is that a stool pigeon service should be established whereby a prisoner can be unsuspectingly interrogated by a fellow, ostensibly an innocent cell mate, but in fact a carefully briefed agent of the interrogator. A necessary adjunct is a well-stocked wardrobe of enemy uniforms of all ranks and services which are correct in their most minor details.

64 78. The first stool pigeons to be employed at the interrogation centre were refugees of German or Austrian origin, but in the later stages of the war deserters, or even ordinary prisoners who from motives ranging from a desire for their own comfort to genuine idealism, were willing to undertake these duties. The fact that members of the German forces were employed for these duties raised the serious problem of their welfare and of maintaining their mental balance under conditions of continual strain; for this purpose special Army officers were charged with looking after them, and they were given quarters in a cottage which stood in a secluded part of the camp. The length of time which for reasons of plausibility the stool pigeons had to be kept with prisoners, together with the extreme nervous tension under which they worked, caused them to be subject to severe stomach disorders.

65 79. The methods by which the stool pigeon obtained information from his prisoner depended largely upon the ability of the stool pigeon himself, who had to maintain an air of genuineness and possess the versatility of an actor. The problem of preventing the suspicions of the prisoner from being aroused was often overcome by the stool pigeon being ostensibly from another arm of the same service as the prisoner, from another theatre of war, or even from a different service of the armed forces.

66 80. A good stool pigeon could accomplish a great deal to help an interrogator. He could put the prisoner in the frame of mind best suited to the tactics upon which the interrogator was relying, and with even the
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most difficult prisoners he could, with continued briefing, conduct a complete interrogation. Not the least of his value lay in his ability to flatter a prisoner into giving him a full account of a recent interrogation, as a result of which details given at the interrogation could be embellished and assessed for their accuracy.

Prisoners' Documents.

67-81. / The papers and documents which the majority of German prisoners carried with them were always a useful starting point for interrogation. Identity cards, for example, gave a clue to a prisoner's unit by their nature and colouring, or perhaps told the unit in a code number; it was only a matter of keeping an efficient records system to have a ready key to the codes. The surprise evinced by a prisoner when told his unit after he himself had refused the information was an extremely effective aid to the breaking down of resistance. Many documents were pieces of intelligence in themselves, although most often requiring further amplification in interrogation.

68-82. During the Battle of Britain the quantities of prisoners' documents requiring examination were considerable. At that time German aircrew had not been trained to any extent in security, and their pockets and aircraft contained such things as maps, code tables, diaries, private letters and lecture notebooks, the latter particularly valuable in supplying information on tactics and equipment. At the interrogation centre no scrap of paper, however small, was thrown away until it had been carefully scrutinised in the light of the interrogation. Railway, theatre, cinema and other tickets were frequently the only indication of a unit's base. On one occasion a prisoner was proved to have come from a particular unit because he carried with him the key of his hotel room at Morgat in France.

69-83. Amongst the most useful documents from the interrogation point of view were Post Office Savings Bank books and paybooks; the latter should not have been taken into the air, but nevertheless one prisoner in ten had disobeyed orders. The Savings Bank book was often used by German aircrew for depositing savings from their pay and therefore, from the rubber stamp showing the branch of the bank at each transaction, indicated a man's movements and by inference the movements of his unit.

70-84. Diaries were useful in supplying information on the movements of units and personalities, which information, besides being disseminated to other intelligence formations where it was of importance, was carefully filed away in the records section for use against future prisoners. In the case of officers' notebooks, there might be lists of men in their own units, with the code lettering of all the aircraft, notes about crimes and difficulties occurring in their units, and other pieces of information useful to help in building up a picture of a particular man or a particular unit.

71-85. As time went on and work of A.D.I.(K) increased in all directions, a small separate section was created at headquarters for the sorting and evaluation of documents. It was necessary for those who had to deal with them not only to have a good knowledge of German but also be able to read gothic characters and bad writing, and to have some ingenuity in solving cryptic references which might have been rendered illegible by being written in a hurry, by immersion in water, staining with oil or by being torn into small pieces and scattered.

Records and Library.

72-86. / Early in the war the necessity was seen for a comprehensive records library for use in the basic briefing of interrogators and for the maintenance of a watch on intelligence already obtained for the avoidance of inadvertent repetition. The records and library section (A.I.K.3.),
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formed at the time of the Battle of Britain, fulfilled this function to the utmost up to the end of the war and, incidentally, proved a useful training ground for the school of interrogators.

73 87. In the maintenance of the records system, small items of information and even single facts at a time were laboriously collected from current interrogations, recorded microphone conversations, overseas interrogation reports, captured documents, extracts from the foreign press and radio, the postal censorship of prisoner of war mail from the permanent camps in the United Kingdom and Canada, the Red Cross, and Most Secret sources. This information was collated so that a perspective of men, units and equipment might be gained and the foundation thus laid upon which the remainder of the branch could build.

74 88. Not the least of the recording activity was concerned with the means of identification of prisoners' units from the documents and papers which they carried so that, as already pointed out, the interrogator could be provided with a good basis on which to open an interrogation and to check a prisoner's statements during its progress; in the final collation and editing of interrogation material editors then had some proof as to the veracity or otherwise of prisoners' statements and could also avoid unnecessary repetition of known facts.

75 89. The main records in this category which were built up during the war were as follows:-

1. A card index of names of members of the German Air Force.
2. A key to identity discs and the units which issued them.
3. An index of types of operational identity cards and the units which issued them.
4. A set of books giving extensive information on operational and non-operational flying units, with their movements, bases, equipment and personalities.
5. A key to unit and airfield postal code numbers. (Field Post Numbers).
6. An index of aircraft crests and badges and the units to which they belonged.
7. An index of the names and signatures of parachute packers at airfields, which signatures appeared on the parachute check cards of aircrew and thus helped to establish bases.
8. A collection of photographs of personalities in the German Air Force.

76 90. The card index of personalities in the German Air Force contained names of the highest generals to the most insignificant privates and was laboriously collated from the sources enumerated in an earlier paragraph. It finally grew to a total of some 80,000 cards on which any scrap of information on any personality was carefully recorded. In the ideal case a card might show a man's name and christian names, his date of birth, his unit, his home address, his wife's and children's names and dates of birth (it was always impressive to be able to tell a prisoner when his eldest son was born and even to celebrate the birthday), his dog's name and its habits, and his military career. The importance of recording such small items of seemingly unimportant information cannot be too strongly emphasised. If and when a man appeared at the centre as a prisoner his surprise upon being confronted with such extensive information was enough to impress him with the omnipotence of British espionage and thus to break down his resistance; frequently the card index told a prisoner's unit where all other methods of identification had failed.

77. With regard to identity discs, it was soon discovered that with a characteristic thoroughness the Germans had devised a system of numbering whereby blocks of numbers were allotted to small operational formations, the numbers remaining in a logical sequence. Since the identity discs were issued at the units, aircrew would change their discs to conform with their movements from one unit to another. The Geneva Convention relieved a prisoner of the necessity of giving any information other than his name, rank and number, but by the very thoroughness of the German system a prisoner divulged his unit without himself knowing that he had done so. Again this was a fruitful source of impressing prisoners with the extent of British knowledge.

78. ~~This method of identification, although of tremendous value, did not succeed on each and every occasion; very often the prisoner had left his disc behind, or he had only recently changed his unit and had not obtained a new disc, or the number which he carried had not yet been identified by the records section.~~ The necessity for keeping prisoners in ignorance of this source of information is obvious, as a report from a repatriated prisoner would certainly have been followed by a change in the system. The system, however, remained in force throughout the war.

78 93. Where the disc failed to identify a prisoner, then in a large number of cases his operational identity card (Ausweis) was frequently helpful. These cards appeared in all sizes and colours, in all types of printing, on various materials such as paper, cardboard and linen and with various signatures; code numbers represented the unit or place of issue. Every Ausweis captured was carefully filed and the code numbers and signatures transferred to card indices. The system on which these code numbers were allotted was eventually discovered, and the comprehensive collection of Ausweise, as it grew larger and larger, became a valuable contribution to methods of identification.

79 94. The set of books which gave basic information on the organisation and movements of the main operational and non-operational units of the German Air Force took the form of a separate loose-leaf book for each unit. Movements of the units were largely kept up to date, and their histories, aircraft equipment and any other special peculiarities were collected from current home and overseas interrogation and from other Air Ministry intelligence sources. Finally, each book contained a list of the senior and specialist officers of the unit and its subordinate formations, as well as the names of all aircrew, if possible listed as crews. The value of these books in both interrogation and final editing was very considerable.

80 95. In the German Air Force every unit and every airfield was allotted a postal code number and the key to these code numbers took the form of a card index. This index was commenced early in the war and by the end of the war it had increased to a fairly comprehensive collection. It proved its worth not only in the identification of prisoners' units but in supplementing or confirming the work of other sections of the Air Ministry. Unlike the identity disc system, the Germans came to know the use to which British intelligence had put their field post code system early in 1941, and just before the attack on Russia the system of numbering was changed, thus rendering valueless the whole of the work done by the records section from the beginning of the war. From 1941 onwards the index was built up anew and after two years it had become more comprehensive than in the first instance.

81 96. The collection of photographs of personalities in the German Air Force, assembled from the foreign press and periodicals and from photographs carried by prisoners or extracted by the censorship from prisoner of war mail, was an extremely valuable asset to the interrogators. German aircrew were prolific photographers so that the book of photographs, arranged under the headings of the operational units, contained the photographs of officers and men as well as snapshots of incidents in the units. It is a strange fact that few if any prisoners suspected the source of these photographs, and again the majority attributed the collection to the excellence of British espionage, with results that can be imagined.

82 97. The contribution by the censorship of prisoner mail to the collection of records proved well worth the effort expended during the whole of the war. Some of the prisoners' correspondence was most useful in providing up to date details of events in their late units, often in thinly disguised codes. At the beginning of the war censorship of prisoners' mail had been undertaken by A.D.I.(K) but as the numbers of prisoners in permanent camps grew this enterprise became too great and was passed over to the Department of Postal Censorship. That department soon built up its own detailed reference system of correspondents and their friends. Extracts of letters which contained items of intelligence were passed to the records section, whose members disposed of the information in the card indices, unit books or collection of photographs.

83 98. The reference library comprised files and a reference index for intelligence already disseminated by A.D.I.(K), including a quarterly index covering all reports, both at home and overseas, a collection, drawn from other intelligence formations, of technical intelligence reports, industrial works of reference; airfield intelligence reports together with air photographic cover where available, and a map room, technical dictionaries and glossaries of terms. During the war a glossary of the terms and slang terms in use in the German Air Force was collated by the records section. Finally as a link between the card index and intelligence reports issued by A.D.I.(K) a log book was maintained which recorded under each day's date every enemy aircraft crash which had been reported by A.D.I.(K).

84 99. If conclusions on the working of a records section are to be drawn, the main requirement is a plentiful supply of manpower for the work. The manpower must on no account be of second rate quality, as to be of real value records must be kept with interest and enthusiasm. The main requirements of the recorder are similar to those of the interrogator; patience, a good memory and above all the capacity for treating information with great discrimination whilst maintaining a conception of the aim of the work. A certain amount of intelligence was lost during the war on account of inadequate staff; for the fullest possible use to be made of refugee information, for example, a considerably larger staff would have been needed, whilst much information which might have been obtained on the German units in the Mediterranean theatre had to be neglected for the same reason.

Editing and Publication of Interrogation Reports.

85 100. The effort expended in the careful organisation of an interrogation centre and in the perfection in methods of interrogating prisoners can be vitiated by a failure to present the intelligence gained in an objective reliable and readable manner. That the intelligence supplied by A.D.I.(K) during the war came to be looked upon as of first-rate reliability was due to an early realisation by its officers that the information disseminated must be checked as far as possible with known facts, must be presented in the light of current knowledge of the enemy and must avoid all conjecture.

86 101. For the first two years after the outbreak of war in 1939 information obtained from prisoners of war had not been considered as one of the more reliable sources of intelligence, but as time went on operational commands and intelligence formations came to realise that the information being submitted to them by A.D.I.(K) was indeed of an authoritative nature.

87 102. One school of thought held at the beginning of the war that the sole duty of an interrogation unit was to report what the prisoner said, and that it was rather the function of the intelligence collating sections of the various ministries and operational commands to evaluate this raw material in the light of their own knowledge from other intelligence sources. It is interesting to note that the German air interrogation organisation worked on this principle throughout the war.

88 103. In the early stages of the war A.D.I.(K) lacked the necessary
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background of that knowledge which can only be accumulated by continuous interrogation over a long period. Consequently at that time it was of necessity general practice to report a prisoner's statement in much the same form as it had been obtained, which may or may not have contradicted the statements of previous prisoners. This procedure was not entirely voluntary and as the experience of interrogators grew the interrogators themselves became capable of tacitly checking the validity of a prisoner's statements during an actual interrogation. Eventually a system of editing was introduced by which a second and documented check could be imposed on subjects reported from interrogation.

89 104. In the last four years of the war, during which A.D.I.(K) had built up the records section as outlined above, it was possible to issue interrogation reports in a form where they were ready for assimilation as well substantiated items of intelligence which neither conflicted with known data nor departed from the objectivity which was so essential.

~~105. The system of editing of reports was perhaps originated rather more by accident than by design. Late in 1940 pressure of work on interrogators was such that they no longer had time to make reports of their findings, and other officers were therefore detailed to undertake this work. The advantages of this procedure were immediately seen; a fresh mind was brought to bear on the case and, having no personal contact with the prisoner, was therefore strictly impartial and unbiased and able to point out discrepancies in the prisoner's statements or between his statements and those of other prisoners. He was able to suggest further questions to extract points of detail and he eliminated~~

90 106. As the system became perfected an editor was allocated to each prisoner or group of prisoners concerned with the same subject, and he and the interrogators worked together as a team until the case was closed. When interrogation reports composed on these lines began to be regarded by the operational commands and intelligence formations as worthy of some attention, a close liaison began to be established with the headquarters of those commands and with some of the R.A.F. specialist groups, *and with other Air Ministry intelligence sections for the purpose of briefing interrogators.*

~~107. Thus, when prisoners were captured whose subject would interest a particular command, immediate contact was established and maintained throughout the interrogation. Briefing of the interrogator was obtained, and in cases where specialist knowledge of a technical nature was required in interrogation, and where the prisoners were suitable, representatives were brought to A.D.I.(K) to take part in the interrogations, the interrogator in this case interpreting for the expert.)~~

91 108. When news of some fresh development or of a future operation was obtained from a prisoner and obviously required immediate action, advance details, however scanty, were telephoned direct to the relevant intelligence or research formations or operational command, who thereupon gave advice as to the lines to be followed in interrogation. They were kept informed of progress and often sent experts to follow the interrogation.

92 109. Like the interrogator, the editor should have a wide and detailed knowledge of all subjects which he is likely to encounter, as to save time he must be able to tell at a glance if statements made by prisoners are true or false or even come within the bounds of possibility. It was found to be an advantage with A.D.I.(K) to divide editing activities between some three or four sub-editors and one chief editor and his assistant, through whom all reports were passed for final editing before their distribution to other formations.

93 110. The necessity for continual study by at least the chief editor of reports from contemporary intelligence sources so that an impression may be gained of current knowledge of the enemy cannot be too strongly emphasised, as /this eliminates

this eliminates the possibility of tiring repetition of known facts, a fault which occurred all too frequently in the many interrogation organisations that began to spring up after the collapse of Germany.

94 111. The distribution of the finished reports naturally depended upon their subject matter, but normally copies totalling between 120 and 200 of each report were sent to the Air Staff, Directorates and departments of the Air Ministry, the Ministries of Supply and Aircraft Production, scientific and experimental formations and the operational and training commands. They were also sent to Allied formations and to the War Office and Admiralty for distribution to interested formations in the Army and Navy. Material concerning high policy, projected operations and outstanding or surprising developments on the part of the enemy were also passed to the Secretary of State for Air and the Cabinet Offices.

Some Experiences of Interrogation.

112. The following notes give a few examples of how experience in interrogation was gradually gained and show the type of information which was produced.

113. The first prisoners to be seen by air interrogators at the Tower of London were from the German submarine U.39 and later another crew - that of the U.27 - was also interrogated. Equipped with this small amount of experience, the officers concerned were ready for the first German aircraft to be shot down. This proved to be a Do.18 under the command of Leutnant Freiherr von REITZENSTEIN, the crew of which had been picked up in the middle of the North Sea by a naval vessel. The aircraft was landed on the water, having been forced down by a shot fired by one of a sub-flight of Skuas from H.M.S. Ark Royal. Much useful information, including details of new aircraft types and the new system of recognition markings for individual aircraft, was obtained from the pilot, whose bragging answers suggested to the interrogation officers a good method of extracting information. The observer, on the other hand, was a model of security, turning aside all questions by a pleasant but non-committal answer, a correct attitude which left the interrogator helpless.

114. A wireless operator from a coastal reconnaissance unit was interrogated for some days and gave extremely valuable information. During the interrogation he had been kept in a room on his own, but another prisoner was captured a few days later and was placed with him as a companion. Immediately the attitude of the wireless operator changed; he stopped giving information willingly and even tried to lie. The danger was then realised of giving a prisoner companionship before he had told the most important parts of his story.

115. Another prisoner landed with a flaming parachute on the Island of Hoy (Scapa) on November 30th 1939. The aircraft crashed on the island before having dropped its bombs and exploded, killing all but the one who escaped by parachute. There was thus no-one to check the survivor's statements, and he was at first believed when he stated that he had been flying in a well-known type, the He.111. After a month in hospital, he was brought to the detailed interrogation centre, and within five minutes let out the surprising information that he had really been in a Ju.88, a machine about which little was then known. The interrogator realised at once that this man was a "born talker", and kept him under interrogation - with excellent results - for 103 days.

116. It can be said without fear of contradiction that there was hardly an aircraft, an aircraft engine, bomb or piece of aircraft armament which was not known by A.D.I.(K) through the interrogation of prisoners and others before - and often a very considerable time before - the emergence of such a weapon in operations. A case in point was the He.177, a description of which was issued as the result of the interrogation of a German prisoner captured on 10th January 1940. The first He.177 to fall into Allied hands was shot down over England

Political
Others
Recommendations
Withhold under:-
German POWs in excess of that required under Geneva Convention

England on the 21st January 1944 and, together with
been reported from interrogations in the intervening
follow very closely the description given in 1940.

~~(DSO 44/69
(S(PH)N 74/3
(DSO 10/69~~

Open after ~~(50 years~~
(75 years ✓

(Tick category and
recommendation as
appropriate).

117. One of the interrogations which had the most
was perhaps that of a wireless operator who, in April
of France, had been convinced by his interrogation of
not possibly win against the overwhelming might of Br
to avoid blood shed the prisoner was induced then to
Knickebein radio beam and other rather similar X and
devices. These were reported in time for the British
countermeasures against a method of bombing which in
constituted a very serious threat to British war indu
Germany under a later repatriation scheme this prison
self with his own authorities by stating that he had
treatment in the Tower of London. In point of fact,
and his treatment was pleasant in the extreme. The p
interrogator at Dulag Luft.

118. In another case an armament officer of a coast
solitary confinement for a considerable time but with
company of his interrogation officer, who took him for
lishments near London and for meals at restaurants.
one of the few who really did not realise he was being
the information was the edification of the R.A.F. offi
six months the book of reference on bombs, fuses and aircraft armament. It was
first learned from this officer with surprise that Germany had radar at the
beginning of the war.

119. The BM.1000, a bomb which acted as a bomb on land and a mine in water,
was reported and described by A.D.I.(K) before the enemy had used the first
specimen against this country; admittedly the race was narrowly won by a ton-
day margin. The warning enabled the naval authorities to acquaint themselves
with the BM.1000's intricacies and to send a cypher signal to the Middle East
Command on the very morning of the day when the first BM.1000 was dropped in
the Suez Canal.

120. The coming of remotely-controlled projectiles was reported long before
the menace materialised. The V.2, for example, was reported early in 1943;
whilst there were rumours from other sources, the series of A.D.I.(K) reports
on the subject certainly contributed largely to the fact that the threat was
taken seriously. In the same way, A.D.I.(K) reports issued at the same time
clearly showed that the Germans were far advanced with the development of jet
aircraft and gave the Ministry of Aircraft Production the stimulus to proceed
with the development of the Whittle jet projects. It was a member of the staff
of A.D.I.(K) who coined the term "athodyd" which came into almost universal
usage as an abbreviation for aero thermo-dynamic duct.

121. Radar devices, both land and airborne, were continually being reported
by A.D.I.(K) throughout the war, in many cases in advance of their appearance
in the war theatres.

122. The German night fighter radar appliances and German tactics, including
their own countermeasures and their answers to British countermeasures, were so
fully reported that when an investigation was made in Germany after hostilities
had ceased, it was estimated that A.D.I.(K) reports on the subject covered 95%
of the whole developed and developing field of German radar and anti-radar
devices with accuracy little short of 100%. R.A.F. 100 Group stated that the
information obtained by A.D.I.(K) had made an enormous contribution to the
minimising of losses in the night attacks over Germany.

/123. Reports on

123. Reports on German day fighter tactics and the methods of ground control were said to have been so accurate that U.S. fighter formations, to whom this information was of course fed, found somewhat to their astonishment that everything happened just as had been predicted and their task of covering their bomber formations was in consequence made very considerably easier.

124. After the ending of the war the whole of the German Air Staff was brought together, first in Germany and then at the Latimer camp, which had meanwhile been vacated by C.S.D.I.C. (U.K.) and had been transformed into an internment camp under the R.A.F. A.D.I.(K) was concerned with their interrogation on historical aspects of German policy, so that the necessary lessons could be placed on record for the future. At the same time, A.I.12 conducted an investigation of the whole organisation of the German Air Force. The technical development section (T.L.R.) of the German Air Staff, its members by now only too ready and willing to divulge the whole extent of German research and development, was interrogated to the full by A.D.I.(K) with the close collaboration of British and Allied experts.

125. Finally, in the post-war investigation of German research in weapons - chiefly Flak rockets and guided projectiles - and in radio, radar and high frequency practice, it transpired that everything of consequence had been reported by A.D.I.(K), in some cases fully and in others provisionally, before the war ended. Subsequent interrogation of the leading civilian technicians in this field produced a complete picture of the stage of development reached in Germany. A.D.I.(K) reports described the weapons and equipment it had been intended to employ, the purposes to which these weapons and equipment were to be put and the firms and personalities undertaking the work. The result was that the Allied investigating formations in Germany and in England had a clear picture on which they could base their own technical studies.

REPORTS BASED ON RECORDED CONVERSATIONS.

95 126. The use of microphones in conjunction with the direct interrogation of prisoners and the employment of stool pigeons has already been discussed, but it must be added that the dissemination of extracts from recorded conversations formed a useful but limited addition to intelligence throughout the war.

127. When C.S.D.I.C. was first formed, part of the original arrangement was that the War Office would be free to use the results of microphone recordings in any way it thought proper, and quite independently of the work where interrogation was concerned. The War Office for its part circulated microphone conversations and periodical collated summaries to its own formations.

128. At the detailed interrogation centre at Latimer the Army maintained a section which transcribed, translated and issued these recorded conversations in the form of reports of a Top Secret category. The procedure was for C.S.D.I.C. to submit the original German transcriptions to the chief officer of A.D.I.(K), who would mark for publication in the Air interest such passages as he thought fit. Reports were distributed by A.D.I.(K) to a very few highly specialised Air Ministry intelligence sections; for reasons outlined in an earlier section of this account, the distribution of these reports was held to a minimum so that information of doubtful credence should not gain circulation.

96 129. The most interesting and informative of these special reports were those of recorded conversations between high-ranking German officers lodged

/in special

in special quarters where no attempt at direct interrogation could be made by virtue of their high rank. It happened that these officers arranged amongst themselves that each newcomer should deliver a lecture to his fellow officers on his experiences in the war; these lectures produced much valuable information.

- 97 130. When propaganda broadcasts began to be addressed to Germany and to the German armed forces, it was found that the recorded conversations from both C.S.D.I.C. and from the high ranking German officers at their special quarters produced valuable material and made it possible for the broadcasters to report and comment on current affairs with a degree of intimate accuracy. From the Air aspect this work was handled by the A.D.I.(K) officers who maintained liaison with the B.B.C. and the Foreign Office. A later section deals with this aspect in greater detail.

in Appendix 'A'

TARGETS AND INDUSTRIAL INTERROGATION OF REFUGEES

Origins.

- 98 131. The origin and growth of the targets and industrial interrogation section (A.I.K.(4)) and its Norwegian offshoot (A.I.K.(5)) are excellent examples of the way in which throughout the war A.D.I.(K) took on new tasks unprepared save by the reserves of energy and enthusiasm.

Developed 132. ~~The seed from which A.I.K.(4) and A.I.K.(5) were to spring was planted, almost fortuitously, in January 1941, when an A.D.I.(K) officer encountered a friendly refugee during a social evening in London. It emerged that the refugee in question had, prior to his escape, been employed on the construction of a German airfield at Bardufoss in Norway. Further investigation showed that a new airfield had in fact been reported here, but since it was then beyond the range of our photographic reconnaissance aircraft, very little more was known. The Norwegian was thereupon interrogated in detail.~~

133. ~~It also transpired that men of this type were entering the country in considerable numbers, as in the case of other refugees they all had to pass through the London Reception Centre at the Royal Patriotic Schools at Wandsworth for security examination, but no interrogation for intelligence purposes was being carried out.~~

- 99 134. At this time the peak period of the Battle of Britain and of the night bombing had passed, and from time to time officers from A.D.I.(K) could be spared for this new work. For a while interrogators were despatched from headquarters to the London Reception Centre on receipt of notification from M.I.5 that interesting subjects were held there. Later, when the full potential of this source was realised, two officers were permanently attached to the Centre. ~~At a later date M.I.19 also set up an organisation at the Centre for obtaining other intelligence of interest to the Army and Navy; by this time the Air Section was firmly established and it remained entirely an A.D.I.(K) responsibility.~~

135. ~~As the work increased, other A.D.I.(K) officers were switched from prisoner of war interrogation to the interviewing of refugees, and a whole-time staff was gradually built up to handle the latter task.~~

Functions.

- 100 136. Refugees did not, as a rule, know anything about the organisation

/of the

of the German Air Force, and their information consisted mainly of pinpointing and describing targets. These targets were of two types - firstly German Air Force installations, and secondly industrial and communications objectives. The former category included airfields, headquarters, stores, fuel and ammunition dumps, and radar installations; while the second naturally comprised economic undertakings of major importance in Germany and the occupied territories, including aircraft factories, oil refineries and synthetic oil plants, ball bearings works, power stations, railway marshalling yards and locomotive repair depots. At the same time information was obtained on correlated subjects such as the personalities and organisation of the German Air Ministry, of the German aircraft industry, and of other organisations important to the German war effort.

- (c) 137. The particular value of information derived from interrogation on these subjects was that it served to corroborate and also to complete intelligence obtained from other sources by supplying details which were not otherwise available. In this way it was possible to supplement aerial cover for a target by an exact description of the functions and internal layout of the various buildings, and thus to clear up questions which had hitherto been unanswerable. Information acquired in this way was more accurate than that based only on freehand sketches, and was of particular value when German industry began to establish itself in underground sites.

Sources.

~~138. From February 1941, when refugee interrogation was first taken up by A.D.I.(K), until June 1944, by far the greater part of the intelligence obtained came from Allied nationals who had been able to escape from various parts of German Europe. These refugees could be roughly divided into two categories - escapees from the occupied countries who had not been directly employed by the Germans, and those who had either been directly employed by the Germans in occupied territories or had escaped from the Reich itself. The first category included both working-class informants and a number of men of the executive grade who were able to provide authoritative intelligence at a high level on subjects of importance to the German war economy, such as the Phillips organisation at Eindhoven with all its ramifications, and the Luxembourg iron and steel industry, to quote only two examples.~~

~~139. Those informants who had been directly employed by the Germans on such tasks as the construction of airfields or who had been used by Germans on industry in the Reich itself, had, owing to the nature of their work, not enjoyed such wide opportunities for observation, and the scope of their information was consequently more limited. Intelligence obtained from these men, however, was relatively of no less value owing to the comparatively small amount of knowledge available on conditions within the Reich, and moreover in this case also it was possible to obtain reliable ground plans of individual airfields, industrial plants and other installations.~~

Sources

- (c) 140. This work brought A.D.I.(K) incidentally into contact with the British espionage and sabotage services. Some refugees with a particularly detailed knowledge of the layout of an industrial complex would put forward proposals regarding its immobilisation by sabotage action. Others would recommend that a certain person, still in occupied territory, should be contacted in order to give the required information. Any such intelligence was immediately passed to the departments concerned.

- (c) 141. Up to the time of the invasion of the continent, prisoners of war were of secondary importance in the eliciting of information of the industrial type. This was due firstly to the comparatively small number of subjects

available for interrogation, and secondly to the fact that the majority of prisoners, especially aircrew, had served in the German forces for such long periods that their industrial knowledge, if any, was largely out of date. ~~During this period, however, prisoners were interrogated on airfields, training schools, and stores, and prisoners of other arms of the German forces were also interrogated in the light of their target knowledge, as they continued to be until the end of hostilities.~~

104 142. From the invasion onwards ~~the relative importance of the two main sources of intelligence was reversed, since on the one hand~~ the influx of refugees naturally fell off rapidly and on the other large numbers of prisoners became available for interrogation. Moreover, thanks to the steadily deteriorating manpower situation within the German forces, the prisoners then coming in included an important proportion of men who had only very lately been called up from industry into the services and who were consequently in possession of recent and valuable industrial information. As a result, from June 1944 onwards the industrial and targets section was concerned almost exclusively with the interrogation of prisoners, and the number of refugees interviewed sank steadily.

Organisation.

105 143. The work was carried out in conjunction with the Ministry of Economic Warfare, the Economic Warfare Division of the U.S. Embassy, A.C.I.U., and interested Air Ministry departments such as A.I.2.(a) and A.I.3c(1). Members of various of these organisations, as well as officers from the American Army and Naval Air Forces, were frequently present at interrogations of particular interest to them, especially in cases where specific details of layout were to be obtained with the aid of photographic cover, and where it was desired to work out aiming-points as the bases of future attacks. The interrogation however was always undertaken by an A.D.I.(K) officer as it was found that trained interrogators were best.

106 144. The A.D.I.(K) officers at the London Reception Centre first made a preliminary screening of the refugees, on the basis of which a preliminary advice was circulated to all interested parties giving particulars of the scope of an informant's knowledge. Specific briefing was provided by these bodies, and a further detailed interrogation on any questions raised was thereupon carried out, usually after the informant's release from the Royal Patriotic Schools, either at an A.I.K.(4) office in the same building as A.I.3c(1), where target information was available, or in the offices of the informant's own government.

~~145. From June 1944 onwards the screening procedure adopted at the prisoner cages and already outlined was employed for selecting prisoners with targets and industrial knowledge. Owing to the limited accommodation at the detailed interrogation centres at Latimer and Beaconsfield, and to the consequent restriction in the time for which prisoners could be held there, the system of circulating a printed preliminary advice had to be discontinued, but interested agencies were notified by telephone and specific briefing and photographic cover for the detailed interrogation continued to be received as before.~~

Developments.

107 146. Until the end of 1942 A.I.K.(4)'s activities were confined to the United Kingdom, but from then onwards officers were detached for similar work in North Africa where refugees were arriving from France, and still later in Italy where natives who had succeeded in passing through the lines were interrogated.

/147. From the

- 108 147. From the time of the invasion onwards an A.I.K.(4) officer was attached to A.P/W.I.U. - the A.D.I.(K) unit in the S.H.A.E.F. Area - for the purpose of collecting information procurable in the liberated territories. When the advance into Germany began other officers were also despatched to the British, American and French zones in order to locate and identify intelligence targets for exploitation by C.I.O.S. (Combined Intelligence Objectives Sub-Committee), the inter-service, inter-Allied organisation formed for the investigation of German factories and research establishments. It was realised that A.D.I.(K) had provided the bulk of the information that had come from Germany during the war years on these subjects, and ~~the Group Captain PHILIP, was~~ head of A.D.I.(K), was nominated chairman of the Air Group of this organisation. The work of preliminary examination of factories and establishments would in any case have been undertaken by A.P/W.I.U. teams working under A.D.I.(K), as this had been one of the functions envisaged for them in the planning of the invasion.
- 109 148. The cessation of hostilities, therefore, brought if anything a further increase in the activities of A.I.K.(4), owing to the amount of material of historical interest in the way of captured German documents and statistics which became available.
- ~~149. Thus, from 1941 onwards, a mass of intelligence was built up on the subjects handled by A.I.K.(4). These subjects naturally varied according to the changing conditions of the war, and they were determined by the bombing priorities which were indicated by I.3c(1), the Ministry of Economic Warfare, and the Economic Warfare Division of the U.S. Embassy. In general, however, German airfields, headquarters, and installations naturally remained of perennial interest, but in the economic sphere the great stress was laid variously on the aircraft, tank, armaments, ball-bearing, synthetic oil and rubber plants, and communications targets, according to the priorities prevailing at the moment. Thus there were few industrial targets attacked by the Allied Air Forces which had not been covered by an A.D.I.(K) interrogation.~~
- 110 150. A piece of work of outstanding interest was represented by a series of interrogations at the close of 1943 of a high official of the Italian Air Ministry, who was able to give an excellent picture of the organisation and personalities of the German Air Ministry, the organisation of the German aircraft industry and its production methods. (A.D.I.(K) Report No.473/1943).
- 111 151. Interrogations of particular interest also covered the German, French, Belgian, Polish and Dutch aircraft industries, on which a very considerable amount of information was collected, and during the course of which targets as distant as the plants at Gdynia and Grudziadz were covered.
- ~~152. Useful pieces of work connected with air operations before the landings in Europe included the identification of the hitherto unlocated FW 190 repair depot at the S.A. Listard factory at Ville-aux-Dames near Tours, detailed layouts for target purposes of the Dewoitine complex at Toulouse, and the plotting of all the electrical sub-stations in the Paris area, many of which had previously been unidentified. Another interesting subject was an interrogation on the large projected synthetic oil plant at Oswiecim (Auschwitz), the existence of which had before this only been vaguely suspected through information from other sources.~~
- 112 153. Intelligence derived from interrogation came to be especially valuable during the last eighteen months of the war for locating and identifying the almost innumerable new sites which were occupied by the dispersed German war industries. In many cases A.D.I.(K) was able to

/confirm or

confirm or deny rumours of dispersal received from other sources, or to indicate locations the existence of which had hitherto not even been suspected.

113 45. Information of this kind was particularly useful where underground sites were concerned, as prisoners or other informants who had actually worked inside the subterranean plants were able to give details which would otherwise not be available, or which could serve as a check on other sources, concerning matters such as layout, ventilation, overburden, and so on. Especially interesting information in this connection, and incidentally the first information, was obtained on the notorious Mittelwerk Niedersachsenwerken, near Nordhausen, which manufactured V.2 rockets, Junkers aero-engines and jet propulsion units. Again, information on a vast project for underground factories in the Litomerice area in Czechoslovakia was provided by a member of the S.S. who absconded with the plans and was picked up in Holland by A.P/W.I.U. and flown back to the United Kingdom.

INTERROGATION OF CIVILIAN TECHNICIANS AND SCIENTISTS.

114. The success of the interrogation of the Italian Air Ministry official referred to at para. 110 above led to the idea of bringing more civilians who had interesting knowledge to impart for interrogation under similar conditions, and by late in 1944 a small but steady stream of such subjects was arriving.

115. In the spring of 1945 a conference was held at the office of the Security Executive with representatives of the War Office, the Home Office, the Admiralty and the Air Ministry, when it was agreed that the Home Office and the War Office should jointly provide a hostel for enemy technicians and scientists and as this was to be inter-service, C.I.O.S. was to take a big interest.

116. A building at Wimbledon was accordingly opened and was made available for the use of the three services. Whilst C.I.O.S. assumed the main responsibility, A.D.I.(K) continued to import scientists and technicians who had been located in Germany by the British and American teams of A.P/W.I.U., and to maintain interrogation officers at the camp to run the intelligence commitment. Between April 1945 and the spring of 1946 this arrangement proved of enormous value to British research and industry in uncovering the secrets of German research and manufacturing practice.

send a copy of his notes to A.D.I.(K) and when the interrogation was complete, the latter issued a report for general distribution containing the substance of each and every interrogation.

160. On the opening of the hostel in the block of flats, the press had been warned of the security aspect of this undertaking, but in spite of this press correspondents and photographers besieged the hostel from dawn to dusk and ridiculous and untrue stories as to the luxury treatment afforded to the inmates. To counteract these articles, the Air Ministry was

160. It is perhaps worth repeating that the press soon came to know that Professor BESSERSCHEWITZ, the German aircraft designer, was housed in the flats. The press photographers duly arrived in the hope of being able to photograph him and the problem arose, when the professor's interrogation had been completed and he was due to return to Germany, of passing him through the press representatives with the minimum of publicity. He was brought out at the front door in the uniform of an R.A.F. officer and passed through the photographers unrecognised.

161. In the summer of 1945 a building at Wimbledon which had been taken over by the Home Office was opened and was made available for the use of the three services. Whilst C.I.O.S. assumed the main responsibility A.D.I.(K) continued to import scientists and technicians who had been located in Germany by the British and American teams of L.P./A.I.U., and to maintain interrogation officers at the camp to run the intelligence commitment.

NORWEGIAN INTERROGATION SECTION.

Development

117 462. The foregoing section has shown how the Norwegian section (A.I.K.(5)) had the same origins as A.I.K.(4) in the screening of refugees arriving at the Royal Patriotic Schools at Wandsworth. When, early in 1941, the Norwegian Military Intelligence office was established at Norway House in London, it was arranged that all future interrogation of Norwegian refugees should take place there rather than at Wandsworth. The work of interrogation was taken over by a Norwegian-speaking officer of A.D.I.(K).

118 463. By agreement with the Norwegians, interrogation on all matters of air interest was undertaken on their behalf as well as for the R.A.F. Information obtained was considerable, although largely confined to intelligence on the West coast of Norway; few of the informants had any really detailed knowledge of German Air Force activity, but they did provide some useful information such as positions and types of radio and radar stations, and details of airfields.

119 464. Later in 1941 Norwegian refugees were beginning to arrive in Sweden, whilst underground activities had been commenced in Norway itself and a well organised reporting service established. To meet this situation a new organisation known as F.O.II - the Norwegian High Command Intelligence Department - was formed in May 1942 to co-ordinate information received through Stockholm as well as direct from Norway through refugees arriving in the United Kingdom. F.O.II established its headquarters in London, and A.I.K.(5), in addition to its work of ~~collaboration~~, undertook to form the Air Intelligence Section of F.O.II.

465. ~~The Air Intelligence Section consequently had access to the numerous underground reports passing through Sweden, and was therefore able to maintain a complete picture of the situation in Norway.~~ In June 1942, A.I.K.(5) was appointed as the R.A.F. Air Intelligence Liaison to the Norwegian Intelligence Department. The field covered in the air interest was wide, and not only included the operations of the Luftwaffe in Norway, but also industrial and shipping activity.

120 ^{in the same year} Later a department of the Norwegian High Command was established for the organising of a Resistance Movement and help in the execution of ground operations. It was through this channel that Intelligence was procured for the attacks on the heavy water plant at Vemork, later connected with the German experiments in atom splitting.

466. ~~The main contacts between A.I.K.(5) and the R.A.F. in the dissemination of intelligence were the same as those already named as receiving intelligence from A.I.K.(4).~~

Extension to Sweden

121 467. In the summer of 1942 the Germans began to take drastic measures to prevent escape from Norway across the North Sea, with the result that the majority of refugees passed into Sweden. Arrangements were thereupon made by the Norwegian authorities for interrogation to be conducted at the refugee reception centre in Sweden, and informants with important knowledge were taken and heard privately in Stockholm. In November 1942, the head of A.I.K.(5) flew to Stockholm with a Norwegian officer for the purpose of appointing and briefing

selected interrogators who would work on the spot, and who could then themselves brief and advise the couriers and reporting organisations with whom they were in contact. Stocks of suitable interrogation briefing, including large-scale photographs of all major installations in Norway and a series of blank sketches for use when filling in details were provided, and a daily course of lectures and discussions covering all subjects of interest was given to the newly selected interrogators. This briefing caused a great improvement in the quality of intelligence passing from Norway through Sweden.

121 ~~168. In the autumn of 1942, a further and important contact was established with the Scandinavian Division of S.O.E. It first tentative and unofficial, this contact rapidly became a recognised link, and Air Ministry approval was obtained for A.I.K.(5) to act as the Intelligence Liaison between S.O.E. and F.O.II, as a result of which the information needed by S.O.E. could be procured without prejudice to security. Later, a department of the Norwegian High Command, F.O.IV, was established for the organising of a resistance movement and to help in the execution of ground operations. A close contact was established between A.I.K.(5) and F.O.IV, which in the later stages of the war was integrated with the Scandinavian section of S.O.E.~~

this channel.

122 169. It was through ~~F.O.IV~~ that intelligence was procured for the attacks on the heavy water plant at Vemork, later connected with the German experiments in atom splitting.

Shipping and Targets Intelligence

122 170. In 1943 it became necessary to gather intelligence on shipping activity in Norwegian waters. Regular reports were by then arriving from Norway; at the same time Coastal Command was increasing its effort to blockade this maritime traffic and was therefore much in need of reliable information. The Ministry of Economic Warfare was interested in maintaining a complete survey of these operations, whilst Photographic Intelligence was in need of material for checking the interpretation of aerial photographic reconnaissance. The information on shipping was issued in a series of regular reports covering all aspects of shipping activity.

123 171. In the autumn of 1943, as a result of the bombing of Heroya by U.S.A.A.F. aircraft, the Norwegian High Command, disturbed by what they considered to be an untimely choice of target, appointed an Industrial Targets Committee, which the head of A.I.K.(5) attended in his capacity of air liaison officer. The purpose of this committee was to draw up a monthly statement giving the estimated importance to the Germans of various industrial undertakings, to suggest a priority list for bombing and to indicate to the Air Ministry any other enterprises planned by the Germans. This Targets Committee continued to produce monthly statements until the autumn of 1944.

124 172. When, late in 1943, ~~Force 134 of Scottish Command and 13 Group (Planes)~~ began the planning of military and air operations for the liberation of Norway *began*, the A.I.K.(5) officer maintained a close contact and supplied all available intelligence on the German Air Force in Norway. At the same time arrangements were made for A.I.K.(5) to take part in the operation. Terms of reference were approved by the Air Ministry, S.H.A.E.F. and the force commanders concerned whereby A.I.K.(5) should be responsible as a unit of A.D.I.(K) for documents of air interest and the interrogation of German air prisoners. When the German forces in Norway surrendered on 7th May 1945, A.I.K.(5) officers were responsible for interviewing the German Air Force surrender delegates who arrived in Edinburgh from Norway.

125 173. Shortly afterwards A.I.K.(5) transferred to Norway with R.A.F. 88 Group. There the section was mainly concerned with assisting the disarmament units with intelligence and with working in conjunction with Field Security with whom they carried out a number of raids on German reservations for the purpose of arresting wanted persons in hiding or in disguise.

OVERSEAS AND FIELD INTERROGATION.*Smalls* THE MEDITERRANEAN THEATRE.

126 474. The original air interrogation section based at Cairo, though composed of officers trained at A.D.I.(K), was wholly a C.S.D.I.C.(M.E.) organisation; it did, however, send its preliminary reports by signal to A.D.I.(K), as well as sending the detailed interrogation reports for distribution in England. In September 1943, all air intelligence obtained by interrogation of prisoners throughout the Mediterranean area came under the control of A.D.I.(K), the Mediterranean units being fused into A.I.K.(Med.).

Cairo.

127 475. *h* In August 1940, several Italian and German-speaking officers who had received a preliminary training in interrogation with A.D.I.(K) in England founded an air section of C.S.D.I.C.(M.E.) at Ma'adi, a few miles South of Cairo. In December 1941, four German-speaking officers were sent from England to reinforce the section, whose total strength was then nine R.A.F. officers, two W.A.A.F. officers and three A.T.S. subalterns. The C.O. and three other officers spoke Italian. Up to this time they had borne the brunt of the work, since the majority of the prisoners were from the Italian Air Force.

128 476. The reinforcements sent to Cairo arrived practically simultaneously with the German fighter force in the Western Desert, and from the beginning of 1942 until the end of the campaign in that area all prisoners taken in the desert except two were Germans. One or two Italian aircrow were brought in from the eastern Mediterranean, but otherwise the Italian side of the unit had little further opportunity for interrogation.

~~477. At the end of December 1941, the Italian-speaking interrogation officer attached to Advance H.Q.(Western Desert) advanced to Cairo and was replaced by two German-speaking officers, who set up their headquarters at the advance prisoner cage at Tobruk during the first week of January 1942.~~

129 478. Cairo, which remained the centre of detailed interrogation, was in communication with the senior intelligence officer at Air Headquarters (Western Desert) and was kept informed by that headquarters of the location of crashed enemy aircraft and the probable location of prisoners. ~~In practice it was found impossible to locate prisoners further forward than the advanced cage, as most of this they were almost invariably brought immediately to the rear by any of 150 or so long units.~~ By diligent canvassing of divisional commanders in the course of the first three or four weeks, a fairly satisfactory arrangement was come to for the recovery and dispatch of documents to ~~the cage at Tobruk. A cage set up at Tobruk in early January 1942.~~

~~479. Air prisoners brought in to the Tobruk cage were given a preliminary interrogation the results of which were telephoned through to the S.I.O. at A.H.Q.(W.D.), and the prisoners were then evacuated to Cairo by air. In the worst cases, where air transport failed, prisoners would reach the interrogation centre in Cairo 48 hours after their reception in the cage at Tobruk. Signals traffic - transmission, encoding and decoding - through the normal channels to Cairo at the beginning of 1942 was subject to a delay of about forty hours. It proved possible to make use of a direct radio link to G.H.Q.(M.E.) from El Adem, which reduced the time of transmission to about two to three hours.~~

180. During moonlight periods it was found necessary to maintain an air interrogation officer in Alexandria to deal with the crews of aircraft shot down during German raids on shipping in the Canal zone. When this officer was in Alexandria, he also interrogated prisoners arriving in the Alexandria cage from the desert, and arranged for their transportation to Cairo.

/181. In March 1942

~~181. In March 1942 the Army section of C.S.D.I.C. (M.E.) decided to reinforce those of their officers who were attached to the various Corps and to the Tobruk cage by the formation of a mobile interrogation unit to be stationed with the Army Corps at the northern end of the line. A decision for this unit was selected at Bel Hammed, halfway between Tobruk and Gambut (A.H.Q. (W.D.) at that time). The air officers were thereupon withdrawn from the Tobruk cage and attached to the new C.S.D.I.C. mobile unit which, in addition to the general cage, had four tents with microphone facilities and direct radio communication with C.S.D.I.C. (M.E.) at Ma'adi. The transport arrangements for prisoners remained as before.~~

~~182.~~

~~In May 1942 the camp site at Bel Hammed was overrun by a German flying column and the Army unit returned to Ma'adi. At the request of the S.I.O. at A.H.Q. (W.D.) the two Air Section interrogation officers remained, one at Tobruk and the other at the railhead cage at Fort Capuzzo. The latter, then in process of formation, was designed to replace Tobruk cage in the event of Tobruk being once more besieged or captured by the enemy. The Tobruk cage was in fact closed down about ten hours before the Germans later captured the town, and the air section officer returned to Fort Capuzzo, where the section continued to function until the cage there was also closed. The air section then joined A.H.Q. (W.D.), retreating with them to the Delta area. During this retreat it was impossible to carry out any interrogation in the field, as the unit was almost continuously on the move. Documents were collected where possible and sent on to Cairo.~~

~~183. Work in Cairo increased steadily throughout the first half of 1942. When the front was stabilised at El Alamein, the Army section of C.S.D.I.C. (M.E.) set up a small field interrogation cage at El Ineiyyed, to which an air section officer was attached. Air prisoners brought to this cage were immediately evacuated by road to Alexandria, where they were put on a train for Cairo.~~

130-184. When the Allied advance from El Alamein started in October 1942, two air interrogation officers were again attached to A.H.Q. (W.D.) and together with air intelligence technical officers followed the advancing troops. Prisoners, including large numbers of German Air Force ground personnel, were interrogated practically on the march, and selected ones were sent back to Cairo by any available means of transport.

131-185. In the autumn of 1942 an American Air Corps officer joined C.S.D.I.C. (M.E.) at Ma'adi as an observer, in order to gain a practical insight into the operations of the Middle East Interrogation Centre. He was made familiar with all phases of work at headquarters, and spent some time with the air interrogation officers in the field during the advance on Benghazi. He remained with the unit until about Christmas 1942, and in February joined the interrogation unit in the Algiers area, which also included an American contingent.

Algiers.

32-186. In November 1942, A.D.I. (K) was called upon to provide German and Italian-speaking officers for the North African campaign. At the same time, four American officers who had been for a brief period of training with A.D.I. (K) left to participate in the same venture. On November 9th, the day after the first North African landings, the late King Commander P.M. SOREN, head of the British unit, led a party ashore at Algiers and negotiated the surrender of Maison Blanche airfield.

133-187. Both the American and British parties signalled back reports on interrogations to A.D.I. (K) for publication in England and generally worked as agents for A.D.I. (K), but as yet they were not officially under A.D.I. (K). Though anxious to co-operate with each other, the teams were in fact kept apart and it was not until General EISENHOWER personally intervened that ~~W.G. SOREN~~, as the most experienced officer available was, in February 1943, put in charge of the combined interrogation team, which, together with Air Technical Intelligence officers, formed the Allied Captured Intelligence Centre at Algiers.

/188. In March

the head of the British Unit

134 188. In March 1943 a French officer from Deuxième Bureau, French Air Staff, joined the unit. At the same time, four officers from the air section of C.S.D.I.C. (M.E.) arrived in Algiers to set up a new C.S.D.I.C. with an R.I.F. officer in command. ~~Owing to difficulty in securing suitable accommodation in Algiers, however, a temporary interrogation centre was set up in April 1943 at the prisoner camp outside Constantine and was staffed by four officers, two of whom were in the field; the resultant reports were issued from Algiers.~~

135 189. With the German capitulation in Tunis early in May 1943 the interrogation organisation was faced with an enormous influx of prisoners. ~~The Constantine camp became so congested that segregation for interrogation purposes became virtually impossible, even the intelligence offices and accommodation being used to house prisoners.~~ At the height of the rush 12,000 a day were passing through ~~to handle the overwhelming numbers of prisoners, reinforcements of interrogators were sent out from England, three British officers from A.D.I.(K) and five U.S. officers from Cairo arriving in May and two more A.D.I.(K) officers at the end of July 1943.~~

190. ~~Permanent quarters had meanwhile been found in Birkadom, a village some ten miles South-East of Algiers, and on 21st May 1943, the Interrogation Section left A.C.I.C. to form the Air Section of C.S.D.I.C. (Algiers). The unit was housed picturesquely but still inadequately in a house which had formerly belonged to a wealthy Arab, and exercise compounds for prisoners were laid out among the fruit trees in the grounds. A shortage of accommodation caused constant difficulties when prisoners arrived in any number; there was accommodation for only 16 prisoners in cells, the remainder being put into four large dormitories, which allowed sleeping space for about 20 each in each.~~

191. ~~Prisoners were given a preliminary interrogation on their papers and effects examined; preliminary reports were then issued and signals sent to A.D.I.(K). Any prisoners who seemed to be in possession of specially important information were sent back to the United Kingdom by air for more intensive interrogation. Others requested by A.D.I.(K) were sent by air or sea according to the degree of urgency. The remainder were fully interrogated on the spot.~~

and Subordination of Overseas
Amalgamation of Interrogation Centres to Air Ministry.

136 192. L At the invitation of the C.I.O. M.A.I.F., the Assistant Director of Intelligence (K), ~~ing Commander S.D. FULLEN~~, visited the interrogation centres at Algiers and Ma'adi in August 1943 and after consultation with the C.I.S.O. H.B. it was arranged that, in order to facilitate the unified control of prisoner interrogation, the Air Section C.S.D.I.C. (Algiers), and Air Section C.S.D.I.C. (M.E.) were to be brought on to the A.D.I.(K) establishment at Air Ministry and called A.I.K. (Med). This was agreed to by the Establishment Branch of the Air Ministry, though it was a complete innovation and contrary to existing practice. ⁽¹⁾
Its value is indicated at para 147.
Sicily.

137 193. L For the invasion of Sicily two mixed parties of three British and four American interrogation officers under the command of a Squadron Leader of A.I.K. (Med) were organised. The interrogation team with the American forces went in on the seventh day from the South, and the team with the British forces on the day following the landings. Forward interrogation was carried out on the island itself, and prisoners (mainly German) were evacuated by air to Tunis and Algiers, and thence, if potentially valuable, back to A.D.I.(K) in England.

~~Responsibility of Documents~~ At Cuneo
194. L ~~When General PATTON's troops reached Comiso airfield which had been very hurriedly abandoned by the Germans, and took over the German Air Force headquarters in the town, large quantities of documents and many valuable prisoners were captured. Forward air interrogators on the spot were able to see that the utmost use was made of both documents and prisoners. ⁽²⁾ Expeditions were made by the forward teams to other German airfields and Air Force headquarters in Sicily and the teams continued to move forward, one with the 7th and the other with the 8th~~

(1) ~~was~~ Similar arrangements existed as regards the Overseas Detachments of /Italy. Technical Intelligence - See Chapter 14, para 19.

(2) See also paras 148 and 165 and Appendix 'E' Technical Intelligence.

Italy.

138 495. In the invasion of the Italian mainland at the beginning of September 1943 two parties of interrogators were again sent in over the beaches; the first party went across the Straits of Messina into Calabria on September 3rd and the second on September 9th at Salerno. ~~After an initial period when the two teams were completely out of touch with one another, they joined up at Serrano.~~

139 496. ~~When Naples was captured on September 24th the air interrogators had commandeered a villa on the Bay of Naples. For many months this villa was used as a collecting and interrogation centre for air prisoners. Later it was taken over as the headquarters of the executive staff of C.S.D.I.C. (Med). At the same time C.S.D.I.C. (Army) set up a small interrogation cage at Portici, where air interrogators also dealt with army prisoners of air interest. Teams were also sent to Sardinia and Corsica, the Corsican party including a French officer attached to A.I.K. (Med) who represented both technical intelligence and air interrogation.~~

~~497. The Algiers headquarters had meanwhile been chiefly occupied in providing information about German Air Force attempts to interfere with Allied seaborne traffic in the Mediterranean, and this section became probably the most important single source of intelligence, especially after the first airborne glider bomb was reported in August 1943. From this time on, its main purpose was to keep track of the reconnaissance and bomber units operating from southern French bases and pass the information to Coastal Air Force, whose task it was to protect the convoys. Again, the more important prisoners were flown or shipped to A.D.I. (K) for specialised interrogation.~~

498. ^{also} Towards the end of October 1943, an officer was posted to Bari to maintain liaison with headquarters B.A.F. and XVth U.S.A.A.F. and interrogate deserters from the Balkans and the few German Air Force prisoners available. ~~In December 1943, the preliminary planning for the Rome "S" Force party was begun. The entire Air Force complement assembled in about the third week in January 1944 at Caserta, and moved off to a waiting area about fifteen miles South of Cassino.~~

Industrial Interrogation.

140 499. ^h Early in 1944, a new unit consisting of British and American officers to interrogate the hosts of refugees who were now drifting from France to Morocco through Spain and Portugal was set up in co-operation with A.I.K. (4) at Casablanca, Oran and Algiers. It reported direct to A.D.I. (K). The informants at these various centres were not only individuals who had escaped from occupied territory, but included also a certain number of displaced persons who had been forced to work in German and Austrian factories. The information they were able to provide for industrial and target purposes amplified that obtained in the United Kingdom. ~~One aspect of this work was the opportunity which it afforded its officers of gaining experience in this type of interrogation, experience which was to prove exceedingly useful later on in Northern Italy.~~

The Anzio Landings.

200. ~~When the Anzio landings were effected in January 1944 an "S" Force contingent, including two A.I.K. (Med) officers, was landed on the fifth day. The Anzio beachhead proved to be very productive of intelligence and the interrogating officers acquired much interesting operational material. This party followed the troops when they moved into Rome in June 1944 and a temporary interrogation centre operated by C.S.D.I.C. (Med) was set up in the Pincio Gardens.~~

"S" Forces.

141 201. "S" Forces had been set up for all major targets, beginning with Tripoli, Tunis and Naples, later for Rome and, in a modified form, were now organised for the larger northern Italian cities. In their modified and final form they consisted of a combined services organisation whose air "force" had the title

~~of the Air Force,~~

No. 1.

of ~~Units~~, F.I.U. (Field Intelligence Unit). The units were intended to enter their targets as soon as possible after the Army spearheads to secure intelligence material and persons for interrogation. They were also to set up interrogation cages and at the earliest possible opportunity were to carry out interrogations on the spot for interested service departments.

~~142-202. Their composition varied, but the last of the Combined Services "S" Forces consisted of about three hundred intelligence officers, a battalion of combat engineers, various signals, transport and ancillary units; S.I.M., the Italian military intelligence organisation brought with them about a thousand combat troops. The Air Force component of the Rome "S" Force consisted of some eight officers of Air Technical Intelligence, six British and American A.I.K. (Med) officers, and one officer and three other ranks from the Y-Service. Two R.A.F. Regiment squadrons were provided to act as guard troops for the Air Intelligence sections.~~

Activity in Spring 1944.

~~203. From the winter of 1943 to the spring of 1944, prisoners had consisted mainly of night bomber and daylight fighter-bomber aircrew, with a constant stream of deserters from the Axis allies - Hungarians, Rumanians, Yugoslavs and Italians - most of whom were inclined to be indignantly surprised when they found that their desertion did not entitle them to preferential treatment.~~

~~204. On June 8th, two members of a forward team attempted to go into the Guidonia Experimental Station. The place had, however, not yet been fully evacuated by the Germans and one of the A.I.K. officers was captured. This officer in due course passed through Dulag Luft but in spite of a nine-day grilling in solitary confinement and a long interrogation by the Gestapo, did not divulge that he was from an interrogation unit.~~

The Move to Rome.

~~205. On 12th July 1944, the headquarters in North Africa and the Air Section at Naples moved to Rome together with C.S.D.I.C. (Med). A detailed interrogation centre was established in the former premises of the Government experimental film studios at Centocelle. Accommodation was provided for a maximum of 72 prisoners in pairs, in rooms with microphone facilities; various compounds in the grounds provided mass accommodation for the remainder.~~

~~206. After the fall of Rome A.I.K. (Med) officers were attached to the 8th and 5th Army cages to interrogate incoming prisoners, both Air Force and Army. Later an additional officer was placed in X Corps cage for the same purpose. Aircrew interrogations followed the usual pattern - tactical at the cage, with immediate subsequent evacuation to Rome for detailed interrogation. Any prisoners screened by C.S.D.I.C. (Med) Army interrogation officers, were interrogated for target information, and if they appeared to be in possession of really useful air intelligence they were sent to Rome. An Air Intelligence field team consisting of two A.I.K. (Med) officers and two from Air Technical Intelligence followed the troops into Florence on the morning after it fell to the Allies, to exploit intelligence targets in that city.~~

Southern France.

~~207. Preparations for the invasion of Southern France in August 1944 had been begun in North Africa with the setting up of a special section run by an air interrogator to collate all information concerning air installations and enemy air units. Planning was continued in Italy, and the actual equipment and organisation of a Combined Air Intelligence Field Team were arranged under the auspices of the Mediterranean Allied Air Forces (M.A.A.F.); all necessary contacts were established and full co-operation of the ground forces when required was assured. The result was the formation of the M.A.A.F. Field Intelligence~~

Intelligence Unit consisting of Allied Technical Intelligence officers and of interrogators, an administrative nucleus and R.A.F. Regiment squadrons for guards and other duties. *After the landing,*

~~208. The unit landed at "Green Beach", St Raphael in two waves, one on the same day as the landings and from the staging area in Naples, and the other on the third day from the staging area in Corsica, where during the waiting period they had been giving security lectures to Allied units based on the island.~~

209. Intelligence work continued in the wake of the advancing French and American forces until they met the Normandy invasion troops. ~~It was then decided that the European Theatre of Operations (ETOUSA) should absorb the North African Theatre of Operations (NATOUSA). Several Air Force units were therefore transferred, including XIIth Tactical Air Command (XIIth T.A.C.) to which the M.A.A.F. Field Intelligence Unit had been attached during the southern French campaign. Owing to regrouping of forces, intelligence headquarters in Italy withdrew their team from France. At the request of the Assistant Director some of the Americans were transferred to the A.P./I.U. working in the S.H.A.E.F. area and Captain, later Major, Van Rossum D.I.U.M., who had led the interrogation team in Southern France, later commanded the A.P./I.U. team with 1st T.A.C.A.F. in the zone of the 6th Army on the southern part of the Western Front. The remainder returned to Italy to await the anticipated fall of Bologna, and to explore the industrial areas of Northern Italy.~~

Northern Italy.

~~210. In the first week in September 1944 M.A.A.F. F.I.U. set up its headquarters in Florence, with a staff of three officers and two advance parties - one on the 8th Army front and the other at Porignano to follow the advance into the Po valley. Target information obtained at 5th Army, 8th Army and X Corps cages was despatched daily to the A.I.K. (Med) component of M.A.A.F. F.I.U., Florence, who issued reports and distributed them to the bomber forces and to A.I.K. (Med) at Rome.~~

211. This state of affairs continued until March 1945, when in view of the impending advance the F.I.U. section was divided into three. A sub headquarters remained in Florence while two mobile parties, known as F.I.U. (A) and (B) went forward. One of these carried the eastern side of Italy with the 8th Army, the other the central and western portions with the 5th Army. To each of these parties A.I.K. (Med) officers were attached to investigate targets overrun in the advance.

212. At the time of the German surrender in Italy, three A.I.K. (Med) officers accompanied the B.I.F. party which took the surrender of the German Air Force at Bolzano.

Greece and Crete

~~144-213. Two officers arrived in Greece early in November 1944, one from Cairo and the other from Rome. ^{and} they continued to work with C.S.D.I.G. (Army) at Kefissia. From 7th to 21st November one officer was in Salonika. On 17th December, Air Headquarters at Kefissia was attacked by E.L.A.S. Forces, as a result of which one officer was captured together with 700 personnel of Air Headquarters. He was in the hands of E.L.A.S. from 19th December for about a month, during which time he was forced to march from Athen to Trikkala, a distance of approximately 200 miles. The other officer was evacuated from Kalamaki on 26th December and returned to Italy.~~

Crete

214. One A.I.K. (Med) officer and one Air Technical Intelligence officer were ordered to Crete in February 1945. ~~They flew from Athens to Heraklion towards the end of the month.~~

215. They spent the latter

SECRET.

the latter
 245. ~~They~~ spent three weeks on the island, visiting all airfields, fuel and ammunition dumps, and such radar stations as were not still in enemy hands, and interrogated deserters from the German-held sector. Valuable liaison work was done with the Cretans, and propaganda material was distributed in the outlying districts on behalf of A. I. (S).

The Final Stage.

145-216. After the close of hostilities A. I. K. (Med), like the other air interrogation units on the Continent, sifted the abundance of German Air Force personnel available and produced detailed interrogation reports on the various major functions of the German Air Force.

146-217. Excellent co-operation was achieved between A. I. K. (Med), which was responsible to A. D. I. (K) in London, and the C. S. D. I. C. (Army) which was under the command of A. F. H. Q. Similarly, there were no difficulties that were not easily overcome in the relations between the Air Section, the C. I. O. who had tactical control of the section, and the various other sections of M. A. A. F., M. A. C. A. F., 1st T. A. F. and XXII Air Support Command.

147-218. The unified control of all overseas interrogation units enabled A. D. I. (K) to provide briefing in all theatres on subjects of common interest, and facilitated a rapid movement of trained officers to any desired theatre. To avoid administrative complications, day to day administrative needs were met by M. A. A. F. on whose establishment the M. T. and clerical staff were carried. This system worked smoothly to the satisfaction of all concerned.

Small THE WESTERN FRONT AFTER THE ~~DEFENSIVE~~ LANDING IN NORMANDY

Basic Planning.

148-219. In August 1943 Air Marshal LEIGH-MILLORY, C.-in-C. Allied Expeditionary Air Forces, formulated the policy that in the forthcoming *landing in Normandy* invasion of Europe certain specialised aspects of air intelligence, including the interrogation of prisoners of war and the examination of captured documents, should be carried out by Air Ministry. Following the newly inaugurated system in the Mediterranean, documents were to be the responsibility of A. D. I. (K).

149-220. Planning for the *landing* invasion started in November 1943, and a joint British-American team called Air Prisoner of War Interrogation Unit (A. P. W. I. U.) was created. ~~The planning was carried out jointly by Squadron Leader (later Wing Commander) G. B. JEPSON, and Captain (later Lieutenant-Colonel) E. M. WARBURG, the senior American officer with D. I. (i).~~ Copies of the relevant S. H. A. E. F. and A. E. A. F. directives will be found in Appendices ~~E~~ and ~~F~~.

150-221. The responsibility for custody and general administration of German Air Force prisoners remained with the Army, but a special provision was made whereby any air interrogation officer could assume this responsibility on his own authority and could also transfer prisoners from one location to another, including the United Kingdom, by land, sea or air. A special authorisation signed by General EISENHOWER, the Supreme Commander, was issued to all A. P. W. I. U. officers enabling them to move freely throughout the whole theatre and to take into custody any German Air Force prisoners. The remainder of the planning period was spent in obtaining establishments for personnel and equipment and in delivering lectures to the R. A. F. Regiment and Army units on security and on procedure when handling German Air Force prisoners.

151-222. Initially it had been planned that A. P. W. I. U. would operate as a single unit, but it was found preferable to split it into two parts, an R. A. F. element working in the British sector and an American element in the U. S. zone. A very close liaison was maintained between the two teams and normally the operations were confined each to its own sector. It was, however, understood that personnel would be transferable from one zone to the other in case of necessity.

/223. The

152 225. The original preliminary interrogation form which had been used in field interrogation in England from 1940 onwards was slightly modified and as R.A.F. Form No.40 was used by both U.S. and British teams. Information was to be signalled by either team to A.D.I.(K), information copies being sent to a few specialised Air Ministry sections and naturally to the other team. Tactical information was passed immediately to the tactical air forces at the lowest level at which the information could be of use.

Operations - British Team.

~~224. The first members of the British team landed in Normandy on the third day of the invasion, June 8th 1944. Two officers were landed with their own transport, one to work with I Corps and the other with the 1st Army Corps. Two further officers in jeeps landed on the same beaches (M/N and J/K) on the fifth day and two more on the ninth. The final move was completed when the headquarters party landed at Courcelles with the advance party of 2nd T.A.F. on July 22nd. A total of ten British A.P/W.I.U. officers was then in France.~~

225. The chief difficulties which beset the early arrivals were concerned with supplies, transport and communications. It was necessary to have a team of interrogators over as soon as possible, however, not only to pinpoint aircraft crashes and deal with air prisoners or documents on the spot, but also because it had been reckoned that Caen-Carpique airfield would be in Allied hands on the second day, and that experienced men would be needed to examine the documents and any prisoners. The airfield was not captured as soon as had been envisaged but a fair amount of air activity took place and the A.P/W.I.U. teams were well occupied.

154 226. It had been planned to have A.P/W.I.U. headquarters at the main headquarters of 2nd T.A.F., with teams at the headquarters of 83 and 84 Groups, but this had purposely not been made a fixed arrangement. In practice it was necessary at various stages for one or other of the teams at the tactical groups to be moved to other duties. With the arrival of 2nd T.A.F. headquarters in Normandy the sphere of activity widened. ~~The Americans had taken the Cherbourg peninsula, capturing many thousands of prisoners, and two of the early arrivals from the R.A.F. team were sent to help with the screening interrogations. As the Americans successively took St. Lo and Rennes and pushed on to Argentan, the tactical Air Force put up a maximum effort against the enemy troops and particularly against the armour held in the Falaise pocket.~~

~~227. The A.O.C. in C., 2nd T.A.F., ordered an exhaustive enquiry into the effect of this air offensive on the morale and fighting efficiency of the enemy. It was therefore arranged that A.P/W.I.U. representatives should work in the front line with all units down to brigade level, to see prisoners as soon as they were brought in and elicit answers to a number of set questions on supplies, morale, their personal reactions to air attack, etc.~~

Co-operation with T-Force

164 228. At this time the first T-Force (Task-Force) operation began. These were forces sent in to important areas immediately behind the Army spearhead to seize and safeguard intelligence objectives. A.P/W.I.U. officers were attached to the T-Forces as required.

155 229. As the fall of Paris was imminent and as the city was a major intelligence target, arrangements were made for some of the R.A.F. officers to go to Paris with the American T-Force and to join with the U.S. section of A.P/W.I.U. ~~Paris fell to the Allies on 23rd August 1944 and three R.A.F. officers of this unit entered the town behind the French armour, to be joined shortly afterwards by members of the American element.~~

156 230. During this period, when the A.P/W.I.U. contingent was fully occupied in Paris, events elsewhere moved so fast and so many new targets were opening up that it was necessary for the R.A.F. officers to curtail their activity in the French capital and press on to Brussels, which was entered on September 4th.

/ This rapid

This rapid advance across France had uncovered so many new targets, including the whole of the V-weapon coast, that the ten officers of the British section were totally inadequate to deal with the targets. It was therefore decided to concentrate on Brussels and leave the intervening targets to the Air Technical Intelligence teams.

157 231. At this time very few German Air Force prisoners were being brought in, and the energies of the unit were devoted to finding out details of the German aircraft and other industries by interrogating satellite firms and organisations in Belgium and Holland. The most valuable investigation was that made into the Erla Me.109 repair organisation which operated in Antwerp. ~~A Flemish store-keeper was traced and set to work to report on the supply situation in general; this report proved to be most valuable, and as a result one particular firm was moved from No.33 to No.1 on the bombing priority schedule. Another useful piece of information from this organisation was the complete list of all the component stores supplying the Erla organisation, information which subsequently proved invaluable in the disarmament of the German Air Force.~~

832 ~~In the Luftwaffe's last all-out attempt to cripple the B.P. on 1st January 1945, an operation in which by 1015 hours the Germans had lost about two hundred aircraft, the resulting work of interrogating prisoners and clearing up the effects of the raid lasted for several weeks. After preliminary tactical interrogation the prisoners were sent to A.D.I.(K) headquarters for detailed interrogation; a consolidated account of this raid, compiled after interrogation of all prisoners who had taken part in the raid, is contained in A.D.I.(K) Report No. 158/1945.~~

C.I.O.S. and C.A.F.T. Organisation

158 233. ~~L Towards the conclusion of the war it was indicated that the war was now rapidly drawing to a close and planning was actually in progress for the working of the unit during the period immediately following capitulation or collapse. The most important task was the investigation of German production and research centres with a view to exploiting them for the benefit of the Allies. This was to be carried out within the area of the Supreme Headquarters by the Combined Intelligence Objectives Sub-Committee (C.I.O.S.). It became apparent, however, that owing to bombing and dispersal the available information was no longer accurate and some preliminary research by field agencies should be carried out prior to the full investigation by Allied technical experts.~~

~~Spander which~~
234. ~~L~~ an organisation known as Consolidated Advanced Field Teams (C.A.F.T.) was set up and its teams were organised under seven groups according to the type of objective. Group 4 covered most of the air items, and the head of A.D.I.(K) became chairman of that Group with an officer from U.S.S.T.A.F. headquarters as his deputy; it dealt with aircraft, aircraft engines, aircraft instruments and equipment, bomb sights and jet propulsion. The group was sub-divided into three areas in which teams worked in the zones of 21st, 12th and 6th Army Groups.

159 235. The officers of the A.P/W.I.U. in each zone, because they were German-speaking and had the requisite knowledge and training, formed the nucleus of the Group 4, and the head of A.P/W.I.U. in the British zone became the team leader in the area; in the American 9th Air Force and 1st T.A.F. zones an A.P/W.I.U. officer was chosen as deputy leader.

A.D.I.(K) Target Lists

160 236. ~~L~~ The targets had largely been established on the strength of A.D.I.(K) reports from refugee and prisoner sources, and A.D.I.(K) headquarters now concentrated on producing and keeping up to date an A.D.I.(K) Targets List to provide both C.I.O.S. and the C.A.F. Teams with a complete list of all known industrial installations, airfields, radar stations and headquarters. The American deputy, on the other hand, undertook the work of calling up teams from interested branches as soon as targets were uncovered. The work of the C.A.F. Teams, which was primarily of preliminary investigation, made a full exploitation of the objectives; this was finished on 12th September 1945 and C.I.O.S. Group 4 was then abolished.

161 237. In order to carry out this work the A.P/W.I.U. establishment in the /British zone

British zone was more than doubled by the addition of sergeant interpreters, drivers and vehicles. At a later date the air personnel under C.A.F.T. Group 7 in the field who were dealing with headquarters, documents and personnel, were also attached to A.P/W.I.U. teams in the field, as they were performing a work which had been undertaken by the A.P/W.I.U. - the collection of documents - since the landing on the Continent.

~~238. In April 1945 the main headquarters and T.A.F. left Brussels and with it the remnants of the headquarters party of A.P/W.I.U. Reports from C.A.F. Teams came in to A.P/W.I.U. headquarters and had to be circulated as quickly as possible to interested agencies.~~

~~239. In addition to all its normal activities, A.D.I.(K) was from time to time called upon to help out in other ways. About a fortnight before the end of the war, for example, it was asked to translate into German the agreement drawn up between the Royal Air Force and SEYSS INQUARDT, the German governor of Holland, regarding the dropping of supplies to the Dutch people.~~

The German Surrender

240. A.P/W.I.U. may truly be said to have been in at the death of the German Air Force, since at 11 o'clock on the night of May 5th a further document, the surrender terms for Luftflotte Reich, was translated, an A.P/W.I.U. officer acting as interpreter for the R.A.F. Delegation. The terms were duly signed, but the interpreter was required to travel to Schleswig on the following day to continue negotiations direct with STUMPF and his staff.

241. An A.P/W.I.U. officer attached to the R.A.F. Regiment force sent to secure Bad Eilsen, destined to be the headquarters of the 2nd T.A.F., took Dr. Kurt T. RIK, of Focke Wulf, into custody in his office at the Bad Hotel in that town and sent him to the United Kingdom for interrogation. This capture at Bad Eilsen proved to be one of the best intelligence actions during these later stages of the war and was only due to the rapid thinking and action by the A.P/W.I.U. officer; the chief offices of the firm were intact and all the key personnel were still in the town.

Post-Hostilities Functions

242. After the conclusion of hostilities, A.P/W.I.U. was again reorganised with representation at the headquarters of the British Air Force of Occupation, now the successor to the 2nd Tactical Air Force, and at 83 and 84 Groups. The work consisted in handling a vast mass of documents and in locating and arresting members of the German Air Force and scientists and civilian technicians who were required for intelligence purposes. As and when interesting Germans were identified, their names and the scope of their knowledge were notified to the appropriate agencies who, through A.D.I.(K), could request their presence in England for interrogation. In the course of this work the organisation of Chef der Technischen Luftrüstung - Directorate of G.A.F. Technical Armament - was reconstituted prior to its evacuation to the United Kingdom for interrogation.

Operations - U.S. Team.

243. Air prisoner interrogation for the American sector of the Normandy invasion was in the hands of ten officers and ten enlisted men, all of whom had trained for longer or shorter periods at A.D.I.(K). ~~In the case of the American officers attached to A.D.I.(K) headquarters, the U.S. field team was administered by M.I.S. ETOUSA and later Com.Z. It was not until well after the war that the American unit was transferred to U.S.S.T.A.F. The relationship of the American team was in fact very analogous to that of the British field team, it being largely under A.D.I.(K) operationally. For tactical intelligence, however, the team worked entirely under the air command in the field.~~

244. The first American officers went ashore attached to the advance party of the 9th Air Force, and landed over "Omaha Beach" on 8th June 1945, the third day. One officer was assigned to a special mission for investigating coastal radar with the IX Engineer Command. Another went in with IX Tactical Air Command. ~~The remainder came ashore in detachments up to the 28th day and were based at~~ 9th Air

9th Air Force Advance Headquarters at Grandcamp-les-Bains.

245. The comparatively few German Air Force prisoners taken alive during first few weeks were interrogated at tactical level and evacuated promptly to A.D.I. (K) in England for detailed interrogation. Close liaison was established with Air Technical Intelligence and Signals Intelligence. The resultant co-operation and direct interchange of information proved to be of great mutual benefit. The 9th Air Force also arranged that prisoners of the ground forces should be interrogated on the effects of ground attack.

246. A number of officers entered Cherbourg with the troops to search German Air Force headquarters, airfields and V-weapon sites. This mission, and later missions to Rennes and Angers, produced good results. When XIXth Tactical Air Command arrived on the Continent, a team was also attached to this headquarters. A strong A.P/W.I.U. detachment entered Paris with the T-Force on 25th August 1944, two days after the fall of that city, and stayed there for a fortnight, obtaining useful information from factories in the area and interrogating civilians.

Movements and Establishment.

247. During 1944 and 1945, A.P/W.I.U. headquarters were established with the advance headquarters of the 9th Air Force. At Versailles the unit was joined by officers from the South. As the advance proceeded, A.P/W.I.U. moved with the 9th Air Force (Advanced) to headquarters in Luxembourg. The teams attached to the IX, XII and later XXIX Tactical Air Commands moved with the headquarters of these Forces. Other A.P/W.I.U. officers were stationed at large prisoner cages to assist in screening air prisoners who were removed to A.P/W.I.U. and, when desirable, evacuated for detailed interrogation to A.D.I. (K).

By February 1945

248. The original ten officers operating in the American sector of the Western Front had been increased by February 1945 to fifteen - thirteen American and two French. They covered the area between Maastricht in the North and Luxeuil in the South, and from Chalons-sur-Marne in the West to the front line.

Organisation and Results.

249. The headquarters staff comprised, according to need, from three to seven officers and from three to five enlisted men. A number of field teams, normally made up of one officer and one enlisted man, were attached to various prisoner cages and at the Tactical Air Commands. Their work consisted in screening and interrogating Air Force prisoners, and sending back suitable ones to A.D.I. (K) headquarters in England. A good many detailed interrogations were carried out on the spot, principally for tactical information.

250. When the armies linked up and the whole of the operations in France came under S.H.A.E.F., three U.S. air interrogation officers formed the section of the A.P/W.I.U. working with the American 6th Army Group from the headquarters of the First Tactical Air Force (Provisional). This party finally ended up at Kaufbeuren, near Munich.

251. To return to the original U.S. party, now working solely with the 12th Army Group and the U.S. 9th Air Force, a great deal of intelligence on targets such as marshalling yards and supply dumps was obtained and proved of service. After the end of the Ardennes battles there was a comparative lull in German Air Force activity over the Allied lines; great numbers of ground personnel, knowledgeable on technical matters, were, however, coming in. These had to be particularly carefully screened because, as a result of the bombing-out of civilians and members of the German Air Force for the infantry, many fairly high-ranking technicians, operational flying men and flying instructors were to be found in the ground forces. After this phase the interrogation units joined the T-Force and participated in the work of C.I.O.S.

/ . 252. On 15th April

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~~252. On 15th April 1945 the headquarters of the unit left Luxembourg for Wiesbaden and in the following month moved to Bad Hissingen, new headquarters of the 9th Air Force.~~

Last Phase.

168
169 253. The highest German Air Force officers, such as SPERRLE, KOLLER and GJLLND, together with many of the most interesting civilian technicians, were captured. From March onwards, a special aircraft was flown twice a week, and sometimes more often, for the sole purpose of bringing such prisoners over to A.D.I.(K) headquarters in England.

169 254. Among the prisoners interrogated by the American unit were Reichsmarschall GOERING and other members of the German General Staff. It had been decided at S.H.A.E.F. level that the whole of the High Command of the German Air Force (O.K.L.) should be collected from their various posts and hiding places and concentrated in a camp near Berchtesgaden for interrogation, and until some final decision regarding their ultimate fate should have been reached. In August 1945 it was decided that they should all be brought over to England, as a more convenient centre; as already stated, the Latimer camp was used for this purpose.

170 255. Teams from ~~Bad Hissingen~~ continued to go out on various assignments finding men needed for interrogation and searching for hidden documents. An hotel was maintained for the accommodation of persons such as scientists, technicians, and other men who possessed knowledge valuable to the Allies, with their families. All documents were collected in a special section and the cases sent by air to the A.D.I.(K) Documents Section for final evaluation and distribution.

171 256. By October 1945 the unit had finished most of its work, only a small staff remaining at Wiesbaden and Kaufbeuren to issue final reports and to wind up the affairs of the unit.

(New page) APPENDIX A

SUBSIDIARY ACTIVITIES OF A.D.I.(K).

SECURITY LECTURES AND PORT LIAISON.

bombing offensive against

1 257. When the ~~Battle of~~ Britain ended in the middle of 1941 and enemy raids became relatively infrequent, the number of field interrogation officers placed at R.A.F. establishments in the United Kingdom was gradually reduced. Some were transferred to new activities which had been developed at headquarters in the meantime, whilst others remained at their original posts but were given much larger areas to cover. Most of these officers were already engaged on Station Intelligence and worked regular watches with the Station Intelligence Officers on the understanding that if they should be called out to investigate a crash a substitute would be provided on the station watch.

2 258. Those who were in or near coastal districts worked with A.I.1(Z) in initiating and maintaining contact with the Port Liaison authorities for the purpose of interrogating sailors and others touching at British ports. These men had often been recently in German ports. They also had the opportunity of discussing problems connected with such matters as air escort to merchant shipping with men of the Merchant Navy, who in their turn were interrogated for tactical information on the German methods of air attack, weapons, etc.

3 259. During the last two years of the war these officers, on the instructions of the V.C.A.S., concentrated mainly on the vitally important task of giving security lectures to aircrew. It was felt that A.D.I.(K) officers were particularly well qualified to warn aircrew of general methods of interrogation owing to their personal experience of the traps into which a man may fall through a lack of adequate warning.

(1) See Chapter 7(i)

/260. One great

- 4 260. One great difference between German and British prisoners lay in the reasons for which they talked. In the case of the Germans the cause was, as already pointed out, very often political. If the German could be shown that his government had deceived him, he was frequently prepared to tell what he knew. When the British prisoner talked it was often because he was deceived by the friendly approach of the German interrogator, as a result of which his conclusion was "The Hun is not such a bad fellow after all". There were some Germans and British who were born talkers and could not stop themselves whatever their security training. In this sense the German maxim never to let anyone know more than was absolutely essential for the accomplishment of his work was sound.
- 5 261. The dangers were firstly that aircrew did not know which subjects were interesting the enemy - hence lectures had to be revised at fairly frequent intervals to keep them up to date; secondly they did not realise the harm they could do to their own comrades by giving away or even by merely confirming apparently unimportant details.
- 6 262. The A.D.I.(K) security lectures were based on actual practice in interrogation of German prisoners, and usually took the following form:-
- (a) The importance for each man to keep silence, whatever value he might think the little he knew would have to the enemy.
 - (b) The type of intelligence the Germans were seeking - such as details of training, units, personalities, tactics, equipment, airfields, A.A. defences, new projects.
 - (c) Recommendations for behaviour under interrogation, supported by instances from the lecturer's own experience in interrogating Germans. It was always impressed on the audience that the only behaviour was a courteous and formal refusal to say anything.
 - (d) Warnings of the type of document or personal effect that would yield information to the enemy; in this connection the necessity for aircrew turning out their pockets before going on operations was emphasised.
 - (e) Aircrew were warned that a German interrogation officer was never a friend, however pleasant he might seem, and that favours were given to prisoners only for the returns they would produce.
 - (f) Methods of interrogation were discussed, with examples.
- 7 263. In the later stages of the war lectures were frequently prefaced by a showing of a film "Information, Please" which had been made in collaboration with A.D.I.(K) and illustrated the interrogation of British aircrew at Dulag Luft, the German Air Force Interrogation Centre.
- 8 264. To bring the lectures up to date both in regard to German methods and the means of countering them, a bulletin was sent out from headquarters every month and contained fresh anecdotes, drawn from experience at headquarters, to illustrate the different points.
- 9 265. There can have been few Allied aircrew who did not hear the necessary security lectures, either from an officer of A.D.I.(K) or one of the American officers attached to it. Nevertheless the enemy obtained more than he need have done, although in the light of evidence from Germany after the war it was apparent that British aircrew became increasingly difficult to interrogate successfully, a proof that the lectures were worth the effort expended.

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- 10 ~~266.~~ Sometimes amusing repercussions were caused by the lectures. On one occasion an R.A.F. aircraft based in the Shetlands was forced by bad weather to land at Dyce after an operation. The pilot sought out the A.D.I. (K) interrogation officer, turned out his pockets and said: "I did exactly what you told us to in your lecture - haven't a thing on me. Now you'll have to lend me a quid!" (which the I.O. gladly did).

INTERROGATION OF R.A.F. ESCAPERS.

- 11 ~~267.~~ In 1941, when every scrap of intelligence on Germany and German-occupied Europe was of great value, A.D.I. (K) undertook the interrogation of R.A.F. escapers and evaders from the Continent. Interrogations took place at the London Transit Camp and at the same time as the M.I.9 interrogations which were concerned with the machinery of escape.
- 12 ~~268.~~ It was assumed that when passing through German territory evaders would have seen enemy installations or activity, information on which could be extracted from them by interrogation. In practice, however, no vital items of intelligence were obtained, and in general the results were meagre for the reason that few if any escapers were trained observers and their accounts were usually too vague to have any value. Much useful information was, however, obtained for the operational requirements sections of Air Ministry and Commands, chiefly as to combat, equipment failures and the ditching of aircraft.
- 13 ~~269.~~ The few escapers from German prisoner camps who had passed through the German air interrogation centre were an exception, and provided valuable information on Dulag Luft and on German interrogation methods. This information, as far as A.D.I. (K) was concerned, was of value as material for the security lectures.
- 14 ~~270.~~ Early in 1944 pressure of work in other directions obliged A.D.I. (K) to discontinue this work as it was usually found that the arrival of batches of escapers corresponded with the capture of German prisoners. The work was thereafter undertaken by A.I.1(a)P/W, the Air Liaison section with M.I.9.

PROPAGANDA.

- 15 ~~271.~~ Psychological warfare is not a new thing. It was Napoleon who called it his Fifth Column, and he was by no means the first to recognise its advantages. As an organised weapon, however, it was never before exploited wholeheartedly until this war, probably because the wireless and the popular press, those instruments of publicity and propaganda, were not until recent years in existence. It must be remembered that this has been a political war - that is to say, the mass of the enemy was not actuated solely by patriotism but also by indoctrinated politics. It was necessary to combat them by using the same methods, and sometimes by turning their own weapons against them.
- 16 ~~272.~~ By an irony of fate, the Germans to some extent defeated their own object and began the war against themselves in this sphere by the immense floods of propaganda that they loosed on their people from the time of the advent of the Nazis onwards. A general feeling of discomfort had grown up among more thoughtful Germans about accepting at its face value anything published in the papers or by the radio. Nevertheless, the fact that for seven years before the outbreak of war the majority of the nation had read and heard nothing but what was permitted by the Party left its mark. Young people up to eighteen or twenty years of age had literally never known anything else. Their whole mental processes were "bound in shallows and in miseries", and they could hardly be expected to realise the existence of mental vistas they had never seen. They had been educated with the calculated object of making them into fanatics.
- 17 ~~273.~~ The Germans must have realised early in the war that the figures of victories and losses published by their official sources were not strictly in accordance with facts. Indeed, a German Air Force officer taken prisoner towards the end of 1942 told his interrogator that he had calculated that if the
/number of

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number of victories claimed by the German Propaganda Ministry were correct, the Allied Air Forces would at that time consist of somewhere near minus 500 aircraft. Admissions of our own reverses were not found lacking in Allied papers and broadcasts, and evidence showed that the Germans gradually came to believe that other news published by the Allies might also be reasonably accurate - even when it was addressed specifically to themselves and therefore tainted with the suspicion of propaganda - though there was to the very last a die-hard section of the nation which refused to accept anything not sanctioned by Dr. GOEBBELS. Nevertheless, the fashion grew of listening-in to Allied broadcasts, more or less surreptitiously, and the way was open for the skilful propagandist. The positive order issued by the German authorities against listening in to foreign broadcasts in the long run worked in the opposite sense to that which was intended; it produced an almost irresistible urge to listen to them, just as in our own case freedom to do so meant that on the whole nobody listened to the German radio except for the sake of getting a good laugh.

- 18 274. Two methods of approach were used. One was to appeal to reason by publishing facts and figures demonstrably true, which would show that the Germans were fighting a hopeless battle; the other was to weaken resistance by putting over subversive ideas, subtly attacking the Nazi ideology and its results, and fomenting internal dissension.

The 'White' Broadcast

- 19 275. 1. The first method was that used by the B.B.C. in its so-called "white" programmes. Those addressed to the German Air Force consisted of news bulletins, talks by Allied airmen on subjects of interest to airmen, and - as a bait to induce the men to listen - the names and fate of casualties broadcast as nearly as possible on the day on which the aircraft were brought down, thereby making it possible for the news to reach friends and relations much more quickly even than by Red Cross telegrams. From April 1942 onwards A.D.I.(K) provided such names, and helped with advice and suggestions about German Air Force technicalities. The first essentials in this programme were of course absolute accuracy and as far as possible a straightforward and instructed approach.

- 20 276. Unfortunately A.D.I.(K) had always to contend with a certain inexperience at the B.B.C. - inexperience in the matter presented, and even more so in the manner of its presentation. The psychological approach to German airmen was, it is maintained, wrong. For example, the B.B.C. would run down aircraft and equipment which were obviously good and try to weaken the men's faith in them. It soon became evident from careful questioning of prisoners on the effects of these broadcasts that this kind of talk induced nothing but irritation and boredom, or the sort of laughter which implied sheer mockery of us and our methods.

The 'Black' Broadcast

- 21 277. 1. The other programme - the "black" - was produced under the aegis of the Political Intelligence Department of the Foreign Office. Its effects were meant to be achieved along quite different lines. The powerful broadcasting stations purported (for quite a long time undetected by the Germans as a whole) to be working from "underground" German studios, and their "voices" were of course all German or Austrian. The German authorities no doubt fairly soon located their origin, but appeared to have taken them sufficiently seriously, for they paid the stations the compliment of doing their level best to jam every one of their half dozen wavelengths. The names of the broadcasting stations as well as the wavelengths and alleged zone of work were changed to suit changing circumstances.

- 22 278. The producers aimed at providing something in the nature of forbidden fruit to encourage the desired audience to listen despite regulations to the contrary. The programme aimed at being amusing, forceful and even outrageous; it told dirty stories, tried to rouse envy and malice, was cynical and misanthropic and hinted at and insinuated every form of meanness and corruption. It hoped to embarrass the German government by freely discussing matters that were rated as Top Secret, such as the radio-controlled bomb and other latent mysteries. Care, needless to say, had to be exercised in this connection not to infringe
/our own

our own security or to suggest prematurely that the Allies knew about any of these things. Perfectly objective news items were broadcast, including a relay of the actual German High Command communique (though with occasional interpolations to twist them in the desired direction); - HITLER's speeches, for instance, were caught on a receiver and retransmitted direct and were intermingled with tendentious and wholly or partly imaginary stories, designed to darken counsel.

- 23 279. The German Air Force section of this programme was eventually sponsored up to about 70% by A.I.K.(3), the Records Section of A.D.I.(K). It was decided that A.I.K.(3) should provide material for the air programme, and by the spring of 1943 a regular weekly visit to P.I.D.(Country) had become part of the routine of the head of that section. Co-operation became more and more active until, from early 1944 onwards, it was the established custom for an officer of A.I.K.(3) to spend three days a week with P.I.D., giving advice, providing ideas and coaching the broadcasters.
- 24 280. Various other branches of Air Ministry were called upon for technical suggestions and confirmation of facts at the regular weekly meetings held at Air Ministry, but much of the material used was actually furnished by prisoner interrogation and microphone recordings, owing to the fact already noted that the German Air Force prisoner tended to be a fruitful source of general gossip.
- 25 281. Most things were grist that came to the "black's" mill. Perhaps there was some hint of irregularity in the conduct of a local Party leader - that he diverted to his own use goods meant for the benefit of his flock as a whole - that his relations with the women were rather more friendly than the occasion demanded - that he was putting by a nest-egg in some unlicensed way - that his ancestry was not altogether above suspicion. Such things and any others that would give local colour to the insinuation that the Party was not as irreproachable as people had been taught to believe were included in the "black" programme.
- 26 282. Again, gossip in the German Air Force might be concerned with one or another of the high personalities in the German public eye, or with officers in a particular unit - their private or official life - their character - their treatment of men - their vices - their real or supposed attitude to politics. Inequality of sacrifice between the higher Party members - whose names were quoted - and the small man was another favourite theme. Having thus persuaded the German mind of the intimacy of its knowledge of public and private affairs, it was the business of the "black" to introduce generally subversive ideas - to create a state of alarm and despondency in undermining the people's faith in their leaders and their institutions by giving true or near-true facts with the right twist.
- 27 283. Something was also done to encourage desertion from the German forces and flight into neutral countries, not by direct indications (except during the very last weeks) but indirectly by pointing out, for instance, the mistakes that led to the failure of some who had already attempted to desert.
- 28 284. In order to be successful with the "black" programme, it was essential that information should be kept perfectly up-to-date, even to the latest popular songs, slang and catchwords used in the German Air Force. This was possible only through continual contact with prisoners. The work required a first-class knowledge of Germany and the German psychology and involved both research and ingenuity.
- 29 285. Reactions to the various talks and musical programmes were frequently obtained from microphone recordings or in interrogation, though direct questions were seldom put. On occasions these reactions showed very clearly that the broadcasts had not failed in their effect. For example, in one instance the story was broadcast of a blockade-breaking ship bringing supplies to a German garrison in Western France; as it happened the crew of the ship in question heard the broadcast. They were startled to find that the ship's movements were known at all, and then - so the microphones recorded after their capture - even the name of the /captain

captain of the ship had been mentioned, which as it happened was not true, but was useful from the "black's" point of view; it meant that the Germans were not only accepting what they heard, but were actually adding to it subconsciously and thus doing the "black's" work themselves.

286. The startling amount of detailed knowledge which was displayed about the German Air Force and its personalities evidently created a certain feeling of inferiority and increased the German complex about the British Secret Service, just as it did in the case of a well-informed interrogator.

ENEMY DOCUMENTS.

(new page)

APPENDIX B

287. It was only natural that with the experience gained in the handling of prisoners' documents, A.D.I.(K) should also take over the examination of documents captured from German Air Force headquarters and installations. Only few headquarters documents were brought in from the African, Sicilian and Italian theatres, but after the invasion the flow of paper into A.D.I.(K) had become so vast that the organisation of the documents section had to be radically revised.
288. After the final burst of activity over England by the German bomber forces in the first three months of 1944, the number of Air Force prisoners captured in England had fallen to a low figure; at the same time documents from aircrew prisoners captured in France continued to arrive in a steady flow and had to be dealt with in the usual way. The bulk of the work in the section was, however, now gradually switched over to the sorting, listing and distribution of documents captured at headquarters, airfields and other installations which had been overrun by the Allied armies. Documents began to arrive at headquarters in sacks, crates and boxes, and it was evident that the small staff which had hitherto attended to the work would not be able to deal with the present volume, and the first increase in the number of officers to a total of six was now made.
289. After a few months it was found that the office space at the Latimer camp was totally inadequate for this work, and new accommodation had to be found. Space was therefore taken in the Air Ministry building in Monck Street, and the removal to these premises was effected in April 1945. From then onwards the staff in the section was several times increased and American personnel was also attached.
290. As the documents arrived they were unpacked and underwent a preliminary sorting with the object of ensuring a quick distribution of those of immediate intelligence value. They were then taken over by appreciators who, after translating the German title and writing a short precis of the contents of each document, decided upon the branch of the Air Ministry or other formation to which it should be sent. The documents were then passed to the typists, who allotted numbers to them and included the titles and precis in a current documents intake list. This list also showed the Air Ministry branch to which each document had been sent, thus enabling a recipient of the list to know to whom to apply for any particular document. It was the object of the section to ensure that distribution to interested formations should take place with the least possible delay. Certain documents which proved to concern more than one branch of the Air Ministry were copied by the microfilm process and were distributed to all simultaneously.
291. As the Allied armies advanced further into Germany, more and more documents were despatched to England by air, S.H.A.E.F. having allotted the responsibility for handling German air documents to the A.D.I.(K)/A.P/W.I.U. organisation. Many of these had been collected in the American zone, and in June 1945 it was therefore decided that a combined centre, containing both R.A.F. and American personnel, should be set up. Suitable premises were obtained in the form of a block of flats at 59, Weymouth Street, London, and the new combined section moved in. The staff was increased to 400/500 persons of whom some thirty belonged or were attached to A.D.I.(K), and the remainder Americans. The new organisation was known as A.D.R.C. (Air Documents Research Centre).

- 36 292. The Americans were principally interested in the technical aspect, and in documents dealing with German aircraft, rocket and jet propulsion units; as the staff of the A.D.I.(K) documents section did not include technicians, it was decided to effect a division of labour. The Americans, who numbered ^(Army) technical experts among their staff, henceforward dealt with the technical documents, while A.D.I.(K) concentrated on the non-technical, including organisation, equipment, training, policy planning, intelligence and the like.
- 37 293. Co-operation between the British and American staff was always very close and friendly, and microfilm work for both sections was undertaken by A.D.I.(K) in conjunction with the Air Ministry microfilm section, D.Micro.S.
- 38 294. During the period immediately following the victory over Germany the quantity of documents arriving from all parts of Germany still continued to increase and A.D.I.(K) staff again had to be augmented by the attachment of 36 German-speaking other ranks.
- 39 295. When the influx of documents was at its height some ten tons arrived weekly, and of the non-technical types, A.D.I.(K) Documents Section sorted and distributed about one ton per week. The number of documents distributed by the section between June 1944 and the end of October 1945 was in the neighbourhood of twenty thousand. This figure does not give a real indication of the work performed, as many of the documents received had no value either from the intelligence or historical point of view, and in consequence were not listed. Nevertheless, all documents sent in had perforce to be examined in order that their character might be ascertained.
- 40 296. Towards the end of October the transfer of the American component of A.D.R.C. to Wrightfield, U.S.A., was contemplated. An agreement was therefore drawn up between A.C.S.(I) representing the Air Ministry on the one hand, and A.C. of S. G-2 representing the Americans, whereby original technical documents became the property of the Americans after satisfactory copies had been made for the use of the British. The date for the final dissolution of A.D.R.C. was fixed for the 15th November and any technical documents received after that date were to be dealt with by M.A.P.(R.T.P./T.I.B.), who were to assume the former responsibilities of the American component of A.D.R.C. and process such documents in the same way as the Americans, sending original documents to the States and retaining copies for the British.
- 41 297. The premises at 59, Weymouth Street, were vacated early in November and A.D.I.(K) Documents Section established itself at 12a, Stanhope Gate, London, which then became the receiving centre for all German air documents from the British and American zones in Germany and Austria. All incoming documents ~~were~~ ^{were here} screened by A.D.I.(K) in conjunction with M.A.P., A.I.2(g) and the American liaison element which had been left behind to represent the interests of the newly formed A.D.R.O. (Air Documents Research Office) at Wrightfield, U.S.A. In accordance with the agreement all technical documents were thereafter sent to M.A.P. and processed by them, whilst non-technical documents were dealt with by the A.D.I.(K) Documents Section as hitherto. It was envisaged that the work of A.D.I.(K) Documents Section would carry on until June 1946, when it was assumed that all German air documents of a non-technical nature would have been found and processed and would be ready for transfer to their final repository at the Air Historical Branch.

SUGGESTIONS FOR A FUTURE POLICY.

GENERAL.

298. In attempting to frame a policy for the interrogation of prisoners in any future war, it is certain that a feeling will arise that such a war may have few points of resemblance to that of 1939 - 1945. History, however, does have a habit of repeating itself, and though mechanical aspects may change, human nature alters very little. The art of interrogation is concerned with the /eternal

APPENDIX C

(New page)

eternal fallibility of human nature and this alone makes it possible to formulate some of the basic essentials of interrogation in the belief that they will have a value for the future, however widely dissimilar the events of that future may be to anything at present known.

299. It seems certain that propaganda broadcasting, a novelty in the war of 1939 - 1945, will always play an important part in any future wars, and interrogators of the future will have to contend with the politically indoctrinated prisoner and indeed, as in the case of the war just finished, will have to make a close study of the enemy's political moves in order to be provided with a weapon for their counteraction in argument with prisoners.

300. In the preliminary organisation of a future detailed interrogation centre three main questions will certainly arise:-

- (a) Whether that centre shall be on an inter-service basis as during the past war or whether the R.A.F. shall assume the sole responsibility for the handling and housing of air prisoners during the interrogation.
- (b) Whether a future air organisation should or should not combine under one control both the interrogation of air prisoners and technical intelligence; during the past war these two subjects were found to be closely related.
- (c) The types of officers and staff it will be advisable to select in order to produce immediate successful results will be a primary consideration.

These questions are discussed under their appropriate headings in the following paragraphs.

ORGANISATION OF AN INTERROGATION CENTRE.

301. It has been argued that a good intelligence picture of the enemy's armed forces was obtained from interrogation of prisoners because the combined services interrogation at the C.S.D.I.C. was the most satisfactory organisation for producing that intelligence. As far as the R.A.F. was concerned, equally satisfactory results could have been obtained on the basis of a single-service interrogation centre; the fact that the Army provided the accommodation, guards and microphone service for air prisoners contributed nothing that could not have been provided by an Air Force organisation. From September to December 1945 the R.A.F. did in fact take over complete control of the interrogation centre at Latimer.

302. The essential work at C.S.D.I.C., that of the interrogation of air prisoners, was carried on by A.D.I.(K) as an entirely independent organisation whose intelligence activities were neither governed nor prompted by the other services. As the chart in Appendix I shows, the only section of A.D.I.(K) having direct connections with the Army at C.S.D.I.C.(U.K.) was A.I.K.(1), whose senior officer was in charge of the air component of C.S.D.I.C.

303. The smooth working of a combined services centre depends entirely upon the breadth of mind and steadiness of the chiefs of the three service departments comprising the centre, and upon the avoidance of the small inter-service jealousies which all too frequently occur and which could lead to a collapse of the whole working system. By a most happy chance the personalities of the heads of the three service departments comprising C.S.D.I.C.(U.K.) were able to co-operate well, largely because these officers had been close friends before the war, so that the combined centre was in effect a success. Situations which could well have led to a serious lack of co-operation within the centre frequently arose, however. For instance, whilst until April 1943 the R.A.F. and the Navy were carrying almost the entire weight of interrogation work at

/C.S.D.I.C.

C.S.D.I.C.(U.K.), the Army staff officers continually gave the feeling that the camp which they administered was one for which the Army held the sole interest and responsibility. As a result the R.A.F. was frequently presented with a fait accompli in organisation or reorganisation without having been previously consulted, and much tact and negotiating by the R.A.F. was necessary to avoid the many serious impasses. An example typifying this attitude was that the Army interrogation component ceased to be a War Office branch - parallel with A.D.I.(K), the Air Ministry branch - and assumed for itself the title of C.S.D.I.C., the name of the combined unit, without previous consultation with or agreement by the other sections of the centre.

- 7 304. Again, a weakness of this system was that microphone operators were drawn from the Army and the little instruction they had had between leaving civilian life and joining C.S.D.I.C. was of a military character; even a short period at an R.A.F. airfield would have had enormous value. It was usually some time before these operators accumulated a background of knowledge on air matters; they listened indiscriminately to discussions by prisoners of any of the three services and therefore in most cases had only a superficial acquaintance with the subjects and technicalities peculiar to any one of the services.
- 8 305. There seems to be no good reason why the Air Force should not establish its own detailed interrogation centre with its own specialised microphone listening staff, and with the R.A.F. Regiment to perform the guard duties of the camp itself. It would certainly be an advantage if the troops who guard and administer the camp were under the control of the chief air intelligence officer; as pointed out in the foregoing account, the requirements of intelligence and in particular of urgent intelligence, call for swift unilateral action not always possible if intelligence and camp administration are not under the same command.
- 9 306. The necessity of one service interrogating prisoners from other services on certain special subjects could be overcome by a close contact and a mutual exchange of information and of prisoners whose knowledge would have a wider interest. Liaison officers posted at other service centres as and where necessary would be of value for keeping the parent unit informed on available prisoners. The need for none other than specialised Air Force officers being employed in air interrogation was abundantly proved during the past war. Experience showed that the degree of specialisation required was such that an interrogation officer, even if he had primary technical or operational knowledge, required at least six months to reach the stage of efficiency necessary for the work; this period was occupied in acquiring the experience of interrogation and the background of knowledge of the enemy air force.
- 10 307. The S.H.A.E.F. directive which laid down the conditions for handling prisoners after the invasion of France (Appendix II) shows that the handling of air prisoners from the time of capture to completion of interrogation could, where necessary, be undertaken by the Air Force. During the ensuing campaign leading up to the defeat of Germany the Air Force field units under A.D.I.(K) did in fact handle important air prisoners from capture to their delivery to a detailed interrogation centre in England. By arrangement with the other services, prisoners were exchanged whose knowledge on special subjects was of interest to the respective services; information of considerable value to the air interest was in fact obtained in this way from Army prisoners.
- 11 308. Where overseas interrogation is concerned, the happy arrangement made in the summer of 1943 whereby all overseas air interrogation units were subordinated to A.D.I.(K) in England, should be perpetuated as a working arrangement for any future organisation.
- 12 309. As for the location of the centre itself, it is to be recommended that it should be placed in the United Kingdom, and close to an airfield so that prisoners being brought by air from distant theatres of war may be taken to the interrogation centre with the least possible delay. The arrangement whereby the camp at Latimer happened to be only three miles distant from the airfield at /Bovingdon

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SECRET.

Bovingdon was found to be most satisfactory, especially during the period following the invasion of the Continent. Finally, the interrogation unit should have control of adequate transport facilities, including aircraft, for the movement of prisoners and subject only to the prime consideration of interrogation requirements.

COMBINATION OF INTERROGATION AND TECHNICAL INTELLIGENCE.

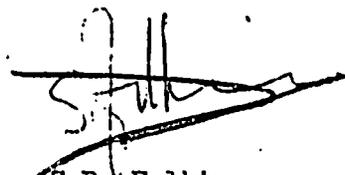
- 13 310. A review in retrospect of the weaknesses of the organisation for interrogating air prisoners leads to the inescapable conclusion that a close co-ordination of interrogation and technical intelligence is essential. During the war A.D.I.(K) worked in very close co-operation with such technical branches as A.D.I.(Sc) and A.I.2(g), and it was found that interrogation was usually capable of amplifying information on captured equipment. Much duplication of effort between interrogation and technical intelligence could, however, have been avoided had the two aspects been joined under one control which could co-ordinate duties such as the examination of crashed aircraft where crews were killed or the investigation of captured airfields and installations.
- 14 311. A.D.I.(K) began the war as a non-technical formation, but when the war ended a number of its officers had, by their continued liaison with technical formations and their frequent interrogation on technical subjects, come to know as much of technicalities as any layman could reasonably be expected; had the staff contained a proportion of interrogator-technicians, the laborious process of initial assimilation of technical knowledge could have been avoided. Against this may be put the argument that an interrogator with a capacity for understanding technicalities and a capability for remembering the functions and applications of the enemy's equipment is adequate for technical interrogation, and that he can obtain expert help or briefing where the occasion arises. The stage where the prisoner has been suitably conditioned mentally for conversation with a technical investigator may frequently only be reached after laborious preliminary work, and may even never be reached at all. The arrangement whereby the interrogator obtained help for technical matters certainly proved to be highly satisfactory in the United Kingdom where expert briefing was immediately available.
- 15 312. By the suggested central control of interrogation with technical intelligence, this liaison could be made closer and the interrogator would for his part have immediate briefing even on small matters, whilst the technical intelligence officer would have the prisoner available for the immediate clarification of more important questions.

SELECTION OF STAFF.

- 16 313. Any advice which can be given on the selection of staff for a future interrogation unit can follow only broad principles. Since all male officer staff must be capable of interrogating, whether their duties are to be interrogation or not, the aim must be to select men of the type whose qualities have already been outlined under an earlier paragraph entitled "The Interrogator". A certain amount of trial and error in the selection of staff obviously cannot be avoided, but any officer who shows after a few weeks' service that he is temperamentally unsuited as an interrogator should on no account be allowed to remain, as interrogation is a question of either producing results or of total failure.
- 17 314. One of the considerations which the selector of officers must bear in mind is that the interrogator should be of a type acceptable to the enemy, since a personal antipathy to type between prisoner and interrogator will produce no results in interrogation. In general, schoolmasters do not make good interrogators, and an early preference in this respect was not borne out by results. The relationship between master and pupil is only faintly analogous to that between a prisoner and his interrogation officer. The schoolmaster is accustomed to unquestioning acquiescence in his edicts, and the form of applied psychology which he practises leads him to be in an odd way too guileless where the hard facts of war are concerned. From the measure of success of officers with a
/previous

previous business experience, the analogy of producer and customer is perhaps more fitting; successful business executives with Continental experience were in the great majority as the most successful interrogation officers with A.D.I. (K).

18345. During the war it was often argued that more intelligence, especially of the operational type, could have been obtained from interrogation had the interrogators been drawn from the operational units of the R.A.F. This theory was proved many times to be a fallacy, since the non-operational interrogator, being a carefully selected man of a high level of intelligence, soon acquired a knowledge of operational requirements during the course of his work, and where necessary he obtained first-hand operational briefing for his interrogations. The operational flying man was usually found to have too many preconceived opinions and a point of view very often limited by the demands of his own trade, and he was inclined to approach the prisoner without an open mind. It is always easy enough to persuade any prisoner to say what the interrogator thinks he ought to say, but the essence of interrogation is the honest reporting of unprompted statements made by the prisoner, due regard being given to the interrogator's assessment of the prisoner's reliability.


S.D. Felkin,
Group Captain.

A.D.I. (K).
31st December 1945.

DISTRIBUTION:

S. of S.; C. of S. (2); V.C. A.S.; D.C. A.S.; A.C. A.S. (I);
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D.D.I. Org.; D. of I. (O); D. of I. (S);

PART II. CHAPTER 8

THE SECRET INTELLIGENCE SERVICE

(See also p/174)

Air Liaison
Secret Intelligence Service

1. The organisation of networks of agents is a specialised task, and is carried out by the Secret Intelligence Service. We are not here concerned with the details of S.I.S. organisation, but only with the potentialities of secret agents as sources of information for Air Intelligence. It is sufficient to say that the S.I.S. is divided into two parts, the Production side, which is organised into sections controlling the agents country by country, and the Requirements side, which consists of sections dealing with particular subjects, such as Naval, Military, Air, Scientific, or Economic Intelligence. Each Requirement section collects from any of the Production sections information concerning its own subject, and passes it to the Service or Ministry concerned. At the same time it receives criticisms on individual reports from the consumer departments concerned, and obtains briefing from them as to what new information the S.I.S. should try to acquire. The Air Section of the S.I.S. therefore represents the S.I.S. to Air Intelligence, and Air Intelligence to S.I.S.

Character of Agents.

2. ~~2~~ The important thing for an Air Intelligence Officer to appreciate is the character of secret agents, and what their capabilities and limitations are. This will help him in assessing their reports, and in framing questions to them. In both these tasks, he will, of course have the experience of the Air Section of S.I.S. constantly at his disposal; but much preliminary trouble can be cleared away if the Air Intelligence officer can look at the problem from the point of view of the secret agents who will have to try to find answers to his questions.

3. Agents are recruited from many walks of life; and their mentality and courage vary accordingly. Some work primarily for money, some for excitement, and others for ideals which conflict with those of the foreign powers on which they spy. The first class is as a rule inferior to the others, and contains a fair proportion of charlatans; this is almost inevitable in S.I.S. work, as recruiting obviously has to proceed by

-1-

personal recommendation, and personal recommendation too often degenerates into 'getting your friends in'. Apart from pure charlatans, who may synthesise bogus information as a profession, there are other professional spies who collect and retail informed gossip, generally about countries other than their own, at little risk to themselves. This gossip is sometimes valueless and sometimes useful. Other agents, whose normal jobs may cause them to travel, collect sundry items from personal observation; information of this type rarely produces anything spectacular, but is often useful, particularly in the economic field. The better sources work primarily for excitement or idealism, and to these sources great respect is due. It is impossible, on the other hand, to respect a man who is selling his country purely for money, and it is consequently difficult to place much reliance on what he tells you; if he will sell you official documents, then these may be genuine, but you must always be on the alert for a 'plant'. It is therefore difficult to trust 'Dirty' work, although it may sometimes produce very valuable results. Valuable early information about V1 and V2 came, for example, from a German officer on the staff of the General responsible for development in the German Army Weapon Office; this was pure treachery. In the 'Dirty' category also comes information obtained through women spies by seduction of foreign nationals. It is only fair to mention here that during the war there was one outstanding report obtained in this way, when a young French girl in August 1943 seduced a German officer attached to Peenemünde, and obtained from him a remarkably detailed account of the embryonic Flying Bomb organisation (although she much confused the issue by telling us that it was for the Rocket). Apart from this one report, no mistress turned up anything valuable as far as is known. The same is true of seduction by alcohol. Usually the statements obtained from a drunken man by an agent who is generally half-drunk himself are of precisely the quality which one would expect.

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4. The best S.I.S. work is therefore generally done by good, clean, honest espionage for excitement or idealist motives; this is particularly true in war. The plan of a Flying Bomb site, for example, was sent to us by one agent who dressed up as a workman and went round under the eyes of the Germans, measuring up all the buildings with a tape measure. Another agent thought this too much trouble and stole the constructor's plans instead (see Figure 1).

Scope and Ability of Agents

5. Agents vary enormously in their powers of observation; this is illustrated in Figure 2, which shows sketches made by several different agents of a German radionavigational apparatus. Nor is this surprising, for the authors of the sketches shown vary from casual labourers to a professor of physics. And to appreciate the difficulty of sketching from memory, the reader may care to glance for a few minutes at the accurate sketch of the apparatus made by A.D.I. (Science) from a low oblique air photo, and then to try to reconstruct it from memory. If he will now compare the result with the original, he will appreciate some of the difficulties secret agents work under. Further, if he will glance at Figure 3, he will see what one secret agent managed to achieve in sketching a 'Seeburg Table' in a German dayfighter control station; this, with similar sketches of the other items of equipment on the station, was the most outstanding piece of agent sketching throughout the war.

6. What has been said about sketching is equally true of verbal description, perhaps even more so. The trouble here is that most people are more accustomed to using words than to drawing sketches, and so the inaccuracies of description, so apparent in a sketch, are not so obvious when camouflaged by a competence of language. If possible of course, verbal descriptions should be supplemented by enemy documents, and sketches by photographs. But this cannot always be done. When it is, the task of the collating officer generally becomes much easier; Figure 4 shows

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a section of a German air defence map showing Radar stations and search-lights deployed in the Kamhuber Line in 1942, stolen by a Belgian agent from the German Commander's H.Q., while Figure 5 shows a photograph of an

Me 110 nightfighter with its 'Lichtenstein' acrials, taken by a Danish agent in 1943. *Figure 6 shows a photograph of comparable merit taken by a French agent of a Giant Wuerzburg radar equipment near Decines, France, in 1943.*

7. *8* In briefing, it is important to know what sort of agent is being employed, and to frame questions to him accordingly. Even an unskilled agent can produce something of value if suitably handled, although of course a thoroughly trained agent is of much greater use. Learn to know your agent as far as possible, and try to put yourself in his position; then guess at what kind of questions he will be able to answer, and ask them.

Limitations

8. *6* In collating information from agents, it is important to know their limitations and more common errors. Most agents can learn to give accurate pinpoints, although their descriptions of what is going on at the pinpoints are frequently awry. In 1941 for example, we were told that on Mont Pincon in Normandy first that there was a long range gun, then that there was an underground aerodrome, and finally that there was a wireless mast 300 metres high. All those were wrong, but the pinpoint was right, and photographic reconnaissance confirmed that it was in fact the site of a new Knickeboein beam station intended for the bombing of this country. Thereafter it became one of our standard techniques to rely on the agents mainly for pinpoints of interesting activity, and to ascertain its nature by aerial photography. Later, the agents improved; but with untrained agents the same rule would probably hold again.

9. Too much should not be expected from individual agents. For example, it is generally of little use asking the agent to obtain the complete aircraft production figures of a foreign power. One has only to reflect how few people in our own Ministry or in the Ministry of

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Aircraft Production know the British figures in order to realise that any one agent, unless he is in an absolutely exceptional position, cannot possibly hope to obtain comprehensive figures for a foreign power.

Individual agents will generally only be able to produce scraps of information, which the Air Intelligence Officer must correlate together, and with information from other types of sources; only by this laborious but fascinating process can a complete picture be built up.

Collation and Evaluation of Agents Reports

10. *B* In collating information from agents, and indeed from all other sources, individual reports will often conflict with one another. This may happen because agents have been genuinely mistaken (particularly if they are untrained), because they are trying to earn a cheap reward by manufacturing information themselves, because they have been duped by the enemy, or because they have fallen into his hands. In this case of conflict, the 'Touchstone' test should be applied if possible (see *Chapter 14* ~~para~~ *p. 1*). This is better than relying unduly on reports from an agent hitherto considered trustworthy, because even trustworthy agents can be duped. But an agent's past performance is of course useful subsidiary evidence in assessing a new report from him, providing the foregoing safeguard is observed. It is here that retrospective criticism is so important.

11. Every agent's report sent to Air Intelligence has to be criticised for the benefit of the S.I.S. staff, who naturally wish to know which of their agents are doing good work, and which are doing bad; but the 'snap' criticism made on first seeing the report is often immature and incomplete. In fact, the best and most important reports are often those which draw attention to new foreign activities which are hitherto unsuspected. No confirmation is therefore available, and the snap criticism can only say 'Very interesting if true, but unconfirmed'. The snap criticism can nevertheless serve a useful purpose in telling a source that he is on a promising trail; and a prompt show of interest will stimulate him to

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further effort. The snap criticism should therefore be made with the greatest possible speed. In a few months' time, it may be seen that the report is correct, but too often this information is not passed back to the S.I.S. The Air Intelligence Officer should regard himself as the representative of all the sources, S.I.S. included, to the Air Staff, and the representative of the Air Staff to the S.I.S. He has a duty to look after the interests of agents who are serving him well, even if he should never personally come into contact with them. He should therefore consider it as one of his primary responsibilities to see that the S.I.S. is told of good work by any of its agents, however retrospective, so that these agents can be suitably rewarded. Nor is this responsibility purely altruistic. The good agents, stimulated by recognition, will work even better: and so the Air Intelligence Officer will receive better service from them.

12. It is probably best not to give new agents too much briefing, until they have shown that they are not only trustworthy, but also men of some judgment. If they are not trustworthy, your briefing may pass to the enemy, and if they are of unsound judgment, you may well find them passing back to you in a different form the information contained in your own briefing; they are unable to keep their minds uncontaminated, and as a result you get back what you have told them mixed up with anything they have observed. But a good agent is always better for thorough briefing, and at the first opportunity he should be taken into your confidence. There is always of course a risk of leakage, but this must be balanced against the potential improvement of information; and providing the latter outweighs the former (this can only be estimated by experience) the risk should be taken. The obtaining of Intelligence is a perpetual battle against the Security of foreign powers and few commanders would expect to conduct a battle without the risk of casualty.

~~SECRET~~

end

AIR MINISTRY INTELLIGENCE IN WAR

PART II : CHAPTER 29

AIR ATTACHÉS

1. Air Attachés are appointed to foreign Embassies and Legations for the purpose of providing advice on problems connected with Military Aviation to H.M. Representatives. They are also responsible for watching, and reporting to Air Ministry, the policy, equipment, training, strength, dispositions, etc. of the Air Forces of the countries to which they are accredited. These latter duties constitute overt Intelligence work and, accordingly Attachés work under A.C.A.S.(I).
2. The collection of such intelligence is, in fact, the first charge on an Air Attaché's work and it cannot be too strongly stressed that this is not permitted except by 'overt' means i.e. formal and open contact and exchange of information with service ministries and representatives of the country in which they are working. The employment of agents or other similar methods is not permitted to British Service Attachés in peacetime.
3. Under wartime conditions, the same principles substantially hold good. Nevertheless unofficial and discreet contacts made by Air Attachés appointed to neutral countries in Europe during the war of 1939-45, particularly those in Stockholm, Bern, Lisbon and Madrid, succeeded in obtaining information often of the greatest value to Air Intelligence. This applied particularly to the field of Industrial Intelligence (e.g. German aircraft production), but also in some degree to general intelligence on the German Air Force.
4. In order to enable Attachés to exploit their opportunities to the fullest possible extent, it was found desirable to keep them informed on G.A.F. equipment, strength, order of battle and dispositions, as a guide to the reliability of their sources, and at the same time to brief them according to such specific requirements as might be needed by Air Ministry. While seldom, if ever, were Attachés in a position to obtain operational intelligence of immediate importance, they were often successful in securing information of considerable general or long term, value; their ability to get into indirect touch with enemy industrialists and other personalities visiting neutral countries enabled Attachés to contribute notably to the collection of general information on the situation inside Germany, such as the effect of bombing, civilian morale etc. In all these ways Air Attachés formed a most valuable, if unobtrusive, element in the network of the Intelligence organisation.

AIR MINISTRY INTELLIGENCE IN WARPART II: CHAPTER 10(i)MISCELLANEOUS SOURCES(i) POSTAL CENSORSHIPORIGIN

1. In 1920, the Committee of Imperial Defence set up a Standing Committee on Censorship. The Standing Committee consisted of representatives of all interested Government Departments, and included an Air Ministry representative.
2. The Standing Committee met from time to time from 1920 onwards, and worked out a detailed and comprehensive scheme for imposing censorship in the event of war. This scheme was approved by the Committee of Imperial Defence on the 27th July 1938 as C.I.D. Paper No. 446-B, under the title "Regulations for Censorship 1938".
3. These Regulations placed the responsibility for carrying out postal and telegraph censorship in the United Kingdom on the Army Council, acting through the Director of Military Operations and Intelligence, War Office. Postal and Telegraph Censorship was to be under the control of a Deputy-Director, designated the "Controller of Postal and Telegraph Censorship."
4. Air Advisory Staff. The Controller was to be assisted by service and departmental advisory staffs. The Air Advisory Staff was to consist of the Chief Air Adviser (Group Captain), who would be the Air Ministry Representative on the Standing Committee, an Assistant Air Adviser (Squadron Leader), an Air Adviser to the Chief Postal Censor (Squadron Leader), and an Air Adviser to the Chief Telegraph Censor (Squadron Leader). The duties of the Air Advisory Staff were to act as representatives of the Air Ministry in Postal and Telegraph Censorship, to act as liaison officers between Air Ministry and the Controller, and to advise the Controller on questions affecting the Air Ministry.
5. In accordance with the Regulations, postal and telegraph censorship was imposed at the outbreak of war, under the control of the Army Council. In April 1940, Postal and Telegraph Censorship became a Department of the Ministry of Information under a Director. In August 1943, it became an autonomous department, under a Director-General, the Minister of Information continuing to be answerable to Parliament for its activities.
6. In the early months of the war, the officers required for the Air Advisory staff were not available or were later withdrawn to other duties and replaced by officers of lower rank, so that when Postal and Telegraph Censorship was transferred to the Ministry of Information in April 1940, the Chief Air Adviser to the new civilian Director had a small staff of junior officers, and worked directly under D. of I. With the rapid growth of censorship, the Air Advisory staff increased rapidly. At first, it was referred to vaguely as "Air Force Section, Censorship Headquarters, London". In October 1940, it received the branch title "A.I.L.(z)". This was changed in March 1942 to "A.I.S.(z)", in April 1942 to "A.I.S.(6)", and in May 1942 to "A.I.S.8."

DUTIES

7. The primary duties of the Branch were closely linked with the objects of censorship. These were defined in the Regulations for Censorship 1938 as follows:-

"The objects of Censorship are twofold":-

/(i)

(i) Main object.

To stop all communications and publications subject to censorship which are injurious to the national cause, and more especially communications to or from the enemy.

(ii) Secondary object.

To collect information of value to the national cause from all communications and publications subject to censorship or examination.

"These may be termed the preventive and informative aspects of censorship, and they operate in all three principal spheres of national activity in war - military, political and economic, using these terms in their widest sense."

8. Security. Accordingly, in matters of security, A.I.S.8. advised Postal and Telegraph Censorship on subjects of interest to the Air Ministry, and informed Censorship of Air Ministry policy and requirements on air matters. Conversely, A.I.S.8. kept the Air Ministry (D. of I.(S)), informed of matters of security interest which emerged from censorship, such as the standard of security, the nature and details of security indiscretions, and also was available to advise Air Ministry on censorship problems or procedure. A.I.S.8. kept in close touch with A.I.S.1. * on matters of censorship policy, and with A.I.S.2. on matters affecting censorship education.

9. Intelligence. Information derived from censorship fell into two main categories,

- (a) intelligence about enemy or potential enemy countries, i.e. information gleaned as a result of the enemy's inadequate security measures.
- (b) information about our own country, e.g. the discipline, morale and welfare of the fighting services.

It was the duty of A.I.S.8. to make known to Censorship what items of information were required from censorship, and to receive the information which resulted from censorship. Vis-a-vis Air Ministry, it was the function of A.I.S.8. to ascertain what information was required by the various Air Ministry branches from censorship, and to distribute to the appropriate branches of Air Ministry the information derived from censorship.

10. In addition to the original functions which resulted from the objects of censorship, other duties were later assigned to A.I.S.8. These related to port liaison, to field censorship, and to censorship training.

11. Port Liaison. The work of port liaison was developed to supplement the products of censorship from a source which was otherwise going untapped. It consisted of interrogating persons arriving at ports, particularly crews of merchant ships and passengers thereon. The information collected related partly to events at sea, such as enemy attacks by air or by submarine, and partly to conditions in enemy and neutral countries as reported by travellers from those countries. Visits were also arranged by Royal Air Force personnel to ships and by Merchant Navy personnel to Royal Air Force stations, to enable them to discuss common problems and improve the co-operation between aircraft and ships.

12. Field Censorship. Field censorship consisted of unit censorship, by officers of the units concerned, and base censorship. A.I.S.8. endeavoured to co-ordinate policy and practice in the various theatres.

/Unit

* Note:- See Chapter 15 (ii)

SECRET

Unit censorship and base censorship were regulated by "Regulations for the Censorship and Treatment of Private Correspondence of Royal Air Force Personnel in time of War or Emergency" (C.D.127). These Regulations were already in existence at the outbreak of war; they were thoroughly revised by A.I.S.8. in the light of the experience gained, and a revised edition was issued in December 1944. Many of the officers who were engaged in the Base Censorship Units had spent a period with A.I.S.8.

13. Censorship Training. The importance of training officers in censorship became increasingly recognised as the war continued. At the end of 1943, a special Training Pool was established. Officers posted to this pool were given theoretical and practical training in censorship, especially base censorship. The personnel for the various overseas base censorship units largely passed through this training pool. The Intelligence (Censorship) Officers in a number of the Overseas Commands were drawn from A.I.S.8. officers, thus ensuring that they had practical experience of censorship and facilitating the close co-operation in censorship matters between the various Commands.

CENSORSHIP NETWORK

14. Postal and Telegraph censorship was organised, both within and outside the United Kingdom, to form as complete a network as possible both to safeguard security and collect information.

15. In the United Kingdom, the principal operating units were located in London and Liverpool, the former dealing with most of the terminal and transit air mail, and the latter with most of the surface mail. Smaller units were set up at provincial towns such as Belfast, Glasgow, Manchester, Birmingham, Bristol, Reading, and Inverness; local terminal mail was dealt with at these units to relieve pressure on the smaller units. Special branches were formed at Manchester and Liverpool to deal with Allied and Enemy Prisoner of War Mail respectively. A.I.S.8. officers were attached to the Units in London, Liverpool, Belfast, Glasgow, Manchester, Edinburgh, Inverness, and from time to time visited the smaller Units.

16. Outside the United Kingdom, Censorship stations were established throughout the Empire, in the Dominions, Colonies, Protectorates and Mandated Territories. These organisations were operated independently, but under the general co-ordination as to policy of the Director General of Postal and Telegraph Censorship. A.I.S.8. officers were posted to many of the more important of these stations, either to advise at their inception, or in some cases for the duration of the war.

17. Information was exchanged between the Imperial Censorship and the Allied and other Censorships, the exchange, of both material and requirements, being effected by the Information and Records Branch of Censorship (I.R.B.)

OPERATION OF POSTAL CENSORSHIP

18. Security. For security instructions, A.I.S.8. relied principally upon the following sources:-

- (a) Air Ministry Orders dealing with security.
- (b) Direct briefing by Air Ministry security departments.
- (c) Minutes of the Release of Technical Information Committee, and their publication regarding aircraft entitled "Publishable Data".
- (d) Press Censorship Bureau Stops and Qualified Releases, which were used to ensure that the policy of Postal Censorship was co-ordinated with that of the Press.

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19. Security instructions were passed on to the branch of the Chief Postal Censor, which collated the security instructions received from the various departments into the Postal and Telegraph Censorship "Consolidated Orders". A copy of these was distributed to every examiner in all units throughout the Imperial censorship network, and formed the guide as to matters likely to involve breaches of security.

20. The security instructions concerning prisoners of war mails were of a special character, and examiners dealing with these mails were supplied with separate editions of "Consolidated Orders" dealing with British Prisoners of War or Enemy Prisoners of War according to the mail they were examining.

21. In the larger censorship units, the number of security queries which arose during the examination of mail was very high, and the presence of A.I.S.8. officers was essential in order that security instructions might be implemented without serious delay and chaos which would have resulted if all such queries had to be forwarded to Censorship Headquarters. Not only were these Officers able to advise upon the security aspect of the mail, but they were also able to advise on questions arising out of the intelligence requirements, thus avoiding unnecessary copying of material.

22. When the German air raids on this country began, the Ministry of Home Security furnished instructions as to the information which could be published about the raids. Censorship found it desirable to have someone at the various units to give more detailed advice, and the Air Advisers were asked to do this, as being capable of assessing the nature of the intelligence required by a country at war concerning the results of its own raids. At the same time, with the authority of D. of I.(S), one of the officers from A.I.S.8. was accredited to do liaison work at the Ministry of Home Security and to provide guidance to officers throughout censorship branches beyond that given in the official qualified releases.

23. In the smaller units, all queries and information were passed to the Censorship Headquarters, and then referred to A.I.S.8.

24. Intelligence. The intelligence requirements of the Air Ministry, collected from the using departments by A.I.S.8, were summarised and passed to the Information and Records Branch of Censorship. These, together with the requirements of all other Ministries, were collated by I.R.B. into the Postal and Telegraph Censorship "Allocation List". A copy of this was issued to every examiner, and formed the guide on which all submissions from intercepts were made. These requirements were also embodied in the requirements of the various Allied Censorships.

SCOPE OF FUNCTIONS

25. In general, mail to or from censorable countries (i.e. enemy or enemy-occupied countries or adjoining neutral countries) was subjected to censorship. The examination of outgoing mail was more important from the security point of view; the examination of incoming mail was more fruitful from an intelligence point of view. Owing to the shortage of manpower, the claims of both security and intelligence could not always be met. Thus, from the middle of 1942 onwards, increasing attention was given to outgoing mails in the interests of security, and intelligence from incoming mails suffered in consequence. Later, when enemy mail, largely uncensored, was captured, first in commando raids and then by the rapidly advancing forces in North-West Europe, a great deal of material of intelligence value was obtained.

26. Inland Mail. Inland mail was not, as a general rule, subject to censorship. It was examined, from the security aspect only, from certain coastal belts along the East and South Coasts from the middle of 1942 onwards, to safeguard the preparations made for raids and for the invasion of Europe.

27. Inland mail was also subjected to examination by means of special internal examinations of mail from selected R.A.F. Stations, conducted in accordance with A.M.C.O. A.79 of 1943. These examinations were only imposed for security reasons, e.g. to safeguard approaching important operations or secret equipment. Mail was collected from all local post boxes, usually for a period of three days, and examined by civilian examiners acting under the supervision and advice of A.I.S.8. Officers. A report on the result of the examination was made available to P.M., to the A.O.C-in-C of the Command, and to D.of I.(S). In the early days of the war, advantage was taken of these collections to report on discipline and morale at the same time, but latterly they were employed for security reasons only.

28. P/W Correspondence. All outgoing prisoner of war mail, both to British and Allied prisoners in enemy hands and from Enemy prisoners in our hands, was examined 100%. The very considerable number of references to service personnel and matters, in contravention of A.M.O. A.1259 of 1943, showed that a great many R.A.F. personnel were not sufficiently conversant with its provisions.

29. Mail coming from British and Allied prisoners, or to enemy prisoners, was closely scrutinised. Although this mail was subject to close enemy censorship before reaching us, surprising items of information were sometimes allowed through. The mail from R.A.F. Prisoners of War generally showed a good sense of security, but there were many references in their letters to service matters, e.g. remarks about their previous stations or squadrons or colleagues, and in this respect there was room for improvement.

30. Correspondence with Occupied Countries. From time to time, special channels were provided to enable Allied air personnel to write to relatives in enemy occupied Europe through intermediaries in occupied countries. This mail was censored 100%, and not even the slightest hint of the whereabouts or occupation of the writer was allowed to proceed. It was discovered that at various times each one of these channels was used by enemy agents, and in retrospect the system appears to have been most inadvisable as Red Cross services had always been provided for short messages. In addition, it is fairly clear that the Germans took little time to perceive the existence of the channels, and it is known that reprisals were taken against the writers' correspondents in some cases.

31. Official Bags. The contents of Ministerial Official Bags were examined from time to time, both for the purpose of safeguarding general security and to prevent abuse of the channels. The examination was carried out by A.I.S.8. and not by Postal Censorship, the examining staff having been lent to the Branch by the Censorship authorities.

32. Telegraph Censorship. A.I.S.8. relied for security instructions on the same sources as for postal censorship (see para.18). The system of operation was similar to that of postal censorship. General security instructions were passed to the Chief Telegraph Censor's (later known as the Chief Telecommunication Censor's) Branch and included together with those from other Ministries in "Telegraph Censorship Instructions", which were the counterpart of the Consolidated Orders mentioned in para.19.

33. In the event of a telegram containing a breach of security affecting R.A.F. matters or personnel, the telegram was referred to A.I.S.8. who consulted the branch of Air Ministry concerned. The number of telegrams so referred was large.

34. A.I.S.8. was also responsible for the coding and decoding of R.A.F. Unit addresses in Expeditionary Force Message (E.F.M.) telegrams to and from R.A.F. personnel. The volume of these was on an average 2,000 a day.

35. Telephone Censorship. The part of telephone censorship which most served the interests of the R.A.F. was that known as "Internal Monitoring", and in certain cases actual censorship of R.A.F. station lines was undertaken.

This was carried out with the strictest care and secrecy, on the direction of D. of I. (S), the actual operation being performed by civil examiners of the Telephone Censorship Branch of Postal and Telegraph Censorship. "Snap" checks on R.A.F. Stations were usually arranged to overlap, at one end or the other, the three day postal examinations mentioned in para. 27. Material from these checks was passed to D. of I. (S) only.

SECURITY INDISCRETIONS

36. Indiscretions of a subversive nature were passed to the relevant security branch of Air Ministry for decision as to the action to be taken, in consultation with the Security Service where necessary.

37. Major indiscretions, if the writer was a civilian, were passed to the Security Service, whereas if the writer was a member of the R.A.F. or W.A.A.F. a submission was made direct to the Provost Marshal's branch for action as a contravention of the appropriate security A.M.O. Minor indiscretions were excised, or the letter returned to sender, according to the practice of Postal and Telegraph Censorship.

38. Inter-service indiscretions were passed, where necessary, to the service affected by the indiscretion for advice, and if any disciplinary action appeared to be warranted the case was referred to the Service of the writer.

39. Where the nature of the indiscretion was such that the letter could not be released after excision, nor returned to sender, it had to be "condemned". This could be done either on the advice of a Ministry or a high Censorship officer.

40. Where the nature of an indiscretion necessitated the making of a submission to Air Ministry, the submission was typed, checked and recorded in the Information and Records Branch of Censorship (I.R.B.) and passed to A.I.S.8. Headquarters where it was allocated, after a final scrutiny, to the interested departments of Air Ministry.

41. Though many submissions were made to the Air Ministry on security grounds, these did not represent the whole value of censorship to security. Much of the security work was purely negative in result, and showed no visible achievement on paper or in statistics. Each letter examined had to be cleared for security, and no record was kept of the numberless letters returned to sender or excised in the interests of security.

DISTRIBUTION OF INFORMATION

42. Information of Air interest which was collected by the censorship organisation from any part of the world was referred or submitted to A.I.S.8. by the Information and Records Branch of Censorship. A.I.S.8. scrutinised this material, and selected such information as had not already been received and was likely to interest Air Ministry Departments.

43. It was not possible to assess the exact value, immediate or corroborative, of the information passed to the using departments. Owing to the large number of intercepts, it was impracticable to ask for an assessment on each submission. The policy of A.I.S.8. was to continue to distribute to the various Air Ministry Departments in accordance with their requirements, as long as these held good, assuming that some percentage of the material was of sufficient interest to justify retaining the requirements. Requirements were revised from time to time, and the Air Ministry departments consulted on this matter.

44. Apart from individual intercepts, information was also supplied to Air Ministry in the form of comprehensive Reports. These Reports dealt with a wide variety of subjects affecting service life, such as living and working conditions, training, morale, and opinion on current problems arising in the services.

45. These Reports were compiled from material drawn from all available censorship sources. In the larger censorship units, all letters written by Air Force personnel were sorted to special Air Tables, and the examiners under the guidance of A.I.S.8. officers, made extracts, known as "Information Slips", from R.A.F. letters on subjects under consideration from time to time. These slips were collected at Censorship headquarters, and formed a useful cross section of views from various sources, not biased by the personal prejudice of individual censorship examiners or A.I.S.8. officers. In the later years of the war, the information collected by the civilian censorship organisation was supplemented by similar information collected by R.A.F. Base Censorship Units.

46. These Reports were distributed to members of the Air Council and to Directors and Heads of Branches, according to the subject matter dealt with.

RETROSPECTIVE CRITICISM AND OBSERVATIONS

47. The value of censorship to the Air Ministry, both on the security and the intelligence sides, was undoubtedly great. It could, however, have been greater, especially in the early days of the war, had the Air Ministry been quicker to realise its potentialities and requirements.

48. Unfortunately, when war broke out, no definite policy appeared to have been formulated, with the result that a great deal of time and labour was wasted in endeavouring to obtain guidance and instructions which, more often than not, were not forthcoming and for which no Department would accept responsibility. Seldom did any Branch of Air Ministry seem prepared to meet its liaison with Censorship even half way with its requirements. The onus of extracting these fell almost entirely on the shoulders of A.I.S.8, which usually was only partially briefed and had to search a good deal for its information. In the case of the Provost Marshal's branch, however, close liaison produced quick and decisive rulings.

49. This lack of a clearly defined policy caused a great deal of unnecessary and useless labour. Had clear cut requirements been forthcoming, it would have been possible to concentrate on these. In the early days, much useful intelligence on enemy territory could have been asked for and received from the examiners alone, whose qualifications for censorship were their knowledge of foreign languages and places, many having actively traded with enemy concerns during peace time. Later, information was obtained on individual targets, notably from German refugee industrialists and others in South Africa.

50. The usefulness of Censorship would have been increased and much superfluous work avoided, if Air Ministry Branches using censorship products had possessed a rough understanding of the methods of censorship, and made it their business to know what mails and what percentages were being examined from time to time. They could then have been of greater assistance to A.I.S.8, the liaison branch, by providing their general requirements, their particular requirements, and details as to what information was no longer required. In this way, the requirements could have been defined to censorship more accurately, could have been cut down to the minimum, and attention could have been concentrated on the information which was likely to prove of greatest value.

51. In Special Security Examinations of airfields, the reason for imposing them, or even any hint of the reason, was usually withheld from the A.I.S.8. officer supervising the examination, so that it became difficult to offer guidance to the examiners.

52. So far as Traveller's Censorship was concerned, the leakages in the security barrier discovered by A.I.S.8. resulted in the promulgation of the series of Air Ministry Orders and Confidential Orders dealing with the carriage of private and official papers by R.A.F. personnel. Although the primary purpose of traveller's censorship was the security one, many letters and documents impounded at ports and airfields were found to be of

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exceptional interest from an intelligence standpoint. The early activities of Port Liaison revealed certain aspects of Traveller's Censorship which had not been fully exploited. The effects of travellers were inspected, but not until Port Liaison was started in February 1941 as an offshoot of A.I.S.8. was there any form of friendly interrogation of travellers to obtain information. Particularly in Bermuda and the West Indies, this field could have been worked earlier with advantage.

53. Postal Censorship was the means of stopping official correspondence from R.A.F. Units in the United Kingdom to R.A.F. formations overseas which had not been routed in accordance with M.C.O.131 of 1944 and its predecessors. This mis-routing of official correspondence was continual. At first, when such letters were stopped by censorship, they were forwarded to the Whitehall Registry for despatch through the proper channels, and the relevant Air Ministry departments wrote to the Units concerned pointing out the breach of the appropriate Order. However, as the breaches did not abate, the practice was adopted of returning mis-routed letters to the originating Unit, with a note indicating that they had been improperly despatched.

54. From time to time it was suggested, and once or twice insisted, that a proportion at least of A.I.S.8. advisers to Postal and Telegraph Censorship should be officers with a technical knowledge of aircraft and aeronautics. At first sight, there was something to be said for this proposition, but in practice it was found that officers with a comprehensive technical knowledge were hard to obtain, and that it was harder still for any technician to keep his knowledge sufficiently abreast with the multiplicity of current developments for it to be of any decisive value. A little, or out of date, learning in such matters was indeed a dangerous thing. Rather was it found necessary for A.I.S.8. officers to keep themselves well informed of the working and practice of censorship and of the types and potentialities of the mails available for examination, and to know which branches of the Air Ministry and the Ministry of Aircraft Production could readily give authoritative rulings upon technical questions.

55. The duty of all concerned with censorship was to keep in constant touch with current matters affecting the Service so that action could be speedily taken to deal with any position which arose during censorship, and so that advice could readily be given to censorship staff on matters of policy or detail affecting the Air Ministry.

THE FUTURE OF CENSORSHIP

56. In October 1945, the Standing Inter-Departmental Committee on Censorship set up six sub-committees to review the working of censorship during the war, with a view to making recommendations as to censorship if required on a future occasion, and particularly revising the "Regulations for Censorship 1938". These sub-committees were composed of persons who had had practical experience of censorship during the war, Air Ministry being represented on them by officers from A.I.S.8. *

57. The position of censorship in the general scheme of government has still to be determined. The desirability of it coming under a Ministry of Defence, if such a Ministry be created, is generally recognised. As an interim measure, responsibility for censorship has now been assigned to the Home Office, though a separate Department would again be required if censorship had to be put into effect.

* Note:- The final result of the deliberations of these sub-committees are not all available as yet (March 1946), and their recommendations will no doubt have considerable effect on any future censorship arrangements.

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58. If censorship ever has to be imposed again, it is desirable that each Ministry should be in a position to present its requirements to Censorship at the very outset, and this is a problem which affects Air Ministry as well as other Ministries. Equally, it is necessary that suitable personnel shall be quickly made available to censorship if the Ministry is to have the immense value which may be gained from censorship in the early days of censorship while communications are still flowing.

59. The Inter-Departmental Standing Committee on Censorship still remains in existence, and is concerned with all problems which affect censorship or may do so if it is imposed again. It is essential that Air Ministry should keep in touch with censorship developments through its representative on this Committee, and that the Air Ministry representative should be kept informed of any developments within Air Ministry which should be referred to this Committee.

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AIR MINISTRY INTELLIGENCE IN WARPART II : CHAPTER 10(11)PRESS and MONITORINGIntroduction

1. In spite of the strict censorship maintained in Germany and the occupied countries, a great deal of information was obtained from Press and Monitoring sources and from the former there was in relation to certain subjects much that was valuable.

PressPRESS

2. For the most part the usefulness of ~~press~~ ^{from copies of the enemy and neutral press intercepted in the post} information lay in corroborating facts already known, although it sometimes happened through a curious lapse in security, that entirely new information was published. An example of this was a press photograph which gave the first indication of the fitting of a 55 mm. gun on a Ju.88 and another which showed a Ju.188 dropping torpedoes - the first definite information received that this aircraft was to be used as a torpedo bomber.

3. G.A.F. Personalities

So far as the order of battle and the organisation of the G.A.F. were concerned there was not much information of value received through this source, but there was a notable exception in the case of information relating to personalities in the G.A.F.; in this respect press announcements of promotions of, and awards to, officers were of value; in particular, the summaries of such announcements made by the War Office and A.I.(t) were well prepared by translators who knew their work. The biographies of G.A.F. officers which appeared from time to time in the Press were occasionally of considerable value; for instance an article entitled "Geschwader Immelmann" appeared in a magazine which gave the photographs and the careers of the Commanding Officer and his staff and also information as to their functions with the unit and as to which of them had transferred with the C.O. from his previous unit. Geschwader Immelmann was known to be Stuka Geschwader 2 and the C.O.'s previous unit was also known; thus this article provided a complete picture of the staff of one unit at one time.

Miscellaneous Intelligence

1. In the case of airfields the Press was a valuable help and sometimes contained detailed accounts of developments on neutral airfields, airfields which in the earlier stages of the war were always liable to become enemy airfields.

+ The daily survey of the enemy and neutral press & technical publications was conducted by A.I.(t) at Air Ministry

5 Press reports were also useful in providing a general picture of the results of Allied air raids; photographs were published, showing interesting details of damage, and announcements concerning the issue of extra rations after a raid and public health conditions could often be used as a basis for judging the severity of a raid and its effect on morale.

6 Intelligence on the Soviet Air Force was so extremely scanty that press announcements on units participating in operations and details of Soviet Air Force personalities supplied much of the available information.

Monitoring

Monitoring

Imitations of Sources

Intelligence derived from monitoring was of less value than that obtained from the Press, but the German communiqués dealing with air operations, particularly on the Eastern Front, were of assistance; in the case of raids on this country communiqués sometimes gave the intended target, a fact not always obvious from the raid itself. Broadcast announcements of promotions and transfers of senior G.A.F. officers provided useful information for their dossiers (for example the transfer of Feldmarschall v. Richthofen from the Eastern Front to the Command of Luftflotte 2 in the Mediterranean was announced in this way), but it was unfortunate that many of the translators (unlike the staff of A.I.(t) and those responsible for the preparation of the War Office summaries of Press reports) were insufficiently instructed and often the exact sense of an announcement was obscured by mistranslation; G.A.F. ranks in particular were consistently mistranslated.

8 Generally, throughout the war, it had always to be borne in mind that much of the information published and broadcast by the enemy was in the nature of propaganda and could only be accepted with caution.

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PART II. CHAPTER 10(iii)CASUAL SOURCES and PIGEONS.CASUAL SOURCES

1. Casual sources cannot be fitted into any planned Intelligence attack because, of course, they are apt to crop up at any time and to speak about any subject. Sometimes they are heard about by accident by someone in the Intelligence organisation, and are then made available for interrogation by the appropriate Intelligence branch. Generally, through some accident in their previous careers they have come into contact with some aspect of foreign activity of interest to Intelligence.

2. An example of the foregoing type of casual source was the Chinese scientist who in the summer of 1941 left Germany, where he had been working, and passed through Ankara on his way back to China. He came into contact with our Naval Attaché, who found that he had several interesting items of information; thereafter the Chinese scientist was brought to London for interrogation. In the course of this interrogation he told us about the radar apparatus on top of the Flak Tower in the Berlin Tiergarten, and asserted that this had a wire-netting paraboloidal reflector, whereas from a poor quality ground photograph taken by the Americans, we had hitherto believed that the reflector was solid. We then looked at the photograph again, and compared it with newly-obtained verticals, and found that the Chinese scientist had been right, and had led us to our first Giant Würzburg. That sort of thing is liable to happen at any time.

3. The second kind of casual source is often called into play by a national emergency such as the outbreak of war, when someone writes to a Cabinet Minister, Service Chief, or Attaché abroad, giving details of something which they believe to be of importance to national Defence. They are sometimes valueless, but in October 1939 one of the most brilliant intelligence reports received throughout the war arrived from such a source. He (or perhaps she) sent in a letter to our Naval Attaché in Oslo saying that if we were wanting information about new German scientific developments all we need do would be to alter on a particular evening the wording

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of the preamble to our German news broadcast. He would listen, and then know whether we would like his information. We altered the preamble, and the information duly arrived. It described the method of working of the German magnetic torpedo and how to counter it, it stated the existence of German radar and gave valuable details of the power and frequency, it described a method by which the German might navigate their bombers by radio means, it told of experiments with a rocket-driven glider bomb for use against ships, it pointed out the existence of Rechlin and Peenemünde, it mentioned the development of a large gyroscopically controlled rocket for which radio control was being devised, and it supplied a sample of the vital element of a proximity fuse then under development and which we only rediscovered when Germany was occupied after the war. It was generally suspected that the "Oslo Report", as it came to be known, was a "plant", because it was ingeniously argued that no one man could possibly possess information covering a wide range of subjects with the accuracy and competence so obviously implied in the Report. But it came true in nearly every detail, and served to alert us to several developments of which we had no previous knowledge. We have never discovered who the source was, but the Oslo Report is a sufficient example to show that casual sources should not be treated flippantly. It was probably the best single report received from any source during the whole war.

4. As with other sources, casual sources are sometimes good and sometimes bad, and the collating officer must treat them patiently and cautiously; if he does, sooner or later he will be rewarded.

PIGEONS.

5. Pigeons were a minor source of Air Intelligence, but they were nevertheless sometimes useful. Carrier pigeons in suitable containers were dropped with questionnaires from the air over Occupied Territory. Should a friendly native find one of these he was asked to attach his answers to the pigeon, and release it so that it could fly back to this country. As with every other kind of source, it was essential to ask questions that the finder could answer. The chances were that the finder would be an agricultural labourer; so the questions had to be such that this kind of man could usefully answer them.

6 Nearly all German radar and radionavigational stations, for example, had rotating aerials, and so it was safe to ask for reports of any radio stations with rotating aerials in the neighbourhood. Even unskilled observers could hardly fail to identify these, and to give fairly accurate pinpoint. So we had the pigeons dropped in areas where agent cover was bad, near where we thought radar stations ought to be. Pigeons drew first blood on three nightfighter control stations in this way. They also brought back news of others already known to us. 163

7. One lucky pigeon happened to be picked up by a patriot, probably one of our secret agents, who was watching a German nightfighter control station at la Croix Caluyau in France, a few days after the inception of 'Window'. He was therefore able to send back immediately a full description of the reactions of the German C.O., who had spent all night trying to intercept seven hundred separate bombers without being able to locate one, and who then asserted that he would rather be attacked by a hundred bombers than submit 'to that torrent of papers'. This information coming so soon after the raid, was of extreme value in that it could be told at once to all our bomber crews, to their satisfaction, whereas information arriving through more secret channels could not have received so wide a distribution.

8. Pigeons can only be used in special circumstances, but an Intelligence officer in a future war should bear in mind their possibilities.

PART III

APPLICATION AND WORKING
METHODS OF INTELLIGENCE

PART III : CHAPTER 11(1)

A.I.3(b)ORDER of BATTLE and OPERATIONAL INTELLIGENCEINTRODUCTION

1. Intelligence, in the work of an Air Staff, is the servant of operations. Its primary function is to facilitate, by the provision of knowledge of the enemy Air Force, the planning and execution of air operations, thus securing the most effective and economical use of air power. The first requirement which it has to meet is therefore the demand for accurate up-to-date information on enemy air strength and dispositions and equipment. This information is necessary in order to assess, for current operations and long-term planning, the enemy's offensive and defensive potential. It was the responsibility of A.I.3.(b) to provide this information based on a detailed and analytical study of all sources of intelligence.

EARLY DEVELOPMENT OF THE SECTION

2. The study of the strength, dispositions and order-of-battle of enemy flying units became the primary commitment of A.I.3.(b) following on the re-organisation of Air Intelligence from a geographical to a functional basis during 1940 and 1941. Prior to this, A.I.3.(b) was responsible for all aspects of intelligence covering hostile or potentially hostile air forces, and at this stage the work was divided into three sub-sections:-

- (a) German Air Force.
- (b) Italian Air Force.
- (c) Spanish, French, Rumanian, Bulgarian and Hungarian Air Forces.

3. Within each of these sub-sections, all aspects of Air Intelligence covering the Air Forces in question were studied, i.e. in addition to the strength and disposition of flying units, such matters as airfields, aircraft production, ground-organisation, personalities, A/A artillery.

4. By the end of 1940, however, it was realized that this method of organisation was unlikely to produce the best results, and the circumstances of war themselves dictated thorough-going changes. All matters such as airfields and production were one by one handed over to special sections dealing only with these matters, and on the separation of A.I.3.(c) (covering G.A.F. ground organisation, transport and air-borne forces) in August, 1941, the re-organisation was complete. Thenceforward A.I.3.(b) was left free to specialize on enemy air strength, dispositions and operations. Its main commitment was inevitably the German Air Force; but it was found convenient to retain also the study of the air forces of the European allies and satellites of the Third Reich, thus allowing the air potential of the Axis in Europe to be studied and assessed as a whole. In general, however, the satellite air forces were a minor and static factor in the overall enemy situation, and nine-tenths of the manpower and work of the section was concentrated on the German Air Force. In what follows, therefore, it will be convenient to ignore the "satellites", which ultimately became so insignificant that they could efficiently be handled by one officer and one clerical assistant, and to describe the working methods employed for studying the operational units and operational activity of the German Air Force.

FUNCTIONS AND METHODS OF A.I.3.(b).General.

5. In the study of the German Air Force four main tasks were assigned to A.I.3.(b) namely:-

- (a) Operations, i.e. to follow and assess enemy scale of effort day by day, theatre by theatre and campaign by campaign.

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- (b) Order of Battle and Dispositions, i.e. to assess accurately enemy air strength in all theatres and in all sectors by types and by units.
- (c) Wastage and Input, i.e. to estimate losses and rates of loss in comparison with input of new and repaired aircraft into operational units with a view to establishing in relation to aircraft production, the periodic increase or reduction in strength of first-line units, together with their current and future trends of equipment.
- (d) On the basis of the data derived from the specialized work enumerated above, to assess trends in enemy air policy and enemy potentialities, or the probable enemy reaction in given circumstances, for the assistance of the Air Staff, Planning Staff and Commands, including the United States Air Force.

To perform these functions the section was divided into sub-sections dealing with the subjects enumerated at (a) (b) and (c) above, co-ordinated and supervised directly by the head of the section and his personal staff who were primarily responsible for (d).

6. These four tasks were closely inter-related and none could be efficiently performed without reference to the others. That is self-evident in regard to the assessment of trends in enemy air policy; it is also equally true of the remainder of the work of the section. It will be seen for example, that operational activity (particularly as reflected in wireless and radio traffic) was one of the main sources of information regarding dispositions and operational strength; it was as a rule far more accurate, up-to-date and reliable than reports from ground sources. On the other hand - as was proved in practice at many periods of the war a study of enemy operational activity, in particular scale of effort, without a secure basis in Order of Battle intelligence, is liable to be misinterpreted and subject to wide fluctuations and a substantial margin of error, by way both of over and under-estimating.

Factual Basis.

7. The whole intelligence background of the section was built up from the individual study of individual items; its knowledge of the German Air Force was a composite picture from its detailed knowledge of single operational units. The whole structure was built stone by stone from the bottom upwards; the history of every single enemy flying unit was followed separately, and the overall picture which resulted was the sum total of separate unit histories. In this way, the whole study of order of battle, of strength and dispositions, was placed on a rigorously factual basis.

Centralisation.

8. The close inter-connexion between the work of the various sub-sections of A.I.3.(b) had important effects on the organisation and activity of the section. Compared with many other sections of Air Intelligence, it required a relatively high degree of centralization.* In view of the fact that the main function of the section was to put out at periodic intervals (daily, week by week or month by month, as the case required) trustworthy appreciations and estimates of enemy air strength and disposition, it was essential for the work of the whole section to be brought into line.

/9.

* In the case of A.I.3.(c) for example, there was no necessary inter-connexion between the various sub-sections: study of air transport, for example, required no reference to 'personalities', 'personalities' no reference to training. Hence a looser organisation, leaving greater scope to the individual officer, was here possible.

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9. While there was little or no scope for the expression of individual opinion, the views of specialist officers constantly made valuable contributions in determining the agreed figures contained in the weekly "Disposition of the German Air Force", which were the basis from which every officer, in his own special field, had to work; they were the framework for all the activities of the section, representing a weekly harmonizing of all views, and at the same time an element of continuity. The foundation, for example of almost every appreciation produced within the section, was the comparison of disposition and strength figures over a period; it was in this way that the basic trends of the enemy air force were observed and calculated. Hence the work of A.I.3.(b) as a section was marked by a high degree of coherence: through the institution of a weekly 'stock-taking', a measure of common opinion was established which contributed greatly to lend weight and stability to A.I.3.(b) opinion and to win respect for its estimates and forecasts.

Assessment of Information.

10. The basis of all work in A.I.3.(b) was the study of the individual operational units of the German Air Force. A.I.3.(b) was not a source of raw intelligence; it was the section to which flowed every item of information on the enemy air forces from Commands or acquired as a result of interrogation, technical examination, photographic reconnaissance, radar, radio and wireless interception, bomb damage assessment, agents and secret service sources, censorship, the scrutiny of foreign newspapers and the findings of air attaché's. It was the task of the officers in A.I.3.(b) to sift and assess these sources of information, to use them for order of battle purposes, and to disseminate the carefully analysed results in the form of digested and authoritative intelligence.

Evaluation of Intelligence.

11. The intelligence material which A.I.3.(b) itself evaluated from such sources as the above, represented the final and official Air Ministry view on all matters concerning the G.A.F. from an operational point of view. The factual evidence derived from detailed study of the enemy order of battle, activity and development in all theatres enabled the information thus focussed on the section to be assessed in terms of actual capabilities, since no single source could be expected to be fully acquainted with the all-round picture which alone presented study to A.I.3.(b).

12. Example. An agent's report might, for example be received, indicating the arrival of 60 Ju.88's at Bardufoss in North Norway. Apart from the primary task of authenticating this item of intelligence, the chain of questions to which it might give rise would be as follows:-

- (a) Was there any corroborative evidence of the move and of the number of aircraft involved (e.g. from intercepted wireless traffic) ?
- (b) Was it possible to identify the unit or units concerned, in particular to determine whether the aircraft belonged in whole or in part, to L.R.Bomber, torpedo-bomber, L.R. reconnaissance or T.E. fighter units?
- (c) Whence was the unit transferred? Was it, for example, a local (and therefore possibly temporary) move of forces within Norway? Or, had it, on the other hand, been brought up from reserve or from another operational theatre?

/ (a)

- (d) What was the purpose of the transfer (was the enemy, for example, anticipating the passage of a convoy from the United Kingdom to Murmansk)?
- (e) What were the effects of this move (possibly in combination with other transfers of operational units) on the overall dispositions of the enemy air forces?
- (f) What scale of attack might be anticipated as a result of the reinforcement of the Bardufoss area?

13. Action taken. Once these questions had been answered in the light of the specific intelligence available and of the general intelligence picture obtaining at that date, action might be necessary. In the first place, there would be liaison with the Admiralty to ascertain the naval situation off North Norway, and, if necessary, to issue a warning to shipping of the possibility of impending air attack. Similar liaison would take place with Coastal Command. It would then be considered whether the transfer implied a new development in enemy plans or strategy; if so, it might be necessary to draft a minute or paper for the information of A.C.A.S.(I) and of the Air Staff, the conclusions of which might be signalled to the Combined Chiefs of Staff in Washington. Next the transfer would be considered in the light of overall enemy dispositions. If it proved possible to determine which area had been weakened to provide reinforcement for North Norway, a signal would be despatched with appropriate priority to the Air Command immediately concerned; if the reinforcement was at the expense of the Russian front, a signal might be sent to the Military Mission in Moscow for the information of the Soviet General Staff. Finally, the transfer would be 'booked' in the disposition sheets and records of A.I.3.(b) with a view to inclusion in the periodic "Disposition of the German Air Force" * distributed from week to week, to keep operational commands in all theatres fully informed of the latest changes in enemy dispositions.

ORGANISATION OF A.I.3.(b).

Study of Operational Activity.

14. The greater part of the man-power of the section was devoted to the detailed study of enemy activity and was organised in independent sub-sections on a "frontal" basis i.e. different sub-sections would specialise on a particular Front as a whole (Russian Front, Mediterranean, Western Front etc.); in the case of the Western Front they were further sub-divided for the study of (1) day and night fighters, and (2) Bombers, reconnaissance units etc. It was the daily task of these officers to decide:-

- (i) What effort the enemy air force had put up the previous day;
- (ii) Which units had been engaged;
- (iii) What strength each enemy unit had had and what was its percentage of serviceability;
- (iv) Which main base and which advanced landing ground, if any, each unit was using;
- (v) With what aircraft was each unit equipped;
- (vi) What transfers of aircraft, if any, had taken place.

15. A good example of the result of this work is to be found in the Weekly Appreciation on the "G.A.F. on the Western Front and in Germany and Austria", an extract of which for December 29th, 1944 is attached at Appendix D. All the figures given in this document were based exclusively on Unit Order of Battle information and were regularly distributed to all Commands and Operational Stations in the U.K. and in the later stages of the War to all Commands on the Western Front.

* Note: See Appendix F.

16. A further example of the sections studying enemy operational activity is contained in the daily "Air Ministry Telegraphic Intelligence Summary" which, from 1940 to the end of the War, was despatched each day to all Home Commands giving the official Air Ministry estimate of G.A.F. activity on the Western Front and against the U.K. An example of this Summary for January 1st 1945 is given at Appendix E.

17. These officers had to be sufficiently acquainted with the units which they were studying to be able to give immediate answers to any question of location and strength and the equipment of the units within their survey; they had to be able to say also what was the normal operational range and bomb load of these aircraft (as distinct from the theoretical capabilities worked out by the technical experts). The information gathered each day was generally recorded in a card index system by the officers themselves and the result of their findings was discussed and agreed upon with the Head of the Order of Battle subsection.

Order of Battle Sub-Section.

18. The head of this sub-section was assisted by one or two other officers who kept in touch with all fronts and all categories of aircraft. It was the responsibility of these officers to co-ordinate the work of all the specialising officers, to know fully all units on all fronts, and to produce overall figures for the 1st and 2nd line strength and disposition of the G.A.F. This entailed a great amount of work, for whilst the officers concerned did not necessarily have the complete detailed knowledge of the "specialists" they had to have sufficient knowledge of the work of all the "specialists" to be able to make decisions on disputed questions of basing, strength and equipment. The card index system was again used thoroughly, officers themselves making the recordings as only by so doing could they hope to acquire the complete familiarity with the enemy units which was essential for the proper execution of their tasks.

19. The practical results of this work, which involved a close watch on all Unit moves, the formation of new Units, the disbandment of others etc., was expressed in a weekly document entitled "The Disposition of the German Air Force;" this represented the official authoritative Air Ministry statement on G.A.F. dispositions in all Theatres and was distributed not only within the Air Staff, but was made available also by signal to all Commands at Home and Overseas as well as to Washington and Moscow. An example of this document giving the G.A.F. disposition on January 5th, 1945 is at Appendix F.

20. The complete G.A.F. Order of Battle, Unit by Unit, was published by this section approximately every three months receiving a wide distribution to all Commands and Stations. During the intervening period the changes in this Order of Battle were notified as they occurred by signal, the Air Ministry Telegraphic Intelligence Summary being frequently used for this purpose.

21. In addition to the identification of Units this Order of Battle included also an Appendix summarizing the changes which had occurred since the previous issue and reviewing current and expected developments with regard to the different categories of aircraft and the equipment of Units etc.

22. An extract from the G.A.F. Order of Battle dated February 1st, 1945, in respect of the single-engined fighter force is given at Appendix G, while at Appendix H (i) and (ii) are extracts from the Notes attached to this Order of Battle. It will be seen that by these means, with the assistance of other appreciations produced from time to time, it was possible to acquaint all concerned with the current situation regarding the German Air Force and its Units.

23. Proof of the accuracy of the work done by this sub-section was forthcoming by the end of hostilities in May 1945 when documents handed over by the Germans showed how close A.I.3.(b) estimates of the strength of the enemy air force had been to the actual fact. * Figures provided at the end of May by the German Air Force Chief of Staff for overall strength at the end of April are given below, together with A.I.3.(b)'s official figures put out on April 29th in a disposition sheet for April 27th 1945:-

/North

* Note: See Appendix 'C'.

	German Estimate.	A.I.3.(b) estimate for April 27th, 1945.
North Germany including Baltic States and Norway	2063	2060
South Germany, Czechoslovakia and Italy	1452 (incl. certain non- op units)	1175
Non-operational	-	435
TOTAL	3515	3670

24. Liaison with Commands. It was an important part of the function of the Order of Battle Sub-section to maintain the clearest possible touch with Commands at home and with parallel sections in overseas Commands e.g. in the Mediterranean, Middle East and France. The latter normally included a proportion of officers trained in or familiar with the working methods and function of A.I.3.(b). This liaison was greatly facilitated by means of a special signals link allowing the rapid exchange of information and views, so that the centralisation already noted within the section was extended to every R.A.F. and U.S. Command engaged in operations against the enemy. The exchange of information was necessarily two-way, for while Commands looked to A.I.3.(b) for authoritative operations, the section in turn relied on digested and well-evaluated intelligence originating within the Commands being passed back to London in order to amplify its overall perspective. *

Input, Wastage and Reserves Sub-Section.

25. The value of an operational intelligence section where the independent work of other sections and sources could be assessed in the light of factual order of battle and operational intelligence was well demonstrated in the winter of 1941-42. Estimates of German aircraft production had up till then been such as to force the conclusion that the G.A.F. had ample reserves of front-line aircraft, having regard to the estimated wastage rate in operational units; the unexpectedly depleted and weakened condition of the G.A.F. after the first 6 months of the Russian campaign therefore cast serious doubts upon this view and consequently upon current production estimates.

26. Formation of the Sub-section. A small sub-section was accordingly formed in early 1942 to study wastage in detail and, as a corollary, to examine closely the input of new aircraft from factories and of repaired aircraft jointly with intelligence on order of battle and first-line strength. Proof was soon forthcoming by a study of works numbers; factory markings, from information supplied by the 'Y' service and by utilising the methods evolved by A.I.3.(e) in arriving at transport aircraft production e, that the output of first-line aircraft had in fact been over-estimated. This was a matter of outstanding importance at that juncture of the war and the methods thus initiated continued to be developed and employed for the remainder of hostilities.

27. Liaison with "Activity" and "Order of Battle" Sub-sections. For the work of this sub-section, the meticulous day to day examination of the scale of activity of each individual enemy flying unit, carried out by the officers studying the enemy operational activity was an indispensable foundation, since it provided the statistics of sorties by type and by front on which all estimates of wastage were based. The work of this sub-section had also, of necessity to harmonize with that of the Order of Battle sub-section, since both sections had ultimately the task of assessing, from two different points of view, the actual strength of the same air force. Although far from perfect owing to

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* Note: See para. 61.

e Note: See Chapter 14. (ii) para. 38.

the many inponderable factors involved, no serious discrepancy between the results of the 'Order of Battle' and the 'Input and Wastage' sub-sections was possible, and in arriving at agreed results, each sub-section provided a check on the other.

28. For Order of Battle purposes it was found that production estimates alone were not sufficient; they had to be studied from the point of view of allocation of aircraft to first-line units, to O.T.U's, to all training establishments and to satellite air forces. Input into operational units was then balanced with the battle and flying accident wastage incurred so that a check could be kept on the increase or reduction in strength of the first line units. First line strength was therefore assessed from two different angles. The Order of Battle sub-section approached the problem from a study of individual unit strength, the wastage and reserves sub-section from a study of aircraft input and wastage by types. This sub-section worked closely with A.I.2.(a) (the section responsible for studying and assessing enemy aircraft production) and ultimately came to be concerned primarily with the number of aircraft being produced; the industrial aspect, such as the location and size of factories, continued to be dealt with by A.I.2.(a). The problem of estimating the input of new aircraft was, however, never satisfactorily solved, and the 1944 estimates of German fighter production have subsequently been shown to have been far too low. *Fighter production underestimated*

29. Introduction of new A/C types. From the work of this sub-section, acting in conjunction with A.I.2.(a) and A.I.2.(g), clear indications were also received of the enemy's intentions to introduce new types of aircraft and what was much more important, his ability or otherwise to implement his intentions to introduce new types of aircraft and what was much more important, his ability or otherwise to implement his intentions. This was particularly valuable in the case of the He.177, the 4-engined bomber aircraft which the enemy was never able to use for the purpose for which it was intended and in the case of the jet propelled aircraft which the Germans were unable to bring into operation with the speed that had been planned. Similarly, valuable information was made available through the findings of this sub-section on the enemy's policy in 1944 with regard to his bomber and fighter forces - the discarding of the bomber in face of difficulties of production consequent upon Allied bombing of his engine and assembly plants and the concentration of his effort towards the building up of a fighter force sufficiently strong to contest Allied air superiority. *late*

30. Wastage estimates. From August 1942 onwards a monthly estimate was made of the aircraft losses from all causes incurred by first line units of the G.A.F. * Flying wastage was assessed by applying to the estimated operational sorties carried out by different categories of aircraft the rate of wastage thought to have been experienced by the G.A.F. during the month, according to categories and fronts. The approach to this difficult problem was based partly on R.A.F. experience of its own wastage, partly on captured documents, on P/W information and on information from every other Secret source. *Mosaic*

31. Allied claims. In considering Allied claims, every allowance was made for aircraft destroyed, damaged or captured on the ground, taking into account pilots claims and P/R of airfields attacked. From the Battle of Britain to the attack on Allied airfields in Belgium and Holland on 1st January 1945 it was found that A.A. Claims and those of pilots in respect of aircraft shot down in combat could not always be accepted at their face value and the need for an integrated study of production, wastage and reserves was further demonstrated when daylight bombing operations began to be undertaken by the U.S. VIIIth Air Force in 1943. The heavy claims of enemy aircraft destroyed in these operations were palpably inconsistent with the accepted order of battle, strength and production estimates; it was not without difficulty that conclusive evidence could finally be brought to prove that a considerable duplication of claims in fact was taking place. Had they been accepted without question a completely false picture of the strength and potential of the G.A.F. would have arisen, and the episode served to emphasize the fundamental importance of a factual approach to operational intelligence in all its aspects.

Head of Section.

32. It was at this level that the most interesting and frequently most valuable work was done, and the responsibility and volume of work was such that from June 1943 to October 1944, the duties of Head of Section had to be jointly shared by two Wing Commanders (See note to Appendix "B"). The task of the head of the section and his immediate assistants, apart from supervising in detail the work of the Section as a whole, was to appreciate general trends and to have sufficient knowledge of general dispositions and activity to be able to provide appreciations of current and future operations and reactions. For this task great alertness, a wide background, an understanding of the enemy's methods of working and a knowledge of past events were necessary. Here, familiarity with the work of nearly all other Sections involving factors such as aircraft production, pilot production, length of enemy training, ability of the enemy crews and their effectiveness in operation, and enemy airfields, had to be taken into account in any assessments which had to be made.

33. Not only a familiarity with the work of outside sections but also a reasonable knowledge of the German ground forces, naval and military strategy, and political and economic developments was necessary on the part of the Head of Section for the proper understanding of the policies and action of the enemy air force. It was here that appreciations for the Chiefs of Staff and for the Planning Staff were written. Here also appreciations for the guidance of Intelligence Officers at operation H.Q.s, both at home and overseas were originated - this latter task became a heavy commitment after June 1944 when in addition to the British a large number of comparatively inexperienced Intelligence Officers were in charge of intelligence at U.S. Tactical H.Q.s on the Continent. It was essential that the officers charged with the responsibilities entailed in A.I.3.(b) should have very great knowledge and experience and the ability to take a wide view which could only come from long familiarity with the work of the Section, based on detailed study without which no proper understanding was possible.

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APPLICATION OF OPERATIONAL INTELLIGENCE TO ALLIED OPERATIONS
AND TO ENEMY MILITARY STRATEGY

Allied operations.

in conjunction with other sections

34. Examples of how the detailed study of the enemy air force/assisted operational commands in the planning of Allied operations are as follows:-

- (a) enemy air reaction to both daylight and night attacks could be assessed with reasonable accuracy. On the basis of Order of Battle information commands were able to route their forces to the best advantage away from the heaviest concentration of enemy defensive force.
- (b) Allied forces attacking enemy airfields were able to concentrate on those known to house the operational units and to avoid wasting bombs on airfields on which only training units were present or which were simply aircraft parks or dumps. This was particularly important during the series of attacks made in March 1945, when to assist ground troops in forcing the Rhine barrier and to ensure immunity for unarmed transport aircraft flying deep into Germany, Allied bombers and fighters attacked the bases of every known operational fighter unit facing the Western Allies. German airfields at this time were crowded with aircraft, since not only were they full of training aircraft but many hundreds of others had been evacuated from training areas in the East and many hundreds of bombers and reconnaissance aircraft for which the enemy had now no use were being kept in Central Germany. Photographs revealed almost every airfield to be a perfect target, if the number of aircraft present were alone considered. Only detailed Order of Battle information made it possible to concentrate on those fields from which danger could come - and this was done with such effect that Allied

/transport

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transport aircraft carrying fuel deep into Germany suffered practically no interference.

- (c) Throughout the war it was possible to assess with growing accuracy the approximate scale of enemy bombing attacks against this country and also the areas which were most likely to be attacked. A.A. Command was thus able to dispose its anti-aircraft guns and balloons in the most advantageous manner. This was of great importance at a period when equipment was not available in such lavish profusion as in the final phases and was vital during the period of preparation for the Allied landing in Normandy.
- (d) A further example shows the direct use of this detailed knowledge in the carrying out of a successful defensive operation. During the North African campaign Allied bombing of airfields in Sardinia had effectively denied the enemy the use as permanent bases of airfields in that island. Consequently enemy torpedo bomber attacks against Allied convoys entering the Mediterranean had to be initiated from bases in Sicily. It became known that in order to range further westward, the enemy used bases in Sardinia as advanced landing grounds. Further, the effective range and speed of his aircraft was known as was the area and the time he was likely to make his first attacks; consequently a fairly accurate estimate of the time of take off and the route could be made. On one occasion when a particularly important Allied convoy was entering the Mediterranean, this information was used to such effect by the Allied operational commander concerned that Beaufighters were sent out to intercept in daylight off the West Coast of Sardinia. So successful was the operation that the Beaufighters contacted the enemy bombers with no difficulty only a few minutes after the aircraft had taken off, shot down about 50% of the force and compelled the remainder to jettison their torpedoes and to return to base.

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Preparation of Forecasts and Estimates.

35. Apart from the frequent writing of authoritative appreciations on the current enemy air situation, one of the major tasks, which in view of its importance became peculiarly the responsibility of the Head of the Section, was the preparation of numerous forecasts of German air strategy and estimation of scales of attack; inter alia these were made for the Air Staff, Joint Intelligence Committee, Combined Operations, Home and Overseas Commands, and also for the Allied Conferences at Casablanca, Quebec and Teheran. Such appreciations, (which might vary from those required for major Allied undertakings e.g. the invasion of Sicily and the landing in Normandy, or the assessment of the enemy air threat in hypothetical cases with a view to formulating Allied strategy, to estimating the future development of jet propelled aircraft strength and G.A.F. reaction to local commando raids) were often of the greatest complexity in view of the many considerations to be taken into account and could not be delegated below the Head of the Section; nevertheless all basic figures contained in these represented the considered views of the section as a whole and not those of any one individual officer.

Washington

36. Examples of such forecasts which were put out are as follows:-

(a) Operation "TORCH" (Allied landing in North Africa in November 1942):-

Estimate of enemy air strength to oppose Allied operation
(forecast made in September 1942).

<u>Italian Air Force</u>	<u>German Air Force</u>	=	<u>Total</u>
530 aircraft	395	=	925 a/c.

After the completion of the operation documents came to hand showing that the actual strength in the area to oppose the Allied landings was in fact:

515 aircraft	385 - 410 a/c.	=	925 a/c.
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(b) Jet propelled aircraft:- Assessment of future German first line strength:-

Estimate for January 1st, 1945 dated 25.9.44.	=	145-190 a/c.
Actual strength at January 1st, 1946	=	160
Estimate for April 1st, 1945 dated 10.1.45.	=	275-325
Actual strength at 23.3.1945.	=	275
Actual strength at 30.3.1945.	=	240.

These estimates of future jet aircraft strength were made in the face of intense opposition at a time when the potential threat of these aircraft to Allied daylight operations was very large and when exaggeration of the threat was very easy - and was in fact rife. The value of Order of Battle evidence, of the knowledge of length of time taken for re-training and conversion by enemy units, of familiarity with the ramifications of intrigue and "politics" within the Luftwaffe was never more clearly shown, for at the time these assessments were made almost all other indications (production of engines, of aircraft parts and fuselages) gave rise in many quarters to the most pessimistic of statements and an almost alarmist attitude.

Enemy Strategy.

37. The use of Intelligence on the enemy Air Forces as a guide to overall enemy military strategy is shown in the following examples:-

- (a) The rapid transfer of flying units from the Western Front and from the Mediterranean area at the end of March and beginning of April 1941 to Bulgaria, Hungary and Southern Germany clearly foreshadowed the German invasion of Yugoslavia and Greece.
- (b) The build up of flying units in Greece, particularly of transport and glider units during April 1941 gave a very clear indication of the German intention to attack Crete, the attack which was eventually launched on May 20th.
- (c) The transfer of flying units to Poland and Eastern Germany from the Balkans and Mediterranean theatres early in June 1941 provided confirmation for the forecast (already made by A.I.3.(e) the section responsible for studying the ground organisation of the G.A.F.) of the German attack on Russia on June 21st, 1941.
- (d) The transfer of bombers, dive-bombers and fighters from Russia to the Mediterranean in January 1942 foreshadowed the attacks on Malta during March and April of that year, and indicated the increasing importance of the Mediterranean in German strategy.
- (e) The resumption of bombing attacks on the U.K. in January - February 1944 was forecast on the withdrawal of enemy bomber units from Italy in December 1943.

Intelligence as a Safeguard.

38. It thus became highly improbable that the enemy could launch any unforeseen large scale attack or any new type of air activity without some warning being possible from A.I.3.(b). The fact that no important development in enemy tactics or strategy after 1940 was unforeseen is in itself a tribute to the effectiveness of the intelligence methods employed - there was no room for spectacular discoveries when every development was closely watched and reported on from its initiation.

SOURCES CONTRIBUTING TO OPERATIONAL INTELLIGENCE

39. The various sources of intelligence which were used by A.I.3.(b) are discussed briefly below. It must be emphasised that the statements made on the relative value of these sources refer to their use purely from the Order of Battle point of view - and are not necessarily representative of the evaluations of other sections.

40. Statements by Prisoners of War. Evidence from P/W varied between complete accuracy and the wildest fantasy, and in assessing it, factors such as age, education, nationality, political and social background, service career, circumstances of capture and morale in general had to be taken into account. Most P/W reports could be cross-checked to some extent against information from other sources and when this class of evidence was accepted for its confirmatory and historical value rather than for its immediate and operational value, it formed one of the most useful sources of Air Intelligence.

41. There were, however, a number of cases when P/W evidence provided the first indication of the apparent presence of units in a new area. Such cases had nevertheless to be treated with caution, since P/W frequently made statements which later proved entirely false.

42. Prisoners' statements, frequently proved of value as indications of change of enemy policy. For example, much useful information was gained from prisoners on the subject of the German intention to re-introduce "Intruder" operations by night fighters over the U.K. in 1945. A considerable amount of detailed information was also provided by this source on the intended use by the G.A.F. of radio controlled bombs against Allied shipping.

43. Agents' Reports. The accuracy of information given by agents, like that given by P/W, varied very widely. A further similarity lay in the fact that it was usually confirmatory or historical in nature, rather than of immediate operational value.

44. There were, however, notable exceptions to this. On one occasion for instance, the first intimation of the move of a Geschwader of torpedo bombers from Germany to Norway came, within 24 hours of the event, from an agent. Such cases were rare.

45. Agents resemble the rest of humanity in their tendency to exaggerate. This was very patent in their reports of numbers of aircraft seen on enemy airfields and also in their attempts to distinguish types of aircraft. Most reports contained a grain of truth but more frequently than not their value was nullified by such statements that "200 bombers" or "100 fighters" had arrived.

46. The type of report which was found consistently more accurate was that which listed aircraft markings, or gave details of unit crests or headquarters' markings.

47. The work of agents proved of immense value when it was directed towards the gathering of information on specific subjects. For this, good briefing is essential and good briefing was not a common occurrence. The haphazard collection of intelligence by agents developed into the amassing of detail so unimportant that it justified neither the risking of the agent's life in collecting and transmitting it, nor the money spent on its acquisition, nor the time spent in reading it by the Section receiving it.

48. Air Attaches. Individual items of great intelligence value were received from Air Attaches but information from these sources was necessarily so infrequent that it could not be used as a basis of day to day work.

~~12~~

SECRET

49. Reports by own Aircrew. Reports from own aircrew were frequently of great value to the student of tactics than to the Order of Battle section, but they necessarily formed a most important method of assessing losses inflicted on the enemy, the strength of his reaction to our operations and the types of aircraft was using.

50. The accuracy of the reports was influenced by many factors which need not be enumerated and great responsibility for passing on the correct pictures rests with Squadron, Group and Command I.Os. without whose sifting, comparing and analysing, the Air Ministry I.O. would be unable to use the information brought back by aircrew. Some frequent sources of error are listed below:

- (i) Tendency for claims to be too high.
- (ii) Numbers of aircraft seen or encountered overstated.
- (iii) Identical enemy formations reported by more than one own formation - this can lead to duplication.
- (iv) Tendency of aircrew, when warned of possible presence of aircraft of a new type, to report this type too frequently owing to "suggestability" leading to errors of identification.

51. Photographic Reconnaissance. Photographic reconnaissance was one of the most prolific sources of Order of Battle information, but no source had to be treated with greater discretion. Its fundamental weakness lay in the fact that a first-line operational bomber, the Ju.88, for example, is indistinguishable in a photograph from a training, reconnaissance or night fighter Ju.88.

52. In assessing photographic evidence the following factors must always be considered:

*Original
P/R complementing*

- (i) Likely presence on airfield of training, communications or transport aircraft which may be confused with operational types.
- (ii) Dispersal facilities on the airfield - hangars, blast bays, camouflage, etc.
- (iii) History of the field - is it a transit station, factory airfield, park or repair depot ?
- (iv) Possible temporary absence of units on operations or unit(s) making temporary use of the airfield as A.L.G.
- (v) The frequency of P/R.

53. Rare and distinctive types of aircraft seen in photographs frequently gave indisputable evidence of the presence of certain units; but normally photographic evidence alone must be accepted with great reserve as an indication of the presence, absence or strength of units.

54. As an example of the accuracy of estimates of strength which is possible in certain circumstances, North Italy in 1943 is of interest. From photographs of North Italian airfields it was possible to estimate to within about ten per cent of the strengths of Ju.88 bomber units as shown later by captured documents. The reason for this accuracy were as follows:-

- (i) There were no bomber schools in the area to confuse the issue.
- (ii) The cover was very frequent.
- (iii) Only a small number of well known airfields were in use.
- (iv) Dispersals and blast bays were not developed to the extent achieved later in the war.

55. To illustrate the reverse state of affairs it is useful to remember that in April 1945 it was impossible to estimate from photographs the strengths and locations of operational S.E. Fighter Units in Western Germany. This time the reasons were:-

- (i) Owing to loss of territory a vast number of aircraft of school and first-line units were sharing a comparatively small number of airfields.
- (ii) The G.A.F. had tried to achieve the greatest possible degree of dispersal.
- (iii) Photographic interpreters were frequently unable to distinguish the various types of S.E. aircraft.

56. Y-Sources.

- (i) W/T Intercepts. The value of intercepted W/T traffic depends largely upon the type of call signs used by the enemy.

Under the old German system of permanent unit-callsigns a very complete assessment of strength and locations could be regularly derived from intercepts. After the change-over to the use of factory markings as callsigns, it became more hazardous to estimate unit strength by this method, and locations derived from it were much less reliable than formerly, since aircraft used their factory callsign throughout their life, whatever unit they belonged to.

The most common sources of error in using this type of intelligence were:-

- a) In assessing unit strength: owing to the fact that in the second half of the war German aircraft used factory markings throughout their life, irrespective of their unit, a given aircraft was liable to be carried on the strength of its old unit long after it had passed to new owners and there was apt to be a long time lag between the actual arrival in its unit of a new aircraft and its unit of a new aircraft and its allocation to that unit by the Order of Battle section.

In assessing the strength of enemy formations engaged in operations, it is always necessary to remember that the number of aircraft indicated by this source is necessarily a minimum number, since certain aircraft may not have been obliged to use their W/T during operations.

- b) In deciding the bases of units or their movements to new bases there was no certainty that aircraft heard in W/T contacting a given base did in fact still belong to the unit to which it was ascribed by the Order of Battle section.

- (ii) R/T Intercepts. R/T intercepts proved of considerable value in estimating the strength of units, but this is a type of evidence which must be used with great caution.

The main factors governing the accuracy of the results are:

1. Completeness of the cover.
2. The extent to which interceptors are able to identify units and formations.

3. The degree of effort exerted by the enemy air force, the most accurate estimates of total strength being obtainable only when the enemy makes an "all out" effort.

It may be said in general that from good R/T intercept cover it is possible to estimate to within twenty per cent (plus or minus) the number of fighter aircraft operating in an area over a period of at least a week of constant operations.

It must, however, be born in mind that single estimates of strength or of reaction derived from this source may be widely inaccurate in other directions and that an approach to the twenty per cent figure of reliability mentioned above can only be made after a series of operations has been carried out.

The value of R/T information increases greatly when a complementary source is available. Thus R/T by itself, when the cover is satisfactory, can give a good indication of the number of units operating in an area and of their strength, even though the names of the units are not known. Other sources often provide the names of the units but give no clue to their strength. When these two complementary types of information are combined, an excellent Order of Battle picture results.

R/T intercepts may be very deceptive as indications of change of base, since frequently changing cover names may be used by aircraft and controllers and this renders errors in identification only too possible.

- (iii) Radar. In the early stages of the war Radar was a valuable service providing information on speed, course, height and size of enemy formations but the number of aircraft as estimated by Radar alone were subject to considerable margins of error frequently amounting to + or - 30%.

Estimates from this source, however, provided an excellent cross-check for those derived from W/T or R/T intercepts.

After the introduction of "Window" the value of Radar estimates declined very sharply to the point where they were merely an indication that enemy aircraft were operating.

57. Estimates of Enemy Aircraft Production. Estimates from casual sources of an enemy's rate of aircraft production, if of great accuracy, are valuable to the Order of Battle section. In practice, however, such accuracy is rarely obtainable and production estimates are only of limited use in immediate Order of Battle work. Their chief value in this direction is in making estimates of future total strength of categories or of individual aircraft types - notably new aircraft not yet operational.

58. Censorship, Press, Monitoring and Casual Sources. These proved of little value. What little information was culled from these sources was usually so out of date as to be valueless except from a historical point of view.

59. Home and Overseas Commands. As already mentioned in para. 24, the intelligence reports emanating from the Home Commands e.g. Bomber, Fighter and Coastal and U.S. VIIIth Air Force and from overseas e.g. Middle East, M.A.A.F. and 2nd T.A.F. were another indispensable source of information.

- (a) The operational intelligence sections in the Home Commands, by consolidating reports passed up from Squadron or Station Intelligence officers through Wings and Groups contributed in an important degree to the final evaluation of enemy air activity, and order of battle (scale of effort and types of aircraft encountered), tactics, losses, etc., often supplying information unobtainable from any other source, e.g. lack of 'Y' cover.

- (b) As regards Overseas Commands, the Intelligence sections developed with time and experience into miniature A.I.3.(b)'s relying on all the sources available within their respective Commands (largely similar to those enumerated above) to provide the most complete and accurate reports in current enemy activity and development, in their particular theatre. These in turn contributed to the overall picture available in A.I.3.(b), supplemented by the close contact maintained by signal as indicated at para. 24 above.

A. I. 3. (b) AS A SOURCE OF INTELLIGENCE

60. The fact that in operational intelligence A.I.3.(b) was in a position to take a synoptic view of information provided by all other sources, whether received direct or evaluated by other sections or Commands, meant that the section alone had a complete perspective of the enemy air force in all its aspects and in all theatres. In consequence it was better informed on the enemy air situation than the Commands themselves, and therefore was looked to by them as well as by the Air Staff for final and authoritative information.

Intelligence for Commands.

61. The manner in which it was possible to maintain a closely knit liaison by signal with overseas commands on all aspects of enemy order of battle, strength and disposition, permitting the closest identify of views and exchange of information, has already been indicated at para. 24 above. A.I.3.(b) was thus able to provide a completely centralised flow of highly reliable and digested intelligence to all commands in every theatre.

62. With the development of the campaign in France, the Low Countries and Germany during 1944-45 this service was of inestimable value to SHAEF and all its subordinate commands, of which a large proportion were American. Each of them was thus able to receive daily, if necessary, a complete review of the strategic and tactical situation, G.A.F. strengths, dispositions, etc. which sheer lack of manpower, experience and information and the pressure of day to day work would have made physically impossible to provide from their own resources. Above all it ensured that recipients at all levels were equally and simultaneously well informed of the latest intelligence and views available in London.

General.

63. Apart from day to day matters of operational importance disseminated by A.I.3.(b), the section was also responsible for the distribution of numerous routine documents in the form of disposition sheets, appreciations etc. not only to the Air Staff and to Washington but also to all British and American Commands at home and overseas. Virtually the whole of the very comprehensive operational intelligence requirements of the U.S. VIIIth Air Force, in addition to those of the R.A.F. had to be met by A.I.3.(b). The quantity and scope of these documents may be seen by reference to Appendix 'A', and examples of some of the more important are given in appendices D-J.

AIR MINISTRY INTELLIGENCE IN WARPART III : CHAPTER II(11)A.I.3(e):INTELLIGENCE on GROUND ORGANISATION.ANCILLARY SERVICES etc.Introduction.

1. In studying an enemy air force it is not sufficient to take account only of its operational units and their performance. The efficiency of front line units depends upon the organisation of the air force as a whole, the manpower of which is only represented by a very small fraction in operational units. It is necessary, therefore, for air intelligence to cover all aspects of an air force.

2. In the early days of the war, owing to lack of personnel, attention was focussed almost entirely on enemy operations and order of battle. An increase in the staff of A.I.3(b) towards the end of 1940 made it possible to begin to widen the scope of that section.

3. In an early division of the work investigations fell under the three main headings:-

Air transport.

Training.

General Organisation.

Of these, the first two appear first to be of more immediate importance since they have a semi-operational function and are susceptible to similar methods of study as those used for order of battle. Indeed, the first, apart from its importance for the mobility of the air force, is directly operational at times because transport aircraft are potentially offensive weapons for the carriage of parachutists and airborne troops. Some units of the training organisation also form potential second line units. But a knowledge of the general organisation of the enemy's air force proved equally important and it was shown that a knowledge of organisation was essential to a correct understanding of enemy operations.

Development & Research.

3. In general much of this work is longer term in nature and liable to less disturbance by the immediate and pressing demands made upon operational /intelligence.

intelligence. There are also other sides to intelligence such as the compilation of records and statistics for purposes of further analysis or future reference which can only be treated on a long term basis. In war the building up of the historical background is essential and records should not be lost.

4. Accordingly, once the work was beginning to shape itself and men with the right qualifications for different kinds of work were beginning to collect, it was decided that the part of A.I.3(b) which had been concerned with the above work should be separated to form a new section for long term research. This section, known as A.I.3⁽⁴⁾(E), actually came into being in August 1941.

5 The natural result of research and increase in knowledge is the opening up of new fields for study, and during ensuing years the scope of the section became considerably widened and the staff increased accordingly. At its maximum size there were in the section sixteen officers, two civilians specially appointed, and seven clerical assistants. Even these were not really sufficient to cope with all the work, but the manpower situation and available accommodation were such that further expansion was not possible.

6 One of the essentials in work of this nature is to have sufficient clerical assistance of the right type. The ordered output of intelligence is the result of the synthesis of many small items; but these items do not come in in an orderly manner and before any synthesis can be attempted the raw intelligence data must be analysed into its component items and these must in turn be sorted. One of the first needs therefore is an efficient and well organized system of indexing and for this purpose clerical assistance of the highest grade is necessary. This was never appreciated by those responsible for the supply of clerical staff.

7 When embarking on this background research no question was considered too academic. The aim was to form a body of knowledge from which the answer to any possible question might be given. The value of such an outlook is twofold:-

- (a) Apparently insignificant and unrelated details often prove to be the key to turn the lock barring some debatable point of operational importance.

(b) Air intelligence as a whole should gain prestige and the confidence of the higher command if it proves capable of answering a great variety of questions.

8 As an example of (a) it may be related that a captured document mentioned the "new setting up" of two parachute divisions. The German word could have been interpreted as having either of the following meanings; it could have referred to the setting up of two new divisions, or it could have meant the rest and refitting of two divisions already in existence, - two very different meanings from the operational point of view.

9 Actually the problem was solved by examining the reference numbers of the document which bore the Roman and arabic numerals of a certain sub-department of the German Air Ministry. Among the details of information collected in this background research were departments of the German Air Ministry and their functions. These could be obtained by seeing from which departments orders emanated in captured Air Ministry orders and similar documents. Fortunately the department in question was known, and since its duties were concerned with the setting up of new units the problem was solved.

10 As an example of (b) Air Intelligence was able to answer ^{an important} ~~from a very high quarter~~ question as to whether German aircraftmen received special bonuses for proficiency on more than one type of engine. Actually the range of questions asked covered an extraordinarily wide field and included such items as estimates of parachute silk requirements and the weight of the heaviest G.A.F. motor vehicle in Sicily. Intelligence, however, failed when requested to estimate the amount of leather used by the G.A.F.!

Assessment of Enemy Intentions

11 A knowledge of the ground organisation proved of great value in assessing enemy intentions. The warning given by the moving in of ground units comes far in advance of that given by the moves of operational flying units. In this connection the first people to appear are usually the signals personnel. In the course of time the whole sequence of development of the

build up of the ground organisation was worked out, and this enabled estimates to be given of the time that would elapse before air forces of a given size would be able to operate from previously unoccupied territories.

A knowledge of the size of the ground organisation in a given area also gives an indication of the number of operational aircraft likely to be able to operate therefrom.

12. Examples of the above are supplied by the Rumanian, Russian and African campaigns. The build up of the organisation in Rumania and Bulgaria was watched from the first entry of signals personnel for airfields communications and aircraft reporting until the whole set up of the ground organisation was ready to receive flying units. Similarly prior to the opening of the Russian Campaign the build up was watched and on this occasion the moving up of works battalions to develop airfields was one of the earliest indications. *Again,*

from the size of the ground organisation in Africa it was possible to assess the maximum number of flying units likely to operate.

13. Such indications as were available on the above aspect of intelligence were discussed with A.I.3.(b) and J.I.S., who made use of them as background in their appreciations of German intentions. In this connexion the disposition of the G.A.P. was often a pointer to German army plans.

Scope of A.I.3.(e)'s Work
14. It is convenient at this stage to list the main headings of subjects covered by A.I.3.(E) during the war, after which the working methods employed for the different subjects will be outlined.

G.A.P. Organisation

- (i) Air Ministry and Commands
- (ii) Airfield Organisation
- (iii) Signals organisation
- (iv) Maintenance and repair

- (v) Supply
- (vi) Works
- (vii) Army and Naval Cooperation
- (viii) Ancillary Branches, e.g. Air Sea-Rescue,
Meteorological Services, etc.

Air Transport

Parachutists and Airborne Troops

Training

G.A.F. Targets

Manpower

Fuel Consumption

Personalities

Compilation of certain historical records

Compilation of Intelligence Data

Prisoner of War Intelligence and captured documents

Transportation in enemy occupied territory

V-weapon organisations

(i) Flying Bomb

(ii) Rocket

Post Hostilities Planning.

In the following pages the working methods used in the study of the above subjects are described in detail.

G.A.F. ORGANISATION

Section Personnel and Special Qualifications

15. The personnel selected for these duties had little or no previous knowledge about the organisation of any air force. This was an advantage because they had no preconceived notions and any conclusions they drew about the working of the enemy air force were free from bias and could not possibly have been wrong interpretations due to subconscious comparison with the Royal Air Force. The work required men of high intellectual calibre and previous experience of research, either scientific, historical or archaeological, was a great advantage. They were left to tackle their problems in their own way but all had to contribute towards a common system.

Working Methods

16. The working was at first slow and laborious; it entailed the collection of a great mass of initially unrelated details, from which a picture gradually

/developed

developed. The first basis of the work was the identification of all the different kinds of ground units, the nature of their duties, their strengths, equipment, subordination, and so on.

delete ^{11/17} Five officers, all with high academic qualifications, were engaged on the work which was portioned out as follows:-

- 1 officer: Commands and Army Cooperation
- 1 " : Servicing and airfield organisations
- 1 " : Supply and repair organisations
- 1 " : Works and buildings
- 1 " : Signals organisation.

Other aspects of the organisation, together with other main subjects e.g. parachute troops and compilation of intelligence data, were also distributed among the above officers.

17. In order to build the picture a system of cross indexing was necessary. First, the different kinds of units had to be indexed. For this purpose each officer kept loose leaf index files covering the units with which he was concerned. In these were entered the numbering of the unit and the location when known, together with abbreviated personal notes giving pertinent information reported about the unit's activities and so on.

18. Each book was then periodically collected so that its contents could be entered on to a place-name card-index. In this location index all places were indexed alphabetically and grouped under their respective countries.

19. Many reports were naturally of a vague nature referring e.g. to "air force personnel", but it was considered just as important that these should also be recorded in the location index; thus it often proved that a later independent report contained the name of a numbered unit to which the previous information could be linked.

Publications on G.A.F. Organisation

20. From this foundation of detail it was possible to build a variety of patterns.

(2) ~~(2)~~ After some time had elapsed and after considerable study and ~~reminetion~~ each officer was able to produce papers on the organisation and functioning of the particular branches of the air force for which he was responsible. These papers, at first of a tentative nature,

were followed by accounts of increasing reliability, until it was possible to publish them in 1943 as a secret publication (S.D.431) giving a comprehensive account of the "Organisation of the German Air Force". The chapter contents of this book were as follows:

Chapter I	Introduction
" II	Airfield Commands
" III	Mobility of Flying Units
" IV	Signals
" V	Works
" VI	Maintenance
" VII	Supply
" VIII	Provision of New Aircraft
" IX	Booty
" X	Air Transport and Airborne Operations
" XI	Railway Transport
" XII	Motor Transport
" XIII	Ground Fighting
" XIV	Cooperation with Army
" XV	Meteorological Service
" XVI	Sea Rescue Service
" XVII	Training

Appendices.

A.	Chief Departments of Air Ministry
B.	Chief Departments of Commands
C.	Operational Areas of Luftflotten (with Maps)
D.	Estimates of Number and Types of Aircraft Employed in Campaigns, 1939 - 1942.
E.	Estimates of Establishments Strengths of Personnel in Chief Commands and Units.
F.	English and German names of Units and Officers.
G.	Table of Equivalent Ranks in British and German Services.

This book was primarily produced for intelligence officers in commands and for senior staff officers and planners. It also proved, however, of very great value for training new intelligence officers, at a time when the Air Force Intelligence Organisation was still expanding considerably in certain directions.

(c) It was found that for many this book was too detailed, and it was followed up by another simpler publication for much wider distribution. This was entitled "The German Air Force in Maps and Diagrams 1939 - 1943" (A.P. 3038) and it was in great demand to the end of the war. The essential feature of the publication was that it could be opened at any page and there would be found a short concise account of some branch of activity of the G.A.F. with an explanatory diagram accompanying it.

(*) Another publication produced jointly by A.I.3⁽⁵⁾(Z) and other sections was "Notes on the German Air Force" (A.P.1928).

21 (2) Diagrams and lists giving the chain of command in the G.A.F. in different areas were produced at frequent intervals, together with maps showing the areas controlled by different commands.

After a time it became possible also to produce periodic orders of battle of certain types of ground units for distribution to intelligence officers in the field and others requiring the information; those found most useful were parachute troops, airfield commands and signals units.

22. (3) Over a period of months, in areas where the ground situation was stabilized, it became possible to piece together by gradual accumulation all the ground organisation of an airforce. Thus, already in 1942 the collection of information on France was started against the day when we should invade. Two years later our picture was complete in time for our invasion operations.

German A.M.O.s as a Source

23. Among the most fruitful sources for gaining detailed information were captured Air Ministry orders in which several pages were regularly devoted to "lost and found" columns in which the owners gave their units; and captured routine orders whose contents could be of no apparent operational value and which were therefore seldom destroyed, but which contained the names of the subordinate units on their distribution lists. For instance, after the Tunisian Campaign the complete ground organisation as it had been in Africa was built up from distribution lists and strength returns contained in quite a small file.

Locations of Units

24. (4) From the earliest days an address book was kept compiled from information recorded in the different unit books and from other sources not recorded. This gave addresses of G.A.F. offices of every description. In course of time a considerable list was accumulated of addresses in different countries. Such lists had value for pinpointing headquarters of special importance as targets.

25 They proved of great value once any portion of enemy territory was overrun. Interrogating officers in the field were supplied through A.D.I. (K) with selected addresses of key headquarters and were thus able to save considerable time by going direct to those buildings from which they might obtain documents of immediate operational value. Such lists were also called for by the C.I.S.O. for target forces going into enemy territory after conquest.

4

26 Information on all such aspects of the work as those mentioned above was incorporated from time to time in the various signals or reports mentioned as emanating regularly from A.I.3(b) and frequent articles were written for A.M.W.I.S. Officers from the section were also frequently required to give lectures.

27 A.I.3⁽⁵⁾(E) was also responsible for work on army cooperation in the G.A.F. and supplied to A.I.3(b) the information on army cooperation units required for their order of battle.

28 (4) Caps
Manpower } From the knowledge of the normal strengths of different kinds of units it becomes possible to assess to a reasonable degree of reliability the total manpower resident in an area once its units are known. Having worked out in detail the ground organisation in a given area down to the smallest unit, constants could be derived for use for other areas from which information was scanty. As an example of the reliability of this method it may be remarked that our estimate near the end of the war for the number of G.A.F. (excluding Flak) left in Norway was 28,000; actually, between 28,000 and 29,000 were handed over under the surrender terms.

29 A knowledge of the number of personnel in any one area proves useful for a variety of purposes and the information was in constant demand by planners and the Cabinet Offices. For instance, it enables an estimate to be made of the quantity of supplies necessary to maintain the forces; such information was frequently required during the war, whether it was to assess the number of trains likely to be run over a given route, or the amount of shipping space on a sea route. The information was wanted by those planning the possible accommodation that might be required for prisoner of war cages should the overrunning of an area be envisaged. The number of men tied down by our bombing offensive was periodically asked for by the Prime Minister or other high authorities.

30 By studying the methods of numbering of the different kinds of units it was possible to estimate how many of each were in existence. This, coupled with a knowledge of the average strength of each kind of unit, enabled a reasoned estimate of the total manpower strength of the G.A.F. to be provided. Such information was required by the manpower committee of the War Cabinet, and had importance seeing that out of the total manpower available to the Germans substantially more than 2,000,000 were at one time held by the G.A.F. Periodic assessments of this total figure were required for estimates of manpower wastage, the number of men that might be made available to the ground fighting forces, etc.

AIR TRANSPORT.

3) Questions about air transport were constantly being asked. This was especially so when there were any rumours about the intended use of parachutists. After 1942 the answers given were always of a reassuring nature and negative in character. Nevertheless they were just as important as warnings of impending operations, since it was on such answers that decisions were made for releasing forces from some once threatened area.

It can be seen therefore that a detailed knowledge of the numbers of transport aircraft was of the greatest value. ^{Conversely} ~~Other demands came~~ when the enemy himself was in difficulties, ^{it was required to know} ~~and we were asked~~ to what extent supplying by air transport was likely to alleviate the situation.

~~Order of Battle~~
Frequent orders of battle of transport units were produced, and figures were supplied for the A.I.3(b) weekly disposition sheets.

In part, the methods for the study of the enemy air transport units were the same as those of the battle order section. For this purpose the card index system was most convenient, cards being kept for individual units; at the same time a location index was kept in which was incorporated also all information on aircraft on airfields from photographic interpretation or other reports which might eventually be linked to actual units.

32. Record was kept of the day to day traffic in areas in which considerable information was available on "Y" sources, such as the Mediterranean. It was thus possible to produce periodic pictures of the whole activity in the area. For this purpose temporary indexes were kept recording individual aircraft; this was a duplication of the work done in A.I.4(c) where the complete index of all aircraft was kept, but it was absolutely necessary so that the officer concerned should have a detailed knowledge and grasp of the situation.

/This

33. This battle order and operational side of the air transport intelligence was undertaken by one officer. This officer was also responsible for all intelligence on glider activity, and such types of non-operational flying units as mine-sweeping, ambulance, drogue-towing, etc.

Assessment of Transport Aircraft Strength

34. One of the chief sources for the individual identification of transport aircraft is "Y". During the war these and other aircraft used four letter call-signs consisting of trigrams with a fourth letter and the picture was complicated by the fact that transport aircraft used unit call signs as well. The elucidation of the problem of the number of aircraft engaged in transport work called for the services of a fully trained statistician and we were fortunate in obtaining one who had worked on biological populations and was therefore most suited for the work.

35. Something like 100,000 four letter call signs were recorded during the war. A very high proportion of these were corruptions, while others belonged to operational aircraft being ferried from factories or to aircraft used for training or other non-transport purposes. The corruptions and these other aircraft had by mathematical process to be eliminated. The history of each aircraft had to be recorded, and there was for this purpose very close collaboration with A.I.4(c) who took over a card index originally started for the purpose in A.I.3^(e). The final analysis of all the material was only made possible with the mechanical sorting aid of the Hollerith machine.

36. It thus became possible to give very reliable estimates of the number of transport aircraft available to the G.A.F. when the results of the statistical analysis were linked up with the battle order information on the transport units.

37. A further extension of the work was the detailed study of the lift capacities, serviceability etc. of organized transport units. For this purpose a large bundle of consignment notes captured in Tunisia proved an unusually valuable source. By the collation of such information, and the gradual accumulation of evidence on flights in different parts of the continent, it was possible to establish numerical constants. These incidentally proved of use when the R.A.F. started air transport operations for the first time on a large scale in the far eastern theatre of war.

It was not then known what was to be expected of a given force and intelligence was appealed to to supply data for the German Air Force for comparison; it was possible to signal full details at short notice.

Transport Aircraft Production

38. Another aspect covered by the air transport section was intelligence on the production of transport aircraft. This work was carried out for A.I.2(a) and in consultation with them. As a result of following the arrival of new trigrams and four letter aircraft in the W/T reports it was found that when these were linked to occasional works numbers a clue was given to rate of production. Thus in A.I.3^(c)~~(d)~~ was first demonstrated the method of finding production by linking works numbers with factory markings heard on W/T.

PARACHUTISTS AND AIRBORNE TROOPS.

39. Parachutists and airborne troops were the responsibility of the War Office. The parachutists were, however, part of the G.A.F. and to understand their organisation it was essential to know the air transport organisation on which they depended. It was therefore rather natural that Air Intelligence also kept its eye on the order of battle of these troops. To have studied the air transport for airborne operations without the men they carried would also have been only to see half the picture. Therefore both were studied and a knowledge of the intentions of one half often threw light on the activities of the other half.

40. Very close liaison was, however, kept with the War Office and any intelligence passed to commands on this subject was always agreed between them and the Air Ministry first.

A knowledge of the parachute organisation was also necessary in the assessment of G.A.F. man-power since very large numbers of men were drafted from the G.A.F. proper to the parachute troops.

TRAINING

41. The training organisation forms a large part of an air force and affords much scope for study. For intelligence purposes it may conveniently be divided under the following three headings.

- (a) 1. Location of schools.
- (b) 2. Syllabuses of training and methods.
- (c) 3. Crew output.

/Intelligence

* Note: For further application of this method see Chapters 18 (i), para , and 18 (iv), paras. 19 and 23-24

Training Schools

42. Intelligence methods for the first, namely locations of schools, are straightforward and similar to those for order of battle. The best system is by card index with the cards grouped under the different kinds of schools and a location index for all training information. Orders of battle were produced at fairly regular intervals, especially for those airfields on which the more advanced stages of training were taking place. The commands were kept continually informed of training airfields suitable for attack, and constant liaison was especially maintained with Fighter Command for intruder operations.

43. Intelligence was often asked to account for aircraft on a certain airfield on which no operational units were known to be based. With the help of the location index it was generally possible to decide whether these were training aircraft, or whether they were likely to be aircraft under repair because that airfield was known to have special repair facilities or a workshop unit based there.

Training Syllabus

44. The collection of information about training courses and methods depended mainly on prisoner of war interrogation, and an occasional captured document. It was not easy to produce a concise picture of this aspect of training because there was a great amount of individual variation and it was only after the careers of many prisoners had accumulated that a reasonable average could be struck. But it was essential that changes in training courses should be detected if possible as they reflected the crew position and threw light on the future degree of efficiency of the trained airmen. It is fair to say that the G.A.F. bomber force was rendered impotent by events whose damaging effects were first felt in the training organisation, namely the removal of aircraft from schools for air transport purposes.

Crew Output

45. The third problem, namely the assessment of crew output is much more difficult and was never satisfactorily accomplished during the war. The chief difficulty was that schools were moved about so much that it was never possible to assess their true number; nor was it possible to get a reliable average figure for the output of one school, since with frequent moves and difficulties such as fuel shortage output must have varied widely from time to time. The only answer possible was a considered figure based

on the likely requirements of the front line force. But this was no guide to the real position which was best watched by studying the crew position in operational units, i.e. whether they were in excess of aircraft, how quickly replacements were made available and so on.

46 In work of this nature close liaison with statistical branches in the Air Ministry working on similar problems for the R.A.F. was helpful. One rather fruitful line of attack proved to be the analysis of the ages of prisoners. It was also possible to supplement the prisoner of war data with information from obituary notices in German newspapers which gave the dates of birth. By watching these ages carefully it was possible to show when the reservoir of older pre-war trained pilots had been used up, since at that time a significant change in the age composition made its appearance.

G.A.F. TARGETS.

47 Once the complete organisation of the enemy air force was known it was possible to carry the work a stage further which brought it into the sphere of direct operational intelligence. One could now appreciate which were the vital or nodal points in the organisation and in view of their importance whether their installations were of the type that could be attacked from the air. Certain major headquarters and control posts are obvious targets, as are supply and equipment depots.

48 But when considering, say, supply depots such as those for fuel one realizes at once the advantages of a detailed knowledge of the organisation of fuel supply. There were, for instance, in the G.A.F. a number of different kinds of fuel depots ranging from the largest bulk stock depots to small fuel issuing stations. Once the importance of the different depots was known it was possible to decide which should be photographed and targetted and what priority for attack should be given.

49 Apart also from the size of a depot its position in the supply route has a bearing on its target value at any one time, e.g. it might be of tactical importance for a time as a local supply point for some area of operations.

50 An interesting example of the necessity for this type of knowledge arose as the result of documents captured in Sicily belonging to a fuel testing unit. These documents were admirably handled by a fuel specialist from the technical point of view, but they contained also certain
/numbered

numbered addresses. It was concluded that these addresses were those of the chief blending stations in Germany and as there were certain gaps in the numbers it was recommended that every effort should be made to trace those that were missing in view of their target value. Fortunately the report fell into the hands of A.I.3(e) and it was possible to prevent the chasing of a red herring, since it was known that the addresses were merely those of the Luftgau headquarters and that the missing numbers in fact never existed since there were no Luftgaus with those numbers.

✓ §1 While developing this target side of the work it became evident that no organisation existed in Air Intelligence for ensuring that G.A.F. targets, other than airfields and R.D.F. installations, were targetted and brought to notice. Largely owing to the initiative of one officer this side of the work was developed in A.I.3(e) for such targets as came within the purview of the section, namely all headquarters, and equipment, fuel, ammunition and other supply depots. For this purpose close liaison between the photographic reconnaissance organisation and A.I.3(c) 1 was maintained.

§2 In this work the all embracing location index proved of the greatest value. For instance under Chantilly in France it was known that there was a main fighter headquarters in the neighbourhood. The subsequent accumulation of reports on a certain chateau there indicated its importance as a G.A.F. headquarters and enabled its identification with that of the fighter command to be made. Once the importance of such a chateau as a target was established we were justified in calling for the necessary photographic reconnaissance preliminary to the production of the target material.

§3 In course of time it was learnt that certain types of H.Q., e.g. Fighter Control, were built on a fairly stereotyped plan with characteristic buildings. If the presence of such an H.Q. were suspected in a given locality it became possible to find it by examination of photographic cover of the area in question.

§4 Working on these lines a dossier was produced which gave all the important organisational targets of the G.A.F. in the West with information on the target material.

But the targets had still to be "sold" to the operational commands. There was no central target section which could do this work and at the same time assess the value of the targets amongst targets of another nature. Obviously any one person is liable to give undue value to his own favourite targets if he has not the picture as a whole in mind. It is in this connection that a target evaluation section would have been useful.

55 In this connection the work of an American officer posted to the Section for liaison duties proved invaluable, and targets were brought to the notice of the different air forces. This officer eventually held a strategic position as Secretary of the P.O.L. Depot Working Committee under the Combined Strategic Targets Committee.

56 Throughout the course of the work, in addition to the production of target information for the dossier, details of targets once they became known were immediately signalled to commands in the field.

PERSONALITIES

Study of Personalities

Study of enemy military personalities serves several purposes, e.g.:-

(a) (1) Knowledge of the characters and histories of senior officers is of value in assessing their fighting capabilities, and what strategy, or even tactics, they are likely to adopt. Changes in high commanders may foretell changes in emphasis of attack in different areas.

(b) (2) Information about enemy personnel forms one of the tools of intelligence. If a man's unit is known, the presence of that man in a given locality may supply confirmatory evidence to reports of the presence of the unit itself.

(c) (3) Detailed knowledge of the lives of low ranking personnel is of great value for purposes of interrogation. A stubborn prisoner confronted with the remark "unfortunate that you should have been captured on the anniversary of your wedding day!" may break silence, thinking that his interrogators evidently know most things and that a little more therefore can hardly matter.

58 The subsection in A.I.3(e) dealing with personalities collected information from all sources, and themselves acted as a distributing centre for passing information out. Periodic lists of senior officers were produced

for the commands; write-ups of prominent or noteworthy officers were made for A.M.W.I.S.; questions were answered in detail about personalities especially in the lime-light at any time. In addition, a very great part of the outgoing work was the supply of A.D.I. (K) with information gained from sources other than prisoner of war, for purposes of interrogation.

Card Index System

3/ Naturally the system that lends itself best for the recording of personalities is the card index. The nucleus of the index was the "Army List" of the Reichswehr (100,000 man army) and the list of officer pilots who were granted permission to continue flying in accordance with the Paris Air Agreement of 1926. Since the war the information has been obtained from the usual intelligence sources, but among these the German press and wireless have been of exceptional value. Until the end of 1943 all promotions of officers of the rank of Oberst (Group Captain) and above were published in the press. Valuable material has also been obtained from press biographies of those who have received high decorations and announcements in the press or on the wireless giving the rank, Christian names and command held by officers whose identity would otherwise have remained uncertain owing to confusion with others of the same name. Press:
 wireless

40 Limitations of space and shortage of suitable personnel set a limit to the number of individuals that could be recorded. Generally it was the rule to record all flying personnel of all ranks, but officers only for other branches of the G.A.F. Even so, some 40,000 cards were accumulated; for this limited scale of recording there was eventually a staff of five, though this was not really sufficient.

~~If possible all cards should be typewritten. Nothing is more exasperating than to pick up a card on which handwriting slopes in all directions and much of which is illegible.~~

41 In addition to the index, there should be a reclassification of the personalities by units, so that at any one time the known personnel in a unit can be viewed as a whole. Such classifications are best kept under the folder or ledger system. Folders should also be kept of the more important people, in which full details of careers are written up "in extenso", together with photographs, press-cuttings, etc.

SECRETMiscellaneous Intelligence for Personalities

62 Other angles of intelligence suitably covered by those responsible for personalities are equivalent ranks and ratings, details of uniforms and badges worn by different ranks and in the different branches of the air force, and details of decorations and awards.

63 Meticulous attention to details of uniforms may be required for dressing up agents or for the identification of suspects. The information was at times asked for by those responsible for the production of propaganda and security films in which realism is necessary.

64 The awarding of decorations should be watched; it may be an indication of weakening of morale should a decoration be lowered in value.

Selection of Staff

65 As in every other side of intelligence the selection of staff for the above type of work is critical. Suitable candidates should be orderly minded and meticulously accurate. ~~Inestimable harm can be done in a very short time in a large card index by one careless person who starts inserting cards in their wrong alphabetical order.~~ ^{added without care} Such elementary rules should be known as that it

is not only the first letter which has value in an alphabetical index, - and it is extraordinary how this can be overlooked. A critical faculty is necessary coupled with a retentive memory; there are many snags, such as corrupt spellings, identity of names, etc. Indexers should be capable of learning and understanding the order of battle and organisation of the enemy air force, otherwise the index is meaningless to them. Above all they should have an active interest in the work and be able to think of each card as a living person and get to know it and its subject as an individual.

66 To some the above requirements might seem elementary, but it is surprising how many people think that the keeping of a card index, if it is to be of any value, is a simple matter, and regard the posting of "a body" for the work as quite sufficient.

67 In this work it was found that a knowledge of German was an advantage, since ~~so~~ much of the information had to be obtained from German books, magazines and periodicals.

COMPILATION OF RECORDSStudy of Enemy Policy

67 One of the earliest tasks of Air Intelligence, when the Germans were on the offensive, especially against the British Isles, was to find the policy behind the German bombing attacks on this country. For the purpose

/At

it was necessary to know what, if any, individual objectives the enemy airmen had as targets. Such information was gleaned from "Y" sources, captured German target maps, diaries carried by airmen, marks on maps, R.D.F. tracks, German broadcasts and periodicals. (w. 1000)

68 An important side of the work was, however, liaison with the Ministry of Home Security, in which there was a department (K.P.I.B.) which kept and issued detailed daily records of bomb incidents in so far as they affected key points in this country. It was, however, not only necessary to know which key points had been damaged, but where bombs had fallen which might give an indication as to intended targets.

69 During the early stages of the large-scale bombing of London the high number of hits on railway objectives gave rise in some quarters to the idea that rail communications were being specially singled out for attack. An individual census in three boroughs by an officer from A.I.3(e) showed that the distribution of the fall of bombs was probably completely random. This survey contributed largely to the starting of the Bomb Census of London carried out by the Air Warfare Analysis Section. From then on the liaison between A.I.3(E) and A.W.A.S. on problems of G.A.F. attacks against this country was very close.

70 In connexion with the above work a most interesting problem to which considerable time was devoted was to find out the system on which the Germans allotted their target numbers.

General value of records

71 The necessity for keeping daily detailed records of G.A.F. attacks against the British Isles so that subsequent intelligence might be tied in with past events led eventually to the compilation of a diary of G.A.F. attacks in which full information, such as scales of effort by day and by night, numbers of bomb incidents, key points damaged, weight of bombs etc., was incorporated. This proved of great value for answering snap questions and has also produced a permanent record of historical value. In fact, the compilation of records for historical purposes should be constantly kept in view. During a long war, full of incident, memory quickly fades and it is essential to be able to turn back and compare previous situations when assessing the future. Therefore every effort should be made as one goes along to keep continuity in the filing of records, papers etc. for quick and easy reference.

72 It is felt that Intelligence might have been made easier at times if there had been a central library, controlled by a trained librarian, in which a complete set of all intelligence and allied appreciations and reports was kept for reference at any time. The lack of such facilities was no doubt due to the insufficiency of persons of the right type throughout the war and emphasizes again that Air Intelligence was understaffed from the beginning and that the expansion came too late.

COMPILATION OF INTELLIGENCE DATA.

73 In the course of time records of a ^{statistical} ~~numerical~~ nature begin to accumulate in Air Intelligence. Such operational information as the numbers of sorties carried out by the enemy over an extended period, the weight of bombs they carry, the operational ranges of aircraft, their fuel requirements and so on come under this category.

74 Technical data and performance figures of aircraft were of course produced by A.I.2(g) but much of this is too detailed for the non-technical intelligence officer. In intelligence appreciation also it is not so much what an aircraft can do which is of value, as what does it do in the field under operational conditions.

Type of Intelligence Data required.

75 An officer of A.I.2(g) interested in such matters accordingly undertook to produce a publication in which all numerical data, that might be useful for intelligence officers and for planners, were collected in convenient form for ready reference. The type of information found useful can be gathered from the subjoined Table of Contents. Examples were given wherever possible of what the enemy had actually achieved in operations. For instance under the effort and consumption per flying unit the following were included. Sustained effort per Gruppe; maximum effort per Gruppe; consumption of aircraft fuel and bombs in an intensive effort by a Fliegerkorps; operations by Fliegerfuhrer Africa; estimated supply requirements of Fighter and Bomber Gruppen of 30 aircraft per Gruppe and of Reconnaissance units per Staffel of 9 aircraft in tons per day (Aviation fuel, Lubricant, Bombs, Ammunition) for sustained operations and for maximum activity. Conversion tables (e.g. cubic metres: litres: gallons; tons for different types of fuel) were very useful when available in the same publication as that giving the Intelligence Data.

/Intelligence

Intelligence DataTable of Contents

<u>Aircraft</u>	<u>Transport</u>
Performance of aircraft by type	By rail
Effort per flying unit	By road
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	By sea
<u>Bombs and Incendiaries</u>	<u>Maps and Photographs</u>
Conversion of metric weights to English	Bomber Grid
Bomb Loads of aircraft	Map Scales
Incendiaries	Scales of Aerial Photographs
Effectiveness of bombs	
Effectiveness of bombing	<u>Personnel</u>
	Ratio of Flying crews to ground staff
<u>Fuel</u>	Leave, non-effectives
Conversions of metric to English measures	Rations, water
Consumption per aircraft per hour	Strengths of G.A.F. Units
Consumption per aircraft per sortie	
Consumption per month by the G.A.F.	
Capacity of fuel containers	
Consumption of fuel per M/T	
Oil consumption	

In connexion with the above the Section was also responsible for producing overall estimates of consumption of fuel by the G.A.F.

P/W INTELLIGENCE AND CAPTURED DOCUMENTS.

P/W Intelligence
76/ While A.D.I. (K) naturally kept for their own purposes indexes of their own reports and could supply answers to questions at fairly short notice, it was very soon found necessary to have such information more conveniently situated in the Air Ministry as well.

77 A.I.3(e) was responsible locally in Air Ministry for answering questions on intelligence from P/W sources. For this purpose a card index was at first started covering all possible subjects, place names, etc. mentioned in the reports. All data were also indexed from which information could be quickly collated about aircraft or personnel for numerical purposes, and the section maintained a complete library of all ADI (K) reports. Furthermore it was responsible for the publication of P/W intelligence in the Air Ministry Weekly Intelligence Summary.
78 After a time when the information on any one subject became lengthy it was found more convenient to transfer it into a subject folder, which is easier and quicker to handle when reading than large numbers of cards. Thus eventually there was formed a considerable number of folders making a subject library on P/W information. The card index was, however, kept going for all new subjects as they cropped up; after several items had appeared on a card for one subject a folder was started for that subject. In this way space was saved and a great number of subjects that might only

/have

have one or two entries about them were conveniently kept together in the card index for quick reference.

79 The key-note of the index was to be prepared for any possible question and it should become a matter of pride on the part of the indexer not to be caught out with some question on an angle not already covered by some subject heading.

~~One of the chief causes of delay and irritation in a hard-worked organisation is temporary loss of papers. It was therefore ensured that one copy of every report was safely retained and bound up so that a complete library set was available for reference. Thus in A.I.3(E) a P/W library was formed which was in constant use and formed a most useful browsing ground for those learning their way about intelligence.~~

~~The Section was also responsible for selecting and editing P/W intelligence for publication in the Air Ministry Weekly Intelligence Summary.~~

Captured Documents

80 Although the capture of large numbers of documents is unlikely at the beginning of a war, provision must be made for the contingency. From the time of the Battle of Britain onwards many maps and other documents were being taken from aircraft shot down over this country. In the first instance these documents were handled by A.D.I.(K) and information deemed worthy of mention was immediately abstracted and published in the P/W reports.

81 The documents were then sent to Air Ministry where at first there was no organisation for dealing with them. The work fell conveniently within the field of A.I.3(e). It took a little time to find out exactly who might be interested but eventually a standardized circulation was worked out, and each document was numbered and indexed, and then passed out with a routing slip attached. This system was very necessary because documents were frequently called for suddenly and it was only under an organized routing method that it was possible to track down their whereabouts at short notice.

82 Chief among those requiring to see maps were D.D.I.4's departments who were interested in any marks giving clues to routes and means of navigation; G.H.Q. Home Forces; the Ministry of Home Security who needed to know what landmarks were used for navigation and should therefore perhaps need camouflaging; M.A.P. who required to know which factories were known to

the enemy; and such people as those looking for clues which might reveal the enemy's system of target numbering; and so on. The captured documents had therefore to be handled by an officer with initiative and imagination to ensure that they found their way to recipients likely to be interested. All maps had to be sent to A.D.I. Maps who naturally had to see and catalogue every type of enemy map produced, and this was the final repository for all except a few needed for future reference.

¶ The treatment of captured diaries and other documents was similar, but it was necessary at times to have certain sections extracted and duplicated for wider circulation or so that recipients could hold copies permanently for their own use.

(For the eventual formation of a special section to deal with captured documents when they became available in bulk see the section headed Post Hostilities Planning).

TRANSPORTATION IN ENEMY OCCUPIED TERRITORY.

General.

After the fall of France in June 1940 the Germans at once began to develop forward aerodromes in their newly occupied territory from which to conduct their air attack on Great Britain and to make preparations for an invasion of this country. It soon became apparent that some delay was being imposed upon their plans by the disorganised condition to which the railway systems of Northern France and Belgium had been reduced by the German air attacks thereon, the demolitions effected by the retreating allied armies, military operations and the general decline in efficiency from which a newly defeated country is bound to suffer. In these circumstances it was decided in August 1940 to appoint an officer in A.I. 3(b) (the section which then dealt with all matters relating to Germany) to study how best the disorganisation of these railways could be continued and increased by British air attacks on key points on the railway systems in question. This study involved an appreciation of the volume of supplies required by the German Air Force in the forward area, an appreciation (in consultation with War Office, M.I. 14) of the movements of German Army units and supplies to the invasion area and an appreciation (in consultation with War Office, Directorate of Transportation and the Railway Research Service) of the

/rail

rail facilities available to the enemy and the most vulnerable parts of those facilities. The Royal Air Force was not in 1940 sufficiently strong to make an effective attack on the enemy's transport system, and the enemy's attacks on this country (both actual and potential) were repulsed by other means, but the study so undertaken developed into a general study of the use to which the German Armed Forces were putting or hoped to put the railways and other means of transport of Europe and North Africa, the capacity of those railways and other means of transport and the best way in which to reduce that capacity by air attack. This study was continued until the end of the war in Europe by an officer attached until November 1940 to A.I.3(b), thereafter until August 1941 to A.I.3(c), and since then to A.I.3(e). The work was performed by one officer until May 1942 and thereafter by two officers, who had the help of a clerical officer from November 1943 onwards.

87. Railway Requirements of German Armed Forces. There was at first very little detailed information on such questions as:-

- (a) how much train space is required to move a given unit,
- (b) at what rate in trains per day and at what speed in miles per hour does a unit normally move,
- (c) how much train space per day is required to supply a given unit in the field when conducting, for example, intensive operations, sustained operations or no operations,
- (d) how is such transport organised.

88. Yet it was essential to provide answers or estimated answers to these questions in order to appreciate how fast the Germans could build up a striking force in a new theatre of operations, to what extent they could maintain a striking force in an existing theatre, and to what extent movements or maintenance could be affected by air attack. These questions, so far as they related to units of the German Army were naturally studied in M.I.14, but so far as they related to the German Air Force were studied in A.I.3(e). The answers were in due course obtained by a careful comparison of a large number of railway documents, ranging from movement orders to consignment notes acquired by capture or supplied by agents.

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87 The first documents of any value in this respect to be acquired by capture were obtained during the Battle of Crete: these documents, for instance, ^{Capt} gave the 'make up' of the special types of military trains used by the ^{Doco} Germans for the movement by rail of the air and army units employed for the capture of the island together with the initials and figures used to designate the various types of military trains, the various classes of passenger coaches and goods wagons of which those trains were composed and the types of vehicle and other loads which the various wagons could hold; these initials and figures formed part of a series of initials and figures which were used throughout the war and were never altered as regards their import. The movement orders captured provided examples of the speed at which units could be moved. // Apart from captured documents, much information was contained in the reports of agents mainly emanating from France and Belgium: these reports often contained or consisted of complete railway documents, many of which by themselves appeared to contain nothing of value, but from a study of them it was possible to piece together the manner in which the Germans had organised the railway system of occupied Europe so far as military traffic was concerned and the routes normally employed for military purposes. // From these documents, for instance, it was possible to discover the average number of bombs of various sizes and the average quantity of fuel that could be loaded into the different kinds of goods wagons, and on occasions it was possible to form an estimate of the flow of supplies of a given kind to a particular area. Further, it was possible to ascertain the various code numbers given to the various railway areas into which occupied Europe was divided, which in turn made it possible to state from what areas units and supplies were being moved in cases where these code numbers only were known: incidentally, German security was better with regard to these code numbers, for they were changed from time to time, and the work of interpretation had to be repeated.

90 Capacity of Railways. Requests are frequently received for estimates of the capacities of stretches of railway line: the object of the request may be to know the rate at which a striking force can be moved or supplied and (where the line is within bombing range) the feasibility of reducing that

/rate

rate by air attack. No hard and fast rules can be given for these estimates, and in order to meet such requests it is essential to know a great many details about the line in question: is it, for instance, double or single track, is it heavily graded, is it electrified or steam operated, is there a change in the gauge or form of traction, what locomotives and servicing facilities are available, what train crews are available, are there adequate supplies of coal or electric power (as the case may be) available, what terminal facilities are there and so forth? To answer such questions it is necessary to study the relevant pre-war technical works of reference and to bring them up to date by an examination of the latest reports derived from air cover, agents, prisoners of war, current maps, timetables, etc.

91 Air Attack. It was appreciated from the start that the efficiency of the German war effort depended very largely on transport: the dislocation of their transport system was therefore obviously one of the most effective ways of harassing the enemy. The R.A.F. attacks on German communications began when the Low Countries were invaded in 1940, with the direct object of preventing supplies and troops from reaching the battle areas. After the collapse of France, attacks on transportation were continued as part of the general air war, assisting in injuring industry and lowering German morale. Later when Italy and then France were invaded attacks were made in support of the invading armies: finally, in the last six months of the war attacks had the twofold object of ruining Germany economically and giving immediate assistance to an attacking allied army.

92 There were thus two distinct purposes in attacks on railway targets: first, there were those attacks which were intended to have a "direct effect", i.e. an immediate interference with military traffic: secondly, there were those attacks which were intended to have an "indirect effect", i.e. an interference which would ultimately contribute to the general breakdown of railway working and consequently of economic activity and the German war effort generally in a specific area. It was appreciated that most forms of attack would produce both effects to a greater or less extent. For example, a cannon fighter attack on a locomotive hauling a train might not only make a very small reduction in the enemy's local availability of motive power (the indirect effect) but might also halt the train and

block the line to other trains until the damaged engine could be removed (the direct effect). Similarly a heavy bomber attack on a marshalling yard and railway centre might not only reduce the enemy's marshalling and locomotive servicing potential in the area in question (the indirect effect), but also prevent movement past the yard until the through running lines had been restored (the direct effect).

93. Whichever was the purpose in view, all kinds of railway targets in the area in question had to be examined. The different kinds of railway targets may be listed (not necessarily in order of importance for that varied with the object in view) as - marshalling yards and railway centres, junction stations and minor yards, locomotive running depots, locomotive repair shops and production works, locomotives and trains in use on stretches of line, bridges and shallow tunnels, and open lines, cuttings and embankments. // A great deal of basic data on such targets as marshalling yards, locomotive depots and repair shops and their relative importance in any given area had been collected before the war by the Railway Research Service, a permanent body maintained by the British railways to act as a liaison between them and railways overseas to ensure the automatic dissemination (in both directions) of economic and technical information likely to be of value to all railways. Their data was of great value from the point of view of ascertaining the railway importance of any given target, but as a rule it needed supplementing before a target could be passed as suitable for air attack and before one could be satisfied that there was sufficient material for the briefing of a pilot to enable him to identify his target and the most suitable aiming point in the target area: nor could they be expected to have detailed information on every railway centre and every bridge in occupied Europe. // It was this extra information as well as their basic data that was required before any particular set of railway attacks could be carried into effect. For this purpose it was necessary to obtain good up to date air photographs, to search the files of ground photographs maintained by the Inter Service Topographical Department at Oxford (many of which had been obtained from the general public in response to a broadcast appeal by the Admiralty), to consult technical works of reference in such

/libraries

libraries as those maintained by the British Museum and the Patent Office and sometimes to obtain reports (through the Secret Service) from agents on the spot. // On one occasion, for instance, when it was considered necessary to create a large fall of rock in order to block a mountain line for a considerable period it was necessary first to obtain detailed geological maps of the area and advice from the officials of the Geological Survey and Museum as to the frangibility of different classes of rock and then to consult a bomb designer as to the correct angle at which bombs should strike the rock. // In due course during the war particulars of the main features of the principal railway lines in most countries in Europe were collected in the form of handbooks produced by the Directorate of Transportation, War Office (who required these particulars primarily for the management of the railways in question after the retreat or defeat of the enemy) or the Inter Services Research Bureau (who required them for their own activities on the ground while the railways were still in enemy hands), but so far as these handbooks were not available, this class of work devolved on Air Intelligence: at the time of the invasion of Sicily, for instance, no handbooks were available and the relevant data had not been collected for the six major railway lines leading over the Alps from the rest of Europe into Northern Italy: it was essential, however, that the fullest information should be obtained with regard to all these lines (amounting in length to over 500 miles) in order to deprive the enemy of the ability to move units and supplies into Italy to meet our invasion of that country which was then about to be effected.

Damage Assessment. * A careful appreciation of the damage caused by a raid on a railway target is required for several reasons. If it is intended that the raid shall cause an immediate interference with military traffic, information is at once wanted to ascertain whether it has succeeded in this object and if so for how long the interruption is likely to last. If it is intended that the raid shall contribute towards the general reduction of the enemy's marshalling or locomotive servicing facilities, again the success or failure of the raid must be estimated so that a decision may be taken as to whether it is better to repeat the

* See also
 Note: See also Chapter 5. paras 68-72. /attack

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99 attack or attack other targets of the same category. In all cases the rate of repair must be carefully watched, not only to ascertain progress at the target in question, but so that from a comparison of a large number of attacks on targets of one category, an estimate may be made of the average number of sorties required to produce a line out for a given period of days on a target of a particular type, e.g. 100 foot bridge, 500 foot bridge, marshalling yard etc. Comparisons have also to be made between attacks in visual and non-visual conditions, attacks by day and by night, and attacks by heavy, medium and fighter bombers.

100 The best source of information for the assessment of initial damage was undoubtedly photo recce: except in the earlier stages of the war a great deal of photo recce was available and was obtained quickly, in many cases within 24 hours of a raid. For the assessment of rates of repair much help was obtained from agent's reports; as a rule, there was some delay in obtaining these, but the information when obtained was invaluable from the point of view of working out the average speed at which the various damaged targets were repaired: for this purpose, the age of the report was irrelevant and what was needed was the detailed progress report of the engineer in charge, and this was often forthcoming.

V-WEAPONS.

101 One of the extraneous subjects undertaken by A.I.3(e) was the intelligence on the V-weapon organisation. The flying bomb organisation was manned by G.A.F. personnel and came naturally within the purview of Air Ministry Intelligence. In this section officers skilled and experienced in intelligence on the organisation of the G.A.F. were ready to hand and the problem of the flying bomb organisation was given to them to work out. The work was of a precisely similar nature to that already outlined in preceding pages and consisted in producing an order of battle of the units concerned, studying their methods of supply, manpower, personalities and so on. In connexion with the supply organisation it was a particular advantage that the section had already in it as part of its normal work the subsection dealing with rail and road transport.

102 Since the rocket organisation was to a certain extent connected with that for the flying bomb A.I.3(e) also undertook the study of this

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organisation. For this purpose, however, an army intelligence officer was posted to the section from the War Office. As the rocket organisation was manned by German army personnel it was essential to have a man fully conversant with army organisation and order of battle.

POST HOSTILITIES PLANNING.

103 One of the functions of Air Intelligence that should not be overlooked is the preparation of material against the day of victory. Officers require to be trained well in advance for disarming, controlling and demobilizing the enemy. In this connexion A.I.3(e) was engaged for about a year or more before the war was ended on feeding the necessary material to the post hostility planning organisations. Numerous papers were written for the purpose and comprehensive orders of battle produced. This work should be undertaken in good time in case the enemy collapse should come suddenly and sooner than expected.

104 As full information as possible on the principles of the working and organization of all branches of the enemy force is necessary for those who are to disarm and control. In this respect where great detail is required, the most valuable source is captured hand-books and no pains should be spared to get together as many documents of this nature as possible in good time. Actually, while being able to supply all the necessary basic knowledge for disarmament officers we were unable to supply sufficiently detailed accounts for those with specific tasks such as equipment, M/T, etc. These officers, knowing in detail the organisation of their own air force in their special branches, required to know similar details about the enemy forces. This information only became available when captured documents started to come in in large quantities after the reconquest of France. To deal with these documents, which required a large staff of translators, duplicators, draughtsmen and so on, a new section was set up, A.I.12, *actually on the establishment of the Air Division of the Control Commission.*

~~A.I.3(e)~~

26.6.45.

A.I.2(b):AIRFIELD INTELLIGENCE1939 and 1940.

1. At the beginning of the war, since Air Intelligence was divided on a regional rather than a functional basis, Airfield Intelligence was dealt with by the country section concerned where, owing to lack of staff, priority was necessarily given to such subjects as Order of Battle. Interest in airfields was therefore perfunctory and only in the German section were any officers employed exclusively on airfield work.

2. In consequence the handling of the subject was always inadequate and sometimes grotesque. Country sections had widely different views on where to draw the line between "suspected" and "confirmed" airfields, and one section had on its list five times as many airfields as in fact existed. Different standards of evaluation, moreover, made any comparative study of airfield capacity between two countries quite worthless.

3. Formation of A. I. 3. (d) Airfield Section. The German conquests of 1940 and the resulting enlargement of the sphere of responsibility of the German section made plain the need for a special German Airfield Section formed as A. I. 3. (d). Later, in 1941, the responsibility of A. I. 3(d) was extended to include airfields in ALL enemy and neutral countries.

4. A. I. 3(d) was immediately confronted with large quantities of undigested airfield material passed to it by the country sections and the first and most urgent task was to produce provisional airfield lists setting out the basic known facts of airfield accommodation, country by country. Areas were tackled in order of importance and urgency, and work was constantly interrupted by requests for special appreciations and reports. In many cases these dealt with areas the study of which had not been completed and it was therefore impossible to provide the best answer that should have been available.

5. The Time Factor. Much time is needed for the initial study of an airfield and for the production of full data. Reports on every item are liable to be conflicting and a variety of maps, plans and publications must be studied. An officer cannot produce more than one to three information sheets a day when new ground is being covered and the number will vary according to the amount of data available. Between 1939 and 1945 there were about a thousand airfields in France alone, and something like 500 officer-days were needed to prepare the original information sheets; to this must be added the vast amount of time required for work on amendments. This time factor must always be taken into account and it would be no light matter if Airfield Intelligence came to be neglected and allowed to get so out of date that a complete re-write became necessary.

1941 - Loss of British Territories.

6. The loss of British territories substantially enlarged the sphere of Airfield Intelligence. Every possible branch and department was searched for records of our own military bases and a few scattered and out-of-date fragments were collected, but the astonishing discovery was made that no central authority existed in the British Isles for the collection of information on British airfields overseas. Further, some of the overseas Commands had no complete knowledge of the bases at their disposal.

7. It was therefore decided that the responsibility for the collection and dissemination of Airfield Intelligence in British territories, except

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the United Kingdom, should be added to the work of A.I.3(d). This decision roughly coincided with the reorganisation of Air Intelligence at the end of 1941 on a functional basis and the new central airfield section became A.I.2(b).

1942 - Liaison with U.S. Air Movements Branch, Washington.

8. In November 1941, "Air Movements Branch" was set up in Washington as an airfield section. Like A.I.2(b) it had started virtually from scratch; it had all the same staff difficulties, initial lack of experience and had too much to do in too short a time; consequently its productions were often inaccurate and therefore soon came to be discredited. An exchange of visits between A.I.2(b) and Air Movements soon proved of great benefit, enabling the former to gain an additional and very co-operative source of information, while the latter was quick to learn from A.I.2(b) experience.

1943 - Airfield Map Production.

9. Close and cordial liaison between Air Movements and A.I.2(b) effected a marked improvement in the standard of Airfield Intelligence and in the Autumn of 1943 the Americans went a stage further and agreed to produce airfield maps for A.I.2(b). A.I.2(b)'s facilities for producing these maps were inadequate, even for R.A.F. needs, and the advent of the U.S. Air Forces in Europe placed an impossible strain on the resources available for producing airfield maps rapidly.

10. In wartime, speed of production of airfield intelligence is essential; maps must be provided in a matter of days, not weeks or months, and out of date maps are useless. Washington had map making facilities and methods not available in the United Kingdom and when Air Movements undertook to provide world airfield map coverage, A.I.2(b) drafting and reproduction facilities were immediately freed for extra work on airfield plans and special maps which were later to prove of immense value.

11. Arrangements were made for exchanges of information when the existence or classification of airfields was in dispute between A.I.2(b) and Air Movements and this exchange proved a gain to both branches, particularly for the Pacific area. A.I.2(b) supplied lists of airfields with position and classification, followed by weekly amendments, and Air Movements obtained their rapid printing and revision and supplied A.I.2(b) in a matter of days with bulk map stocks for distribution.

1944 - Division of Anglo-American Responsibility.

12. In the Summer of 1944 an officer of A.I.2(b) joined Air Movements and took with him microfilmed copies of all A.I.2(b) files, plans and maps of the Far East. British and American information was pooled and A.I.2(b) ceased to issue its own publications for the Far Eastern theatre. Air Movements' productions contained more data than previously and their standard was immeasurably higher than in 1942, and Stocks of Air Movements' airfield lists were sent to the United Kingdom and India by air for distribution.

13. While Air Movements assumed responsibility for airfield information in the Far Eastern theatre, A.I.2(b) retained responsibility for Europe, Africa and the Middle East. This division of responsibility greatly simplified the whole problem. The staffs of A.I.2(b) and Air Movements were about equal in size and had either of them been required to deal unaided with all theatres of war, their staff would need to have been doubled to provide the service which was ultimately achieved.

SOURCES OF AIRFIELD INTELLIGENCE.

14. In peacetime a variety of official and semi-official airfield lists, Air Attache reports etc., provide the bulk of airfield information, but in war the main sources were as follows:-

- (a) Ground reports from agents, etc.
- (b) Photographic reconnaissance.
- (c) Prisoner of war interrogation reports.
- (d) Postal censorship extracts.
- (e) Captured documents.
- (f) Wireless intercepts.

Relative Values.

15. Information from all the sources noted above increased in volume and improved in quality as the war progressed. The relative value of different sources varies with varying conditions but in few cases can a single source provide a complete answer. All sources must be fully exploited and the value of any source can be increased by skilful direction. Thus, careful use of the criticism sheet attached to ground reports instructed the agent as to the type of data wanted; close liaison with photographic interpreters resulted in improved reporting, and directives to interrogators of prisoners of war and to the Censorship ensured that they obtained the right type of Intelligence.

Ground Reports, etc.

16. Ground reports from Western Europe were very numerous and very good but it must always be remembered that agents reports, while in general valuable, are often imprecise and may not be based on expert knowledge. They therefore require careful handling and must be treated with caution. Interrogation of G.A.F. prisoners of war often yielded most valuable information as the prisoner was in a position to give expert and detailed information about airfields he had flown from. Captured documents such as maps sometimes gave useful information, while Postal Censorship extracts frequently contained references to the building of new airfields, and wireless intercepts ('Y' Service) gave a good indication of activity at particular airfields.

Photographic Reconnaissance.

17. Photographic Reconnaissance is of very great value as a source, but first the position of the airfield must be known before it can be photographed and, in the case of new airfields, this position was usually obtained from agents' reports. Also, Photographic Interpretation is, to a considerable degree, a matter of opinion. The dimensions of a runway, for example, can be calculated with precision from a vertical photograph, but the serviceable area of a grass airfield cannot, and it may be quite impossible to detect from a photograph that certain parts of the area have minor undulations which make it quite unusable. It is therefore necessary to use it in conjunction with other sources.

18. Airfields of interest were photographed regularly in order to enable developments to be carefully watched. Routine reconnaissance programmes were arranged to cover these, and requests from all authorities, whether British or American, for Photographic Reconnaissance of Airfields in N.W. Europe were canalised through A.I.2(b). That co-ordination

became essential in view of the great number of authorities interested in order to eliminate duplication of superfluous demands; all programmes had, moreover, to be subject to constant review in the light of changes in the strategic or tactical situation.

Collation of Material.

19. Each airfield had its own file into which every item of intelligence from whatever source was placed and periodically evaluated. It is important that information from all sources should be sifted and compared since a true and complete picture of the airfield situation can only be built up if information from all sources is collated and digested by a central authority with full access to sources of intelligence which may not be available to Commands or other formations. Such formations should therefore be discouraged from jumping to conclusions as a result of any stray reports that may come into their possession.

INTERNAL ORGANISATION.

Expansion.

20. In 1939 there were two officers in the German Section engaged on airfield work. By 1940 there were four and, by the end of the War in Europe, A.I.2(b) had a staff of 37 officers including three Americans. In addition one officer was employed on full time duties with Air Movements Washington. In the early stages increases of staff rarely kept pace with increases in demands for Airfield Intelligence and not until 1942 was it possible to allocate responsibility for definite areas to individual officers. Even when this allocation became possible it was always made with the proviso that the energies of all officers might be transferred at any time to study areas other than their own which had become of operational importance.

Specialist Officers.

21. While the guiding principle of organisation was the allocation of particular areas to individual officers, for areas where urgency was great the work was broken down and shared by several officers, each of whom specialised in a particular aspect of the work on the area in question. One officer was responsible for handling ground reports, another for scrutinizing photographic interpretation reports and a third for dealing with unconfirmed or suspected landing grounds, their work being finally co-ordinated by the officer responsible for the production of the airfield list.

22. It was found that officers so employed very soon became expert in dealing with their particular type of report and were quick to notice trends of enemy development. For instance an officer dealing with unconfirmed landing grounds soon noticed if rumours began to accumulate about a particular locality and, in the same way, an officer dealing with photographic interpretation quickly noted any changes in enemy methods of airfield construction.

Flexibility.

23. Intelligence requiring intensive work was called for at short notice on areas as far apart as Madagascar and Spain, and it was at all costs necessary to have an organisation sufficiently flexible to cope with sudden demands from unexpected quarters. While A.I.2(b) devoted by far the greatest part of its resources to the study of enemy or potential enemy areas, the widespread character and unexpected developments of the war made it necessary to hold a watching brief for areas which, while appearing far removed from the war zone, might suddenly become of

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operational importance. The division of responsibility with the Americans referred to above helped immensely to reduce this problem to manageable proportions.

Sub-Sections.

24. In addition it was also necessary to form sub-sections to deal with tasks divorced from the routine compilation of airfield lists. Production and distribution was a particularly important and complicated task in view of the constantly changing formations, titles, addresses and requirements of recipients and, without the efficient handling of this task, (which towards the end of the war required three officers) most of the work of the section would have been thrown away. In the same way the Daily INTREP signal instituted in April, 1944, to give daily up-to-the-minute airfield intelligence to the Tactical Air Forces (see paras. 37-41), was produced by a special sub-section staffed by seven officers, three of whom were later attached to SHAEF for airfield intelligence duties.

Distribution of Duties.

25. A table showing the distribution of duties between May, 1944 and May, 1945, is attached at Appendix A. This was arrived at as the result of experience and functioned well in the conditions for which it was designed.

PRESENTATION OF AIRFIELD INTELLIGENCE.

26. Numerous special appreciations and reports were produced as required throughout the war, but airfield intelligence was also supplied as a matter of routine to a large number of formations in the following forms:-

- (a) Airfield Lists.
- (b) Airfield Maps.
- (c) Bi-weekly Activity Reports.
- (d) Daily Airfield INTREP Signal.
- (e) Airfield Target Priority List.
- (f) Airfield Occupation List.

In addition, target material on airfields published by the Target Section was vetted and partly prepared by A.I.2.(b).

Airfield Lists and Plans.

27. The basic publication was the Airfield List which consisted of airfield information sheets and plans with a gazetteer and introductory remarks on terrain and meteorology, and also a brief account of the characteristics and development of the airfields of the country. The gazetteer listed all airfields and landing grounds alphabetically and the information sheets described them in detail. Airfields were illustrated with line plans wherever possible. These plans were normally fully annotated and had a strong target bias. An example of an airfield information sheet and plan is shown at Appendix B. During the war, lists covering 70 different countries were produced and the number of airfields dealt with in each list varied from nearly 1400 in the case of Germany, to 21 for Albania. All these lists had to be kept constantly up to date by the issue of revised plans, information sheets and amendments.

Airfield Maps.

28. The next step was the production of special airfield maps. These were required in the form of basic coverage to complement the airfield lists and also to illustrate various specialised aspects of the subject. The different types produced are described below.

29. Basic Coverage. Maps showing up-to-date and complete airfield cover are a most valuable adjunct to airfield lists and it was the aim of A. I. 2(b) to provide such maps for all areas covered by airfield lists. Many obstacles had to be overcome before this could be done. The chief problems were inadequate draughting and printing facilities and a solution was only found when Washington undertook the drawing and printing of airfield maps. Although Washington produced all basic coverage maps, responsibility for the information shown on them was divided between A. I. 2(b) and Air Movements as noted in paragraphs 12 and 13.

30. The scale adopted was 1:2,000,000 for Europe and 1:3,000,000 for the rest of the world. All airfields and landing grounds were broadly divided into a few main categories, each of which was shown by a symbol, the symbols and classification being agreed between Washington and A. I. 2(b). An example of this type of map is shown at Appendix C.

31. Special Maps. In addition to the basic coverage described above, the invasion of the Continent produced a requirement for maps on a scale of 1:1,000,000 showing the operational area. These were revised at frequent intervals and re-issued every six or eight weeks. For speed of production they were drawn and printed in England.

32. Airfield Development Maps. After the Normandy landings, these maps were re-issued every seven or ten days to keep pace with rapid developments. They consisted of the latest edition of the special map noted above, reduced to about 1:2,000,000 with a faded background. Over-printed in bolder type were additions, deletions and alterations to symbols resulting from development or better information.

33. Paved Runway Maps. When interest began to be taken in German airfields from the point of view of possible use by Allied aircraft, the presence of paved runways assumed considerable importance and maps were prepared on which all airfields with paved runways were prominently marked and the runway lengths indicated in hundreds of yards.

34. Jet Airfield Maps. The special airfield requirements of German jet aircraft prompted the production of a map showing all suitable airfields. Symbols were overprinted in colour on a faded base airfield map to show the choices available to the enemy, and also last resort airfields which might have to be used or which might lend themselves to rapid preparation.

35. Airfield Group Maps. These were in effect target maps and were prepared at the request of the American VIIIth Fighter Command. Airfields of target interest were accurately plotted on a 1:1,000,000 map and divided into handy sized groups, each group being surrounded by a printed frame. The groups were arranged geographically and numbered and the airfields within the groups were also numbered, so that an airfield could be identified in such terms as "Group 5 Number 4". The maps were taken into the air and VIIIth Air Force used them for switching formations from one group or airfield to another. All difficulties over the pronunciation of foreign names were thus eliminated and the maps were extremely convenient for briefing by telephone etc. The maps were frequently revised, new areas covered and numbers changed so that an automatic security measure was provided.

Activity Reports.

36. These were first issued in 1942 and were sent out twice-weekly

in a form which enabled relevant extracts to be cut and stuck on airfield information sheets as amendments. They consisted of digested P.R. reports and, later, of expanded information from the INTREP signal.

INTREP Signal.

37. This service was instituted in April, 1944, in preparation for the coming invasion of the Continent and it was designed to provide up to the minute airfield intelligence to keep pace with rapid changes in the tactical situation in operational areas.

38. It consisted of a signal sent out nightly to all interested formations which contained a digest of all airfield information for operational areas received during the previous 24 hours. It gave general notes on the situation, estimates of airfield serviceability and activity, reports of attacks on airfields, details of development and repair work, and essential data on newly discovered landing grounds. First, Second and Third Phase Interpretation Reports, Ground Reports, reports on attacks on airfields and Y-service reports were all collated and the essential points included in the nightly INTREP.

39. The officers detached from A.I.2(b) to work on the Continent with the Airfield Section of S.H.A.S.F. were in close and constant communication with A.I.2(b) and passed to it all raw airfield intelligence material originated on the Continent for inclusion in the INTREP signal. They were also responsible for the Continental distribution of the signal.

40. The construction of new tactical airfields, which was undertaken on a large scale by the enemy to obtain relief from the bombing of his main bases, was reported in the INTREP as soon as observed and these airfields were often attacked as soon as the enemy moved in. Status charts showing estimates of day to day serviceability were kept and the probable serviceability of each airfield signalled daily in the INTREP by a simple numerical code. Estimates of serviceability were largely derived from photographic reconnaissance, and bomb damage, weather, ground reports, and nature of soil were all taken into account.

41. Few German airfields had runways and in the winter of 1944-1945 at one period more than 80 out of 100 were unserviceable. Attention was drawn to this in the INTREP and the VIIIth Air Force was able to reduce substantially the number of fighters required to escort bombers. The aircraft thus made available were used for ground attacks and A.I.2(b) were informed that more than 200 fighter were freed for this work.

Airfield Target Priority List.

42. This service was supplied by the A.I.2(b) detachment at S.H.A.S.F. in collaboration with Air Ministry. It supplied guidance on the relative general merits of airfields in the area under review. Any study of airfield activity in a tactical area would reveal that certain airfields were always occupied and others only fairly frequently or sometimes not at all. It also showed that certain airfields which were rarely used as operational bases were nevertheless centres of sustained activity; such airfields were usually important repair bases and maintenance units, the destruction of which was liable to affect the efficiency of large areas. All these factors were taken into account in the airfield priority list and the most profitable targets suggested.

Airfield Occupation List.

43. This list was started early in 1945. It was produced in conjunction with the G.A.F. Order of Battle Section and Signals Intelligence and set out the location of G.A.F. Units with numbers and types of aircraft. It was issued weekly with daily amendments and teleprinted to interested

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formations. The list was used in conjunction with the airfield priority list for attacks on airfields.

EXPLOITATION OF AIRFIELD INTELLIGENCE.

General Survey.

44. In 1939 our knowledge of the airfields of Germany was very incomplete and we knew little beyond the fact that German Air Force Stations were roughly similar to R.A.F. Stations with hangars and other buildings forming a compact group at one end of the landing area which, in the great majority of cases, had a grass surface. It was also known that the Germans had many satellite landing grounds but numbers and locations were unknown, and no useful conclusions could be drawn from the inadequate information at our disposal.

45. There was then no possibility of grounding the German Air Force by bombing its airfields which had therefore little target value. Neither was there any question of requiring full details for planning the basing of large friendly air forces in enemy held territory. In consequence little interest was taken in the subject and it was not until 1940, when our information became much more detailed and extensive, that valuable deductions as to the enemy's intentions could be made from his airfield development.

46. The need for Airfield Intelligence continued to grow steadily as the war developed and once the Allies were in a position to plan offensive action the demands from Planning Staffs grew continuously. They were interested in the number, location and capacity of enemy airfields, both with a view to gauging the strength of the enemy forces which might operate from them and also for estimating the size of the Allied Air Forces which could be based on airfields it was hoped to capture.

47. By 1944 the British and American Air Forces were strong enough for airfields in the Western European Theatre to become profitable targets and this greatly increased the demand for Airfield Intelligence and also the speed with which it had to be produced and distributed.

48. The exploitation of Airfield Intelligence may therefore be said to fall under three main headings:-

- (a) The deduction of the enemy's intentions from a study of his airfield development.
- (b) The provision of detailed information and special appreciations for Planning Staffs.
- (c) Provision of target material, in collaboration with the Target Section, for attacks on airfields and the compilation of priority lists of recommended targets.

Enemy Intentions.

49. Reliable forecasts of the enemy's intentions can often be made from a study of his airfield development, as any major changes in his strategy must be reflected in his airfields. There were many examples of this during the war and the early German airfield development work in occupied Europe gave some particularly good indications.

50. Developments in Occupied Countries. In 1940, after overrunning Denmark, Norway, France and the Low Countries, the Germans began energetically to develop airfields in the occupied countries. Prior to 1940 our knowledge of the airfields of these countries was meagre but after the French collapse airfield information suddenly became of great importance

and it rapidly became evident that useful intelligence could be gained from a close study of the German developments. Information regarding the location and strength of the different types of G.A.F. Units; the direction from which the main weight of attack was to be expected; and the bases from which an airborne assault might be launched, was urgently needed, and at least some of the answers could be supplied from a proper appreciation of the enemy's airfield situation.

51. Specialised Airfields. Fortunately the Germans supplied almost all the clues. Airfields were constructed for types of unit and for the size of unit they intended to base there. It became possible to say with complete certainty that an airfield was for fighters, Ju 52s or He 110s, and so on. Furthermore, they built exactly the number, size and shape of aircraft shelters required at each base. Any change in the role of an airfield was duly heralded by appropriate constructional work. A good example of this is Lille/Vendeville, a photograph of which is reproduced at Appendix D. Originally a bomber base with typical bomber lay-out and shelters for bomber aircraft, it later became a fighter station and the changes were announced well in advance by the construction of shelters for fighters.

52. Operational Capacity. It was therefore a straightforward matter to work out the type and strength of the Air Force for which accommodation had been provided in a given area. The experience gained laid the foundation of knowledge for the production of estimates of operational capacity which were of value to the Order of Battle Section, and which at a later stage in the war were in almost daily request by Planning Staffs.

53. Bomber Airfield Development 1940/41. During the winter of 1940/41, having encountered serious difficulties in operating heavily laden bombers from small grass airfields liable to become soft after rain, the Germans carried out a massive airfield building programme in North West France. A.I.2(b) had very full information on the progress of the work. There were no particular signs of haste and the work was extensive and thorough. Long concrete runways, hard-standings and tarmac aprons were laid down at all bases and every facility was provided. All the airfields had elaborate lighting systems and were admirably designed for the operation of night bombers. None of them showed any signs of being intended for the operation of the troop carrying aircraft and short-range fighters which would be needed for an invasion attempt and everything indicated that the enemy intended to carry out greatly intensified night bombing attacks on the United Kingdom.

54. Invasion Alarms 1941. It is essential that any appreciation should be based on all the known facts and not on isolated reports. Early in 1941 an attempt at invasion was expected in many quarters and one isolated report created something of a stir. Included in the great volume of ground reports received at this time were many hundred of worthless generalisations. One such report read "Work on all invasion airfields has ceased". This was not strictly correct, but work had in many cases stopped because building had been completed. This report slipped into circulation and one Service interpreted it to mean that, work on the invasion airfields now being completed, the enemy was about to launch an invasion. Another appreciated that work having ceased was an indication that the enemy had changed his plans and called the invasion off. A.I.2(b) had repeatedly pointed out that the work in question was not necessarily connected with invasion preparations and did not in fact appear to be designed for this purpose, while it did clearly reflect the enemy's desire to provide greatly improved bases for night bombers. A.I.2(b) therefore concluded that an immediate invasion was not projected, and that intensive night bombing as a long term policy had been adopted, possibly to be followed by invasion at a later date.

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Planning Staff Requirements.

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55. Operational planning requirements are all embracing. An air force cannot operate without airfields; therefore, any plan which involves the use of air power must take into account the airfield situation and in many cases the potential or existing facilities will be a decisive factor.

56. It follows that Planning Staffs require up-to-date airfield information in a convenient and readily accessible form for any area with which they may be concerned. The provision of such information in a form suitable for easy reference entails an enormous amount of labour and detailed research, and, as previously indicated, it was available at the beginning of the war only in an incomplete and unco-ordinated form. An airfield census taken in May 1945, revealed that there were 23,000 airfields and landing grounds throughout the world on which A. I. 2(b) had information.

57. As soon as the development of the airfield section made it possible, Planning Staffs were supplied with airfield lists and maps as a matter of routine and with special appreciations and reports as required. The type of report or appreciation called for clearly reflected the trend of the war. At first, estimates of the enemy's intentions and the offensive strength he could concentrate in a given area were required, but later, when the offensive was passing to the Allies, the demand for estimates of the size of the air forces we would be able to base in territory it was intended to capture.

58. To the first phase belongs a report prepared early in 1941 listing the airfields available to the G.A.F. for an offensive against Yugoslavia; and to the second, an appreciation written in January, 1943, showing that the conquest of Sicily would give the Allies better airfield facilities than either Corsica or Sardinia.

59. Existing enemy airfield facilities usually fell a long way short of Allied requirements and Engineer Planning Staffs were much concerned with estimating the possibility of extending existing airfields and with choosing possible sites for new ones in enemy territory. Reliable data was hard to come by and it was not possible to meet all requirements. Although the problem was not primarily the responsibility of A. I. 2(b), a certain amount of assistance was obtained from the information held and special reports with lists of former landing grounds and reported sites were prepared.

60. Planners required information for both short and long term projects, and, after the Normandy landings, during the dynamic phase of the war in Europe, these varied in scope from the seizure of an airfield to the capture of Berlin by an armoured task force to be supplied entirely by air. Airfield information was in constant demand for planning of airborne operations, for supplying rapidly advancing ground forces by air and, eventually, for the evacuation of prisoners of war. The Engineers were interested in the availability and distribution of airfields which could be rapidly made serviceable for supply purposes and had also to plan for the staging forward of Allied operational air force units.

61. For all these purposes accurate knowledge of the capacity and current state of repair of individual airfields was essential. During this period of rapid advance answers were required at the shortest notice and only the presence in S.H.A.E.F. of officers detached from A. I. 2(b) to S.H.A.E.F. for specialist airfield intelligence duties enabled the required promptness to be achieved. The S.H.A.E.F. detachment was at all times in the closest contact with A. I. 2(b) by telephone.

Target Intelligence.

62. This aspect of airfield intelligence falls into two parts:-

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- (a) The provision of target illustrations for bomb aimers.
- (b) The selection and recommendation of profitable targets.

The provision of all target material was the responsibility of the Target Section (A. I. 3(c)(1)), but the development of A. I. 2(b) as a central airfield section made it the natural adviser of the Target Section on airfield questions. A. I. 2(b) was able to advise on the selection of airfield targets for which material should be prepared, and this enabled all requests for photographic reconnaissance of airfields, in which both sections were interested, to be canalised through A. I. 2(b), thus avoiding much duplication of effort.

63. Target illustrations of airfields prepared by the Target Section were passed to A. I. 2(b) for annotation and correction before being printed. This saved the Target Section much time and study and eliminated the conflicts of detail which would inevitably have occurred had the annotated target illustrations issued by the Target Section and the airfield plans issued by A. I. 2(b), both of which were prepared from photographs, not been edited by the same authority.

64. The Airfield Section was in a better position than any other to gauge the target value of airfields and to say which were likely to prove profitable targets. In order to ensure that up-to-date target material was available at the shortest notice, A. I. 2(b) compiled lists of airfields for which target material should be prepared in order of priority. These lists were constantly reviewed in the light of changes in the tactical and strategical situation and no complaint was ever received that target material was inadequate or lacking at critical moments.

Recommended Targets.

65. In the early stages of the war the enemy had more than enough airfields at his disposal. There was no possibility of grounding his air force or seriously reducing his scale of effort by attacks on his airfields. In general, therefore, airfields had little target value, but even at an early date there were certain exceptions which offered profitable targets. A number of airfields in Western Europe were used by the enemy for specialised anti-shipping work and A. I. 2(b) were able to submit details of these airfields and suggest means for reducing the enemy's scale of effort. In the same way, it was possible to pick out airfields used by the enemy for night bombing and, in collaboration with the Order of Battle Section, to suggest likely targets for our Intruders.

Airfield Attacks - 1943/44.

66. The great increase in the strength of the Allied air forces in 1943, coupled with the decline in the fighting value of the G. A. F., brightened the prospect of achieving useful results by attacking enemy airfields. A policy of weakening the enemy's potential scale of effort by attacking his ability to maintain and repair aircraft, was adopted. Important facilities were attacked systematically and A. I. 2(b) worked in close touch with the attacking air forces. Special files were kept in which damage to installations was recorded and advice was given on the order of importance of future attacks and whether further bombing of particular installations was necessary.

67. Allied Landing on the Continent. Prior to the Normandy landings, airfields in France and the Low Countries were heavily attacked. The enemy then hastily built large numbers of temporary landing grounds, the total of which rose to 213 before he was driven out of France. Ground reports were excellent and notice of new work was usually quickly received. Photographic reconnaissance was ordered immediately and often received the same day. The precise location and essential particulars were then signalled in the nightly INTREP signal sent to all interested formations

and target material was prepared at once. The enemy's efforts to disperse and conceal his forces were very largely nullified by the speed with which his satellite landing grounds were discovered and reported.

68. Co-ordination of Airfield Attacks. A.I.2(b) had always insisted that attacks on airfields to be profitable should be as carefully studied as attacks on industry or communications, and targets should be chosen with as full a regard to overall considerations, and in conformity with a logical strategic plan. The Airfield Priority List described in paragraph 42 was an attempt to co-ordinate all attacks on airfields. Although there was always a tendency for individual Commands (on both sides of the Channel) to select airfield targets without regard to overall considerations, A.I.2(b) could claim to have initiated through its offshoot at S.H.A.E.F., some worthwhile operations, forestalled a number of ill-considered ones, and to have won some regard for its views on the planning of such attacks.

69. Jet Airfields. By the Spring of 1945, German Jet Fighters were appearing in considerable numbers and proving an increasing menace. These aircraft required airfields with longer runways than German airfields normally possessed and the approaches had to be unusually good. All suitable airfields were known to A.I.2(b), special maps were issued as noted in paragraph 34, and constant watch was kept on the progress of constructional work.

70. The Rhine Crossing. The increasing activity of German Jet Fighters presented a serious potential threat to the troop carrying aircraft which were to carry the airborne forces across the Rhine. Shortly before the Rhine crossing took place, A.I.2(b) was asked to produce a list of all airfields on which Jet Fighters could possibly be based to interfere with the operation. The very complete information held by A.I.2(b) enabled the list of possible airfields to be reduced to twelve with complete certainty that no airfields not on the list were suitable for Jets, even as a last resort. All airfields listed were heavily bombed on the 21st March 1945, and again on the 24th when the crossing operation was launched. No Jet Fighters appeared in the area for over a week. The destruction of their bases had kept them grounded and most of the airfields were overrun by the Allies before they could be made serviceable again.

Conclusion.

71. The attack on the Jet airfields is perhaps the most striking example of the operational application of airfield intelligence which the war produced. The Rhine crossings practically marked the end of the war in Europe, and the exploitation of airfield intelligence during the last year of hostilities is summarised in the final INTREP signal dated 7th May, 1945, which is reproduced below:-

AIRFIELD INTREP NO. 389.
POSTSCRIPT.

Since April 1944, many valued manufacturers of component parts of airfield information have contributed towards final assembly in the Intrep Signal of the finished product, which has triumphed over any communications difficulties to keep all well informed.

Knowledge wedded to superior air power spells trouble for an enemy, and the G.A.F. had plenty to worry about.

Together we have watched:-

- (a) Success of attacks on main German repair facilities and bases in France prior to D-day.

4.

- (b) Enemy efforts to find protection by dispersal of units on to clusters of hastily prepared satellite landing grounds, which policy was rendered ineffective by rapid discovery and reporting.
- (c) At the end of 1944 the very nearly total unserviceability of grass airfields in Germany, and consequent limitation of targets to attack and police with therefore inevitably increased effectiveness.
- (d) Discovery of special requirements for jets, and belated 1945 efforts to provide satisfactory bases which were frustrated by Allies.
- (e) Feverish last minute attempts to convert peace-time airfields into operational bases, in which enemy tasted bitterness in last battle of our own earlier experiences of "too little and too late".
- (f) Devastating results of airfield attacks in March, 1945, and efforts to repair which failed for lack of time.
- (g) Gradual compression of the G.A.F., until hundreds of aircraft cluttered up the airfields, and (H, for Holocaust). The end of the German Air Force.

In concluding our final Intrep we acknowledge gratefully the help of all contributors.

The following is an extract from a signal received from Air Staff, S.H.A.E.F. in reply to the above:-

"Intrep No. 389 acknowledged. Feel sure we speak for all recipients in expressing gratitude for immense efforts put into this service, particularly in recent months. Confident that your knowledge and advice always available has been major factor in any success achieved."

AIR MINISTRY INTELLIGENCE IN WAR

PART III : CHAPTER 11 (iv)

A.I.2(a):

*Introduction*AIRCRAFT PRODUCTION INTELLIGENCE

1. The purpose of aircraft production intelligence is two fold. First to assess enemy output and future strength as an indication of the future size of the enemy air force and second, to provide details of the targets to be attacked to weaken those air forces.
2. This dependence of modern armies on the industries behind them represents a weakness which properly exploited, will bring defeat to the most powerful forces. Both Great Britain and Germany failed to appreciate at the beginning of the war the possibilities of precision bombing, and it is known that Germany believed that their industry could not be seriously affected by this form of attack. Consequently their aircraft industry which had been concentrated ^{as late as 1942/43} into large complexes, had later, under the pressure of Allied air attacks, to be hastily dispersed into a large number of smaller units. The immense effort entailed by this dispersal programme did not prevent an extraordinary recovery in fighter production which reached its peak in the autumn of 1944. ~~decreased efficiency of the industry resulting from this change of production methods was an important contribution to the gaining of air supremacy by the Allies.~~
3. The Production Intelligence Section should function as a central collating section drawing raw and semi-digested intelligence from many outside sources, such as the Agents' Organisation, P/W Interrogation, Photographic Reconnaissance and captured enemy material. Each of the units dealing with various types of information needs to be briefed with the requirements of the Production Section, which becomes the responsible authority on the subject concerned, and it has been found that close personal contact with these various sections is an essential requisite for rapidity of action.
4. To appreciate fully the relationship which developed between these sections, it should be helpful to give a brief description of the procedure which was usually followed in presenting fresh targets to the bomber forces. Normally the Production Section received the first intimation of the existence of a new factory, and it was the responsibility of that section to assess the value of the new factory and to decide if it should be included in the schedule of targets. Once this had been agreed, P.R.U. (later through the Joint Photographic Reconnaissance Committee) was requested to obtain aerial

*Incorrect
Non-sense**cut
what part*

photographs of the area concerned, both large and small scale cover being required; the former for identification of the factory and detailed interpretation of the various buildings, and the latter for producing area illustrations for target material. In some cases, it was found that suitable photographs already existed, which considerably speeded up matters, since this part of the process was entirely dependent on suitable weather conditions.

5. Once photographs had been obtained, they were examined and reported upon by the Aircraft Industry Section at the Interpretation Unit, who had in the meantime been briefed by the Production Section with details of the relevant ground information. The resulting interpretation report, with the ground information and photographs, were then passed to the Target Section for the production of target dossiers. This whole process could seldom be completed in less than several weeks, and in periods of bad weather and when new targets were very numerous, considerable delays were unavoidable. Special targets could be, and were, dealt with in a matter of days, but when it is realised that target material for each target ran into thousands of copies, the necessity of avoiding interference with the normal flow of this work can be appreciated.

PRODUCTION INTELLIGENCE IN PEACE-TIME

6. The proper study of the industries of foreign countries in peacetime should give a sound appreciation of what we are likely to meet in case of war. Much will depend upon the ability of Air Attaches to visit the factories and report upon the activities of the countries to which they are accredited, while representatives from our own industries, who make business trips abroad, should be called upon constantly to report their observations. The competitive nature of privately owned industries will in itself help to give us information, since firms will be only too anxious to advertise their activities and to tell prospective customers what they can produce. There is something to be said in this respect, for international competitions as a means of encouraging countries to show what they are making, but these will defeat their own object if all the major producers cannot be induced to enter, since we would merely be giving away our own developments.

7. However, every effort should be made to build up as complete a background as possible, from which to work should war break out.

PRODUCTION INTELLIGENCE IN WAR TIME

8. Although the advent of war removes the possibility of direct contact with the enemy's industries, many new sources of information become available, while others become intensified. The methods of assessing production rates are discussed later, but it should be mentioned here that they were largely based on works numbers and dates of manufacture, combined with the identification of factory call signs. The more important sources of information are as follows.

← SOURCES OF INFORMATION

← Agents' Reports

9. Reports from these sources varied a great deal in reliability and quantity in accordance with the part of Europe from which they were obtained. For example, intelligence on the German exploitation of the French aircraft industry was based very largely on agents' reports, which maintained a high standard of accuracy, while for the majority of the war, agents' reports from Italy were virtually non-existent. From within Germany, agents were reliable in respect of factory locations, but proved unreliable when they attempted to give output figures. This was to be expected, since the most elaborate precautions were taken in all factories to prevent leakage of information, even to the extent of segregating the various departments, and when contact was made with an individual factory hand, he would only know of the output of his own particular shop. "Hearsay" reports were usually unreliable, many of them being based on deliberately false information, and those which were genuine tended to give figures for daily output, which frequently suggested fantastic monthly rates.

10. Much useful information was obtained from agents in occupied countries, both about the Repair Organisation and in regard to the manufacture of components, some of which were wholly sub-contracted to factories in these countries. Nations occupied and forced to work by the enemy, must always offer scope for espionage, and although it may be impossible to get reliable information out of the enemy country, a sufficient amount of detail may be forthcoming from occupied territories to enable useful checks to be made of overall production as suggested by other sources.

11. Prisoner of War interrogation: P/W Interrogation has been the most prolific source of industrial intelligence, particularly during the last two years when increasing numbers of foreign workers, who have worked in Germany, have become available, and Allied offensives have produced a steady flow of prisoners.

12. To use this source of intelligence to the full, it is essential that interrogating officers be fully briefed with the type of information required by the various sections. A close liaison has existed between the Production and P/W Interrogation Sections, which was contributing to the Air Forces being provided with target material based on information of high reliability.

13. Crashed and captured aircraft: Examination of enemy aircraft is a valuable source of production intelligence as well as of technical information. The main production data to be obtained include: (a) name plates, (b) compass correction cards (c) engine data cards (d) four letter call signs.

This information was collected by technical inspection officers who undertook this duty in addition to their normal work. In the early days of the war, the importance of this source of information was not fully realised; later much valuable material was collected though the amount was restricted by a shortage of such technical officers. As a lesson for the future, it is important that these officers should be adequately briefed as to the type of information to be sought.

14. Captured documents: Documents from which production intelligence may be obtained fall mainly into two categories, namely (a) those to be found at G.A.F. stations and (b) those at factories. Until enemy territory was over-run such documents were rarely encountered and only in very few cases did German aircraft crashing in Allied territory contain documents of any value to production intelligence. However copies of enemy records obtained through agents provided information of the utmost value (see para. 30). Once the Allied advances began, documents were captured in increasing quantities, at first under category (a) and later, as factories were captured, under (b).

15. Aircraft log-books from the main source of production intelligence to be obtained from G.A.F. stations. These are of great value since they normally show the works numbers of the aircraft, the places and dates of manufacture and the four letter call signs. Other documents to be found at stations include records of aircraft handled, including works numbers and call signs.

16. From factories, it is possible to obtain details of material produced and output rates, and sub-contractors supplying, and recipients of, the goods made. Examination of records of aircraft factories in France and Belgium gave much valuable information about the dispersal of production in Germany.

17. Photographic Interpretation: Photographic Reconnaissance is an essential part of production Intelligence. Firstly as a means of confirming the existence of suspected factories, secondly as providing the target material for precision attack, and thirdly as a means of assessing the extent of damage after attacks have been made. There have been occasions when the first intimation of a probable factory has come from chance photographs. With regard to the assessment of damage to aircraft factories, experience showed that the greater caution should be exercised, since the function of buildings may have been mis-interpreted and work may be continuing in undamaged buildings of little apparent importance.

18. So far it has not been possible to assess rates of production from P.R. It is, however, possible at established factories to form some view of the intensity of activity from the number of aircraft present, and also to confirm the types being made or changes in type which are taking place. This calls for much more frequent cover than has normally been practicable, and may be misleading if unknown causes, such as weather, have interfered with the normal ferrying procedure, leading to an abnormal accumulation of aircraft on a factory airfield.

19. W/T Interception: The Germans adopted a system of allotting four letter call signs to aircraft during the manufacturing stage. Normally these call signs were in blocks of 26, in which the last letter ran in sequence from A to Z, while the first three letters remained constant. It was discovered early in the war that works numbers ran concurrently with the last letters of the blocks, thus if No. 1 had a call sign with last letter A, the call sign of No. 26 had last letter Z. So far as is known call signs were not used a second time, and although the principle is simple enough, it was not followed rigidly and many of the call sign blocks were never identified. The application of this type of information to estimating production is discussed later in paras. 33-34.

(vii) Air Attaches

20. Such useful information can be gained by Air Attaches in Neutral Countries. Both Switzerland and Sweden provided opportunities for indirect contacts with German industrialists who were constantly visiting those countries on business.

21. Air Attaches require to be fully briefed by the Production Section, both as to the extent of existing knowledge and the type of new information required.

(viii) Postal and Telegraph Censorship and Foreign Press

22. Normally there was little to be gained from these sources of intelligence. Occasionally extracts from letters confirmed the existence of factories, and some photographs from ^{illustrated periodicals} ~~papers such as "Signal"~~ gave something useful towards identifying factory activity. It is possible that an intensive study of the advertisements in enemy papers might have increased our knowledge of accessory manufacturers, but this is one of those lines of enquiry which would entail a great deal of work for a doubtful gain and, when man-power is a major consideration, would hardly be justified.

TREATMENT OF INTELLIGENCE(i) Method of Reception, Collation and System of Filing

23. ~~It has been found by experience that~~ An efficient method of registering and recording the receipt and disposal of documents is absolutely essential. Although the system of filing information should insure that all available intelligence on each subject or factory is readily obtainable from a single file, it is impossible completely to eliminate the necessity of referring to original documents. Suitable intake log-books should be kept, in which every document coming to the Section should be entered, together with its reference number and date, date of receipt, brief statement of subject and ultimate disposal. The vast majority of documents need to be ready by the Head of the Section, who passes them to the individual officers dealing with each subject concerned, whose duty it is to see that necessary extracts are taken for entering in the filing system. Eventually documents which are to be retained in the Section should be filed in chronological order for ease of future reference. ~~It is also important that officers should see that reports which might interest other Sections are passed to them before final disposal.~~

24. The "System" of filing should be so organised that each subject

or factory is allotted a separate file, into which all relevant matter is entered. Since it is essential that all such files be kept up-to-date, considerable importance attaches to speed in completing this filing, and it has been found absolutely indispensable that typists be attached to the Section for taking extracts for the files. Under war conditions, when information is required at short notice, it is not satisfactory to rely on a typing pool which must handle the work of many sections with consequent unavoidable delays. The latest reports are probably the most important, and since most enquiries are received by telephone, the files must not leave the Section. It may appear that undue stress is being laid on this point, but it has been found by experience that it is one of great importance.

25. The files of the "System" should be divided into several sections, namely:-

1. General intelligence by factories
2. Photographic intelligence by factories.
3. Special files such as Production (General), Firms (General),

etc. while each of these Sections should be divided as to:

- (i) airframes
- (ii) aero-engines
- (iii) accessories
- (iv) aircraft repairs
- (v) aero-engine repairs
- (vi) underground plants.

It was also found desirable to divide the work between countries, since the detailed study of the German aircraft industry, which for several years incorporated the industries of many occupied countries, called for distinct working parties within the Section.

(id) Liaison with other branches and Ministries

u. 2. The ideal to be aimed at in Production Intelligence should be the independent assessment of output rates, which should then be linked up with estimates of strength, wastage and reserves to give an overall picture of the enemy's present and future potentialities. Unfortunately, the information normally available did not allow of this being achieved. It was possible at times to be reasonably accurate about the output of some of the factories, but to obtain the overall picture it was frequently necessary to be influenced by Order of Battle information. To this end, therefore, a close liaison was

established with the Order of Battle Section, and estimates of actual production were made jointly by the two Sections.

27. At the same time, liaison was required with other Ministries, in particular those dealing with Economic Warfare and our own aircraft production.

28. M.E.W. were officially responsible for the overall study of enemy industries, and although they accepted Air Ministry estimates of aircraft production, they were always the authorities on subjects such as capacity, man-power, supplies of raw materials and the overall industrial picture. It should be appreciated that, for this reason, the activities of the Air Ministry Production Section were intentionally limited to the estimation of actual production achieved and the preparation of target programmes for attacking the aircraft industry.

29. ^{The Ministry of Aircraft Production}
~~was~~ provided useful information on our own production problems, which enabled comparisons to be made and probable German achievements to be assessed. Much of this work was done in collaboration with M.E.W.

^{C/S}
 (111) Methods of assessing production →

← Aircraft
 Agents Reports Etc
 30. Methods of assessing output rates of new aircraft vary considerably with the type of evidence available. For example, it was possible to get, from time to time, the official figures for production of German aircraft in France, and from Poland details of production of certain components, which helped towards our estimates for the types concerned. On the whole, however, estimates of production in Germany were based on aircraft works numbers and manufacturing dates, from which it was possible to assess the numbers of aircraft made in given periods. // ^{31. Works Numbers}
 The most satisfactory method of arriving at monthly rates is to plot graphs of the works numbers against the dates of manufacture, and the resulting curves give average rates, provided the aircraft were numbered in sequence. From the Production Section's point of view, therefore, the collection and recording of works numbers is an essential function, which calls for the co-operation of ^{Technical Intelligence} officers in the field, who inspect crashed aircraft and collect all relevant name plates. There are, however, many difficulties, each of which increased the possible margin of error in arriving at production estimates.

32. Output figures are required monthly, as soon after the end of each month as possible. Even in the most intensive operations, an air force

does not turn over its strength in much less than three months, and it will be seen, therefore, that on an average an aircraft would be already at least three months old when it fell into our hands, and the evidence derived purely from aircraft must normally be several months in arrears. Nevertheless, for an industry that is producing steadily on mass production principles, this time lag would not be of serious consequence, but once any marked changes take place, such as rapid increases or decreases in production rates, it must be some months before these changes become apparent, months which are vital from the operational planning point of view. It is necessary, therefore, to incorporate other information in an attempt to produce up-to-date figures.

In this respect W/T interception plays a big part.

33. Value of W/T Service

(fighter types excluded)

It is possible to follow many aircraft during their test or delivery flights by means of W/T interception, and to form reasonably accurate and up-to-date assessments of current production rates. There are, of course, great fluctuations in the amount and reliability of this type of intelligence. For example, identifications of a particular type at a known factory are not so frequent that a sudden cessation can be accepted as indicating no production. Therefore, it ^{usually} ~~always~~ takes some months before type changes can be positively confirmed, ^{and} the position is further complicated when a factory is attacked. Unfortunately single-engined aircraft are not usually fitted with W/T.

34. It will be appreciated that the call signs themselves do not identify the aircraft types, and in many cases cannot be identified with a specific factory. However, there are usually some aircraft in each block of call signs which ^{show} ~~show~~ recognizable characteristics, which enable the type to be deduced. Likewise, it is ^{usually} ~~impossible~~ ^{fairly difficult} through W/T to tie up the call signs with aircraft works numbers, and it is essential, therefore, for crash inspection officers to attempt to identify call signs and works numbers of enemy aircraft.

35. Data Cards etc

Aircraft usually carry in the cockpit, both compass correction and engine data cards. The Germans normally showed the works numbers and four letter call signs on the latter cards, while in fairly new aircraft the date on the compass card would give the approximate manufacturing date, provided it was the date of the first swinging of the compass. By noting the names of the individuals signing the cards, it was possible to identify those who were employed at the assembly factories, and who only dealt with new aircraft. Cards signed by these individuals usually supplied approximate manufacturing dates.

Summary

36. Thus from time to time, single aircraft were identified with their works numbers, call signs and dates, which provided basic points for graphs. By degrees intermediate points were filled in and patterns emerged from which it was possible to assess average production over a period of months. Sometimes the evidence was strong enough to deduce monthly fluctuations, but normally nothing better than averages could be given.

(b) Aircraft components
Makers Name Plates Etc.

37. The assessment of output rates for components also is largely based on works numbers and dates, and in the case of the G.A.F., could only be achieved for a few types, and for a few factories making these types. The data for these assessments came almost exclusively from name-plates, which as the war continued and the enemy became increasingly security conscious, became less and less informative.

38. However, some information must be shown on aircraft components for the information of maintenance units, who require to know the manufacturers of all parts, for obtaining replacements or for returning those which may prove faulty. Furthermore, parts must be passed by inspectors before they are used, and by noting the stamps, types of plates and codes used, it is often possible to identify factories making airframe components.

Need for careful study and collection

39. The study of name-plates calls for great detail and the careful collection and filing of the plates in separate packets for each aircraft. It is extremely difficult to prevent private manufacturers from putting their names and addresses on their products, and indeed in peace time it would be injurious to their interests to expect them not to do so. It takes time to introduce war time controls and it is during the early months of a war that the most vital basic information can be obtained, after which it is possible to follow changes as they occur.

40. Each name plate should be clearly marked on the back with the works number and type of the aircraft and the component from which it was taken, at the time of collection. All the plates from each aircraft should be placed in a single packet marked with aircraft type and number, four letter call sign, and place and date of collection.

Name Plates from the Far East:

41. In the Far East the collection of name-plates has been fully developed, and they constitute the main source of production intelligence.

The Germans, however, have never been so informative on their plates as the Japanese; nevertheless, the principle remains the same, and as many plates as

possible should be collected from each aircraft. As time goes on it should be possible to discard many types of plates which obviously will not be helpful.

← (of) Aero-engines

42. Works numbers and manufacturing dates also form the basis of production estimates. Neither the Germans nor ourselves have made it a practice to put dates on engine name-plates, and although many of the plates have been collected from German engines, it has been practically impossible to produce any reliable estimates. Engine log-books have been virtually the only source of manufacturing dates, and these were never obtained in sufficient quantity to give even an overall cover of the production of one type. However, works numbers should be recorded, and the sizes of the various bands should indicate the relative importance of each factory. As in the case of airframe plates, it is important to collect them from the beginning when they are likely to show manufacturers names and factories concerned.

(2) Miscellaneous
Difficulties of Accurate Production Assessment

43. The value of log-books has already been mentioned. Since these documents are not supposed to be taken into the air, they do not normally become available until enemy airfields or factories are captured, and it is not usual for any attempt to be made to code the information they contain.

44. Factory Code System
 Towards the end of the war, the Germans introduced a letter code for armament factories and latterly these codes were replacing names and addresses in log-books. However we were able to read some of these codes since many of the inspectors' stamps remained the same and comparison with earlier log-books left little doubt as to the factories concerned.

45. Gaps in Works Number Bands
 The estimating of production of aircraft is greatly complicated by the introduction of gaps in the number band sequences. Only a scant sample of each band can be picked up, and when it is known that such gaps are occurring, the difficulty of assessing the number of aircraft represented by a given range of numbers can be appreciated. Prior to 1943, the only gaps which appear to have occurred embraced clear hundreds or coincided with changes in sub-type, when fresh starts were made at round numbers. During the last two years, however, indiscriminate gaps were introduced, and we had to use diverse means of approximating the gaps. Many of these approximations were later proved to be wrong, as numbers were received within the gaps concerned, and past estimates were found to have been incorrect.

Monthly Revision of Production Estimates - 162 -

46. Nevertheless, in order to provide the best up-to-date estimates, such approximations have to be made, but it should always be made clear that error is to be expected, ^{it is essential that} and retrospective revisions should form a part of each monthly production paper. It will be found that with an industry in which several assembly factories are making each type of aircraft, up-to-date information cannot be expected for each factory every month. Many of the estimates will be based on past figures, and when it becomes clear that these require revision, previous months' estimates may be affected. Recipients of the monthly papers should be informed of the difficulties and left in no doubt of the necessity and reasons for such retrospective revisions.

DISSEMINATION OF INTELLIGENCE

47. During war, information from the Production Section is required by a variety of customers. To meet all requirements intelligence was disseminated by the following means:-

(i) Monthly Reports

48. Reports were issued monthly, each giving a schedule of estimated output for the previous month, together with descriptive summaries of any new intelligence which might affect targets or future plans. These reports had a wide circulation in which the branches providing intelligence were included, and therefore, besides their value for giving information to operational sections and commands, they served the purpose of briefing these other intelligence sources.

(ii) Periodical special reports

49. More detailed reports on special subjects (e.g. single-engined fighter production) were issued from time to time. These were intended to provide overall pictures of particular branches of the aircraft industry for target information, and, although the monthly reports were used as a means of keeping our customers up to date, these special reports gave much greater scope for detail.

(iii) The "Jockey" Committee

50. When in the summer of 1943, the German Fighter Industry became the first priority for strategic attack, the "Jockey" Committee was formed as a means of bringing Intelligence and Commands together to discuss the progress of the operations. The Committee met weekly from June 1943 to April 1945, and it afforded a model of how cooperation between all interested parties can be effected.

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51. In the Spring of 1943, a series of schedules were drawn up of all the targets to be included for attack by both heavy and medium bombers, and as the operation progressed, it was the duty of the committee to assess the status of each target attacked, to add new targets and to assess the priorities within the schedules.

52. A weekly signal was sent to the Commands concerned, showing targets suspended on account of damage, targets sufficiently repaired to justify further attack, and new targets to be added to the schedules. A separate priority list was also issued dealing with targets for attack by the heavy bombers, together with suggestions for the tons associated with the aircraft industry for area bombardment.

53. The findings of the "Jockey" Committee provided the basis for target selection by the Strategic Bomber Forces, and also to some extent by the Tactical Air Forces in the U.K. The informal nature of the proceedings enabled representatives from the Commands to discuss available intelligence and to agree with the conclusions formed. It was also arranged that daily contact could be made between the various members, so that vital intelligence need not be held up until the next full meeting.

~~(iv)~~ Schedules of factories

54. Schedules of factories, and regular amendments, were prepared for general information, and in particular for the use of the various bodies charged with the control and disarmament of the aircraft industry at the termination of hostilities.

COMMENTS AND SUGGESTIONS

Increasing Unreliability of Certain Production Estimates

55. Official German documents have shown that our estimates of production rates for certain types, in particular S.E.Fs, became increasingly unreliable after the middle of 1943. There can be no doubt that this was primarily due to security measures in regard to aircraft numbering introduced by the Germans at that time. The methods of arriving at these estimates, which have already been described, depended on our catching a reasonable sample of the numbers or call signs of all types of aircraft, and as long as the numbers were used in sequence, the estimates were fairly accurate. When these methods were first introduced in 1942, our information was reasonably adequate, and our faith in, and dependence on them became possibly too great; ^{in course of time} ~~while~~ the older methods were allowed to sink into the background and were never given the attention which might have been helpful to us at the later stage, when our newer methods were

becoming less reliable. That this was inevitable on account of the man-power situation, does not detract from the necessity of considering what should be aimed at as an ideal.

Integration between Production, 'Y' and Order of Battle Sections.

56. A further factor in the under-estimation of German fighter production during 1944 was that, in face of the P/R damage assessment reports and uncertainty as to the extent to which the aircraft industry had been and was in process of being dispersed, the works number evidence was not able to be accepted although pointing to a higher level of production. Due to the initial under-estimate, the expansion which occurred during the year could not be properly assessed, while an additional factor concealing the actual output was the absence of any commensurate increase in fighter Order of Battle strength. Such cases emphasise still further the need for constant revision of productive estimates as indicated in para. 46.

57-58. A number of sections were interested in call signs and works numbers, and each recorded them for their own particular purposes. It is probable that by having a central recording section, sufficient man-power could have been released to enable the other sections to concentrate more closely on their own interests. At the same time the estimating of production rates should be separated within the Production Section from the locating of factories for target purposes. In fact it would probably prove most successful if a joint working party could be formed with personnel from both the Production and Order of Battle Sections, whose sole function would be to arrive at estimates for production rates and wastage.

58. ← Liaison with M.E.W. & M.A.P.

↓ It would then be possible for the Production Section to make independent studies of production capacities, in conjunction with the other Ministries, such as Economic Warfare and Aircraft Production, who could help with the required data and statistics about the R.A.F. Such cooperation was intended when the Production Section was first formed, but for various reasons it was never very practicable, and once we became involved in the attack on the G.A.F., and the factories concerned were subjected to attacks, studies of that sort were no longer possible. However, they could have helped materially in assessing the capacities of known installations prior to attacks, and, by giving a better knowledge of our own difficulties under attack, and enforced dispersal, might have given us an idea of what the Germans were likely to achieve in similar circumstances. Even so, it is doubtful if anything could have prepared us for /the

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the astounding expansion which did take place in German S.E.F. production despite all their difficulties.

Inaccuracy of Fighter Production Estimates

59. The extent to which our estimates of S.E.F. production fell short of the actual output, raises the question of the real value of such estimates. The main difficulties arose from the facts that we had far fewer works numbers in proportion to the actual numbers of aircraft for S.E.F.'s than for other types of aircraft, and also that though P.R.U. was successful in locating many dispersal factories, it could not always furnish evidence of their activity. At the time of the most intense series of attacks on the industry, much time was devoted to assessing the effects of the attacks in terms of production lost, etc., and it is clear that we underrated the Germans' ability to make good such lost production. Since, however, estimates of both present and future strengths of the G.A.F. were arrived at independently of the production rates^x, it is possible that a much broader assessment of production would have answered the purpose. Although our assessments were found to be largely inaccurate, our experience should be valuable for future work, especially if it will show that a purely mathematical approach to the problem based on insufficient 'sample' of works numbers etc. will seldom give an accurate answer.

Prime functions of Production Section

60. By far the most important function of the Production Section should be to establish the structure of the industry, to locate the factories, to assess their target value and discover potential bottle necks; it should be to these ends that the majority of the Section's resources be directed. To do this adequately for all countries in the world, in addition to preparing estimates of their aircraft and aero-engine output, proved impossible, for not only did its commitments cover the Axis Countries but also the Occupied Countries whose contribution was by no means negligible, as well as the Neutrals. We were fortunate in being able to hand over to Washington the entire researches into the Japanese industry but not before these had absorbed a considerable amount /of

Note: The reasons for this were:-

1. Time-lag in production estimates.
2. Increasing discrepancy between factual Order of Battle Intelligence and Production Estimates.
3. The direct and indirect effects of current and future Allied bombing strategy on aircraft production had to be taken into account in estimating future G.A.F. strength.

of work which would more usefully have been employed on Germany.

6182. Experience indicates that should a state of war exist between this country and any other major power or combination of such powers, the Production Section should be responsible for research into such country or countries alone, and work concerning other countries should be diverted to another section. The disadvantages of increasing the commitments were brought out when in 1944 the Flying Bombs, and later the Rockets were allowed to divert the attention of a part of the Production Section away from the Aircraft Industry, a disadvantage that was accentuated by the fact that the nature of, at any rate, the Rocket, was dissimilar to that of aircraft. The result was a serious break in the continuity of the Section's normal work which was felt for some months when we had to revert to it later in the year.

6183. Conclusion.

↓. On the whole it can be claimed that the Production Section acquitted itself well despite the difficulties arising from limited man-power and the considerable fluctuations in the volume of reliable intelligence on which to work; in particular the lack of sufficient factual information was a constant source of difficulty. To function efficiently not only in peace-time when much of the information available in war-time would naturally not be available, but also in any future war it would be essential for the closest liaison to exist between the Intelligence Section of the Air Ministry concerned with production and any body created for the study of economic intelligence, and during war-time to ensure the fullest supply of all forms of raw intelligence, however secret, collected by properly organised and fully briefed field teams.

A.I.2(a)

AIR MINISTRY INTELLIGENCE IN WARPART III : CHAPTER 12A.I.3c(1)PREPARATION OF TARGET MATERIALHISTORICAL

1. The object of this publication being primarily to place in the hands of future permanent Staff Intelligence Officers a guide for further work of this nature based upon the experience gained during the War, it is not intended to detail at any length the many reorganisations of the Target Intelligence Section which took place in the early part of the War up to about 1941, except to say that starting from 1936, the sections responsible were known as A.I.1(b) and A.I.9, and they were located at Whitehall, Northside (Ivor, Bucks), and Hillside (High Wycombe, Bucks). An interesting and full report on some of this earlier history exists in the form of a report ~~prepared by Capt. Dawson of Hillside and is~~ available in the A.I.3c(1) library. ~~handed over at the end of the War.~~
2. From 1941 until the end of the War the responsibility of preparing all Operational Target Material used both by the R.A.F. and U.S.A.A.F., operating from British bases, was vested in A.I.3c(1), ~~who were~~ located at Lansdowne House, Berkeley Square, until those premises were rendered uninhabitable due to a Flying Bomb in August 1944, and thereafter at Ashley Gardens, Victoria, S.W.1.
3. Two developments which occurred during the War which had a fundamental effect on the preparation and form of target material were firstly, the gradual growth of the Ministry of Economic Warfare over the years, and secondly, the arrival of the United States Army Air Forces in this country in 1942. By the former, an additional valuable source of information on the economic and industrial value of targets was gradually made available, and, as a result of the development of daylight ~~precision~~ bombing by the latter, much more detailed target material was required.
4. It has also to be remembered that the strength of the R.A.F. was continually increasing throughout the War and although a great deal of the effort of that force was devoted to area bombing by night, nevertheless a large number of precision targets were attacked both by day and by night, more particularly towards the end of the War.
5. The form and content of Target Material was varied and improved continuously during the course of the War, and the 1945 product bore very little resemblance to that being used in 1939. This was natural since as experience was gained in operations, tactics were altered and, as a result, target material had to be amended to suit.
6. Target Intelligence differs from many other forms of basic intelligence in that it has to be extremely closely allied to operations - it is in fact one of the most important and direct bridges between Intelligence and Operations. It is the duty of a Target Intelligence Department to be continually aware up to the moment of what Intelligence knows and what Operations require and to marry the two.

7. The experience gained by A.I.3c(1) in the European War was also applied to the Far East War, by having representatives of the Section serving in responsible capacities on the Joint Target Group, the corresponding body in Washington preparing basic target material for the Far East War.

The form and content of the material produced by that body followed very closely indeed that produced by A.I.3c(1) for the European War.

DEFINITION OF STRATEGIC AND TACTICAL TARGETS.

8. As a very large amount of target material was prepared for the immediate military targets for attack by light and medium bombers in support of ground operations, as well as for long term strategic targets for attack by heavy bomber forces, and as the procedure adopted in its preparation, as well as the final material itself, ~~was~~ quite different in form for the two purposes, it appears advisable at the outset to define what is meant in these notes by the terms Strategic and Tactical Targets.

9. Strategic Targets are those selected primarily for attack by Heavy Bomber Forces; they comprise principally large key manufacturing or industrial establishments in the enemy's economic system primarily used to produce either directly or indirectly the weapons of War, the elimination of which would deprive him of the ability to keep his fighting forces supplied and, hence, eventually force him to lay down his arms and sue for peace:-

These may be grouped in four classes as follows :-

- (a) Finished Products such as Aircraft, Armaments (Tanks, Guns etc.) Naval Vessels, Submarines, Long Range Missiles, etc. etc.
- (b) Accessories or Components such as Aero Engines, Marine Engines, Ball Bearings, Ignition Apparatus, Chemicals, Explosives, Radio and Radar Equipment, etc. etc.
- (c) Production Process Equipment such as Machine Tools, Jigs, Electric Power, Transportation, etc. etc.
- (d) Raw Materials such as Steel, Oil, Aluminium, etc. etc.

These are all 'Long Term' targets, the impact of the destruction of which will not be felt immediately in the front line strength due to accumulated stocks and 'pipeline' effect.

10. Tactical Targets are those selected primarily for attack by Medium or Light Bomber Forces or Fighter Bombers in support of ground operations; they comprise targets which assume temporary importance as a result of their relation to the form and area of the immediate military operations in progress. They include such objectives as Airfields, all forms of Transportation (such as Rail Junctions, Bridges, etc.) Headquarters and Camps, Ammunition and Fuel Dumps, Coastal Defences, etc. etc.

These are 'Short Term' targets, the impact of the destruction of which will have an immediate effect on the course of the battle.

11. It will be appreciated that there is necessarily an overlap between these two forms of targets, and, just as in emergencies Heavy Bomber Forces may be called upon to attack Tactical Targets, so, conversely, Medium Bombers may, on occasions, be employed to attack Strategic Targets. There are cases where both types of forces may be employed to attack the same general target system, and transportation as a good example of this. For example, in order to disrupt the enemy's supplies to his front line troops it has often been necessary to employ Heavy Bomber Forces to destroy large marshalling yards and large railway installations, etc. well behind the lines, these being primarily Strategic Targets and calling for a large scale heavy bomber effort to be effective, whilst the Medium Bombers have been employed in destroying bridges, etc. on the inter-connecting lines between such marshalling yards and the front line itself, these being essentially Tactical Targets.

12. There are also special types of targets which are in a class of their own, such, for example, as the Bomber Command attacks on the Ruhr Dams for which very special weapons were developed, and very special training given to the air crews taking part. There are also special cases of great emergency in which all Forces are employed irrespective of type such, for example, as the attempts to sink the Scharnhorst, and Gneisenau, during their escape from Brest, attacks on the Bismarck, etc.

PLANNING, DIRECTIVES ETC.

13. The reading of the more detailed matter in the subsequent parts of this ~~Chapter of the Handbook~~ will be assisted if a brief note is given here to show how the Target Section fitted into the general bombing organisation, whence it received its instructions, and how it arranged its priorities for the production of the material.

14. Genealogically the section - A.I.3c(1) - came under D.D.I.S., who was under D. of I. (O)*, who was directly under A.C.A.S.(I). However, during the War, and in view of the operational importance and urgency of the work, A.I.3c(1) were given permission by ~~D. of I. (O) with A.C.A.S.(I)'s agreement~~, to make and maintain the closest possible direct contact with the other Directorates and Commands, save only in respect of high policy matters which, of course, had to, and did always, pass through the proper channels.

15. The work of the section was not limited merely to the preparation and issue of bulk supplies of finished target material to stations for a given list of targets, but also included much preparatory and advisory work in developing plans and directives.

16. Directives to Commands for Bombing Operations were issued by the Air Staff under the signature of the C.A.S. or the V.C.A.S., as a result of advice and recommendations put before them by A.C.A.S.(Ops.) and D.B.Ops. who in turn, may have received the suggestions in this connection from other service Ministries such as the Admiralty or War Office or civilian Ministries such as the Ministry of Economic Warfare, or from their own Air Intelligence.

* Note: See Chapter 1, Appendices "B-E".

17. The part which A.I.3c(1) played in this process may perhaps be most simply shown by considering a typical hypothetical case. Suppose for example, that M.E.W. should consider at a particular time that, say, Aluminium was a very vital raw material in which the enemy is in short supply and that a further reduction by bombing of his already attenuated supplies might render his position critical, and reduce his production of vital weapons to such an extent that it would force an issue and bring the War to an end. If they considered the case strong enough, they would prepare and submit a detailed paper to the Air Ministry on all economic aspects of the subject.

This paper on receipt by Air Ministry would probably be forwarded back to A.C.A.S.(Ops.) and D.B.Ops. for study and report on operational possibility of effecting the destruction required. It would enable D.B.Ops. and his staff to consider these special factors he needed far more information than the name and location of the plants concerned. He would want to know for each plant its exact location, its size, its appearance, the construction of the buildings, its proximity to landmarks, smoke screens, defended areas, need for re-attack, etc. etc.; in other words he would want detailed target material on the subject. Supposing that these were not available, then he would call upon the target section to prepare preliminary data in single copy covering all these points. A.I.3c(1) would then proceed to obtain the necessary photographs and particulars, and produce in original form detailed target folders on these plants.

18. Now the preparation of single copy 'study' material is very different from the full preparation, printing and distribution down to station of bulk supplies of the material required for operation - and whilst the latter is more or less a mechanical procedure once the necessary intelligence data is available, it takes time both of the Target Officer himself and the production centres. Therefore, by their constant contacts with the Directorate of Bombing Operations, A.I.3c(1) kept closely in touch with the matter at this stage and, as soon as there was any indication that the Air Staff might issue a directive shortly, then they at once put the bulk material in hand so that it was readily available at stations when the Commander-in-Chief's Operational Orders for attack were issued. It is important to mention that there was such a constant heavy load on the Target Section during the War, that there was never time to produce full material at random on all targets which were mentioned at any time, and it was therefore necessary to keep the closest possible contact with D.B.Ops. and the Commands themselves etc. in order to conserve all efforts to produce only the right material in the right order.

At all the major high level conferences which were held (the Combined Staffs during the war to determine broad strategy, Casablanca, Quebec, etc.) representatives of Planners, Intelligence and Operations were in attendance; prior to those conferences A.I.3c(1) along with many other intelligence sections were called upon to provide much basic target data for the discussions. This "pre-operation" information again proved of inestimable value to A.I.3c(1) in planning the work and priority of target material which would be required; it also helped the security problem greatly by making it possible judiciously to jumble up the target systems by

by sandwiching them, and thus give no appearance of any specific plan to those who might be handling the production end. At the same time it ensured that the material was ready in good time.

21. Bomb Target Committee. Up to about March 1944, a fortnightly conference took place in Air Ministry under the chairmanship of D.B. Ops. and known as the Bomb Target Committee of which A.I.3c(1) was a member. Those taking part regularly comprised Senior representatives of R.A.F. Commands, of U.S.S.T.A.F.* American VIIIth Air Force, the Admiralty, War Office, Ministry of Economic Warfare, and occasionally depending upon the matters to be discussed - representatives from other Air Intelligence or Service Departments. At these meetings target systems, special targets and operational factors were fully discussed, and the meetings were invaluable to A.I.3c(1) in ordering their work.

22. Attack on G.A.F. One of the first Target Systems comprehensively and heavily attacked was the German Air Force, consisting of attacks on main Aircraft Assembly Plants, Component Plants, Aero Engine Plants, Repair and Training establishments and Airfields, etc. The targets were split up for attack by Heavy Bomber Daylight Precision attack, Heavy Bomber Night attack, Medium Bomber attack and Fighter and Fighter Bomber Sweeps, the division being made according to the range and bomb carrying capacities of the various forces and the nature and size of the various installations. Attached to the directive were schedules of targets in their various classes, running into dozens of pages, and these were prepared and kept continuously up to date by A.I.3c(1), no less than twenty major revisions being necessary during the course of the complete operation, due to constant new intelligence becoming available which caused some targets to be eliminated and others added.

23. Jockey Committee. This committee, set up under D. of I.(0) to co-ordinate intelligence for the attack on German aircraft industry met weekly and was attended by the various air intelligence representatives such as A.I.3(b) (German Air Force Force and Battle Order), A.I.2(a) (German Aircraft Industry), A.I.2(b) (Airfield Section), A.I.3(e) (Equipment and Training etc.), A.I.3(c)1 (Target Intelligence), A.I.3(c)2 (Bomb Damage Assessment) etc., as well as representatives of the Planning bodies such as D.B.Ops. sections of U.S.S.T.A.F. and senior Intelligence Officers from the R.A.F. Commands, VIIIth and ~~IXth~~ American Air Forces, and sometimes ~~IXth~~ 15th American Air Force (M.A.A.F.).

24. From the combined intelligence resources of these various expert bodies the enemy's current situation and reaction to the bombing attacks was reviewed weekly; not only were certain targets deleted and others added, but the current priority of all targets in each class was determined, and at the conclusion of the meeting a top secret signal (known as the Jockey Signal) was issued giving all these priorities for the guidance of day-to-day planners at the various headquarters.

25. Working Committees. About the middle of 1944, other target systems came under attack as is well known, such as Oil, Transportation and Ordnance Depots. For each of these systems a separate Working Committee was set up, which met weekly to carry out work on their respective systems such as described in the previous paragraph for the German Air Force. The composition of the Committees varied in each case in the matter of the experts. Thus in the case of Transportation there were representatives of A.I.3(e) (Air Intelligence Transportation Sub Section)**, Directorate of Transportation at the War Office, Railway Research Service, Transportation

* United States Strategic and Tactical Air Forces, equivalent in status to Air Ministry.

** Note: See Chapter 11 (ii)

Section of M.F.W. etc. Naturally A.I.3c(1) had a representative on every committee, since target material was required for them all. Experts on Bomb Damage and Photo-Interpretation also attended all the committees.

26. Combined Targets Selection Committee. When the air forces became of such size as to be able to attack more than one system at the same time, a small, high level, overriding body had to be set up known as the Combined Targets Selection Committee, whose main duty was to adjudicate on the priorities to be given to the various systems from week to week. For this purpose they used the reports and recommendations of the several Working Committees already described.

27. Tactical Targets. ~~These notes would not be complete without some reference to the Tactical Target situation.~~ The selection, several months before the Invasion, of the targets for which material was required, was determined from many conferences which A.I.3c(1) held with all interested parties such as Tactical Air Forces, A.E.A.F., S.H.A.E.F. 21 Army Group, etc. etc.

28. In the period D-21 up to D Day a series of almost daily conferences were held at A.E.A.F.H.Q. at Stanmore with representatives of all Air and Ground forces present, during which time the complete series of targets to be attacked right from D-14 to D +4 were agreed upon both in relation to the exact time of attack, and the forces to be allocated to each. A.I.3c(1) representatives were in continuous attendance at these conferences, and had to prepare for the use of all air forces a comprehensive index showing complete target particulars and reference of each objective to be attacked.

29. Liaison. These notes ~~will, it is hoped~~ have given an indication of the way in which A.I.3c(1) fitted into the general bomb planning organisation. Quite apart from these specific committees etc., A.I.3c(1) maintained a weekly personal contact with Command Headquarters (Bomber, Fighter, Coastal, ~~VIIIC~~ A.A.F. etc. etc.) with whom, throughout the week they were in almost hourly contact by scrambler telephone. They were also called upon to attend hundreds of special meetings with D.B.Ops., and many other planners. This question of liaison is also dealt with under paras. 79-103 and Appendix D of this ~~section of the handbook.~~
Chapter.

30. The most important lesson to be learnt from it all for use in the future is to realise that a Target Intelligence Section is not a watertight compartment which can be run from an office. It needs continuous contact (preferably personal) with all interested parties on the Intelligence, Operational and Planning sides; thereby it must ensure that those bodies themselves will keep the target sections fully informed of all projected operations (with due allowance for security), and that the target section always has a representative present at all meetings at which matters are to be discussed which will ultimately call for the preparation of Target Material. In other words, the Target Section must always ensure that it is kept in the picture as otherwise its products will be useless.

SOURCES OF INFORMATION

31. In order to prepare detailed target material on several thousands of targets, and have it readily available on several thousands more in case they became important, a very great number of sources of information were tapped.

SOURCES OF INFORMATION (Cont'd)

It appears that this may be considered most conveniently here under three headings as follows :-

- (a) Raw intelligence material automatically flowing in regularly to the section.
- (b) Digested and collated intelligence reports from various departments, also automatically flowing in regularly to the sections.
- (c) Specialist Sources of intelligence tapped as and when required on specific targets or studies.

32. Filing System. Before describing these in any detail, it is as well to mention briefly the filing system used to handle the great mass of intelligence which was received. This again was divided broadly under three headings namely :-

- (a) Individual Working Files for each target. Several thousands of targets were logged and allocated the necessary reference numbers. These included all important enemy installations of all types, irrespective of whether they were on current operational directives or not. Any information or scrap of intelligence received in connection with any one of these targets was filed in the working folder for the target concerned. Individually these items, which might only be a hazy reference in a two-line extract or intercept, might appear at first sight to be of little value, but collectively they enabled the mosaic gradually to be pieced together to give the whole story about the target. The files were, of course, grouped geographically, and separate sub-sections dealt with different countries as shown more fully in para.110.
- (b) Target System or Category Files under industries such as Oil, Steel, Aircraft, Chemicals, Submarines, etc., in which were filed all reports or data dealing with a given Category or Classification of Targets. These files were invaluable in keeping up to date the relative importance and priority of each class of target - information so frequently required for the preparatory and advisory work which A.I.3c(1) were called upon to do in connection with preparation of directives, planning, etc. etc. In these files priority lists of targets in each class were kept and maintained up to date. The important point here, again, was that this information had to be kept up to date for all classes of targets and not just those on the current directives.
- (c) Correspondence and Informants Files, separate for each individual or organisation concerned. Frequently one had occasion to re-establish contact with an informant some two or three years after the original contact, if it was felt that he could give information on some new aspect of a problem in connection with which he was known to have knowledge.

These three groups of files relate solely to the handling of intelligence material. There were of course many other files dealing with correspondence with Planners, Commands, Headquarters, Production Centres and many other subjects.

83. Raw Intelligence Material. Turning now to the Raw Intelligence which flowed into the section automatically and continuously, there were six main sources as follows :-

- (a) PHOTOGRAPHIC INTERPRETATION REPORTS prepared by C.I.U. (Central Interpretation Unit) at R.A.F. Station, Medmenham*. ~~From the aspect of preparation of Target Material their contribution was truly magnificent, and the astounding amount of intelligence which the many P.I. officers concerned extracted from photographs was quite outstanding.~~ The regular reports of greatest value to A.I.3c(1) were probably the D section reports (Industry), F section reports (Transportation), K section reports (Damage Assessment) and the Aircraft and Airfield Section Reports, though many other reports from other specialist sections were of very great value, as for example the Z section reports of flying Bomb sites, etc. A.I.3c(1) with its close liaison with M.E.W. and many civilian industrial organisations, acted on very many occasions as a link with C.I.U. and brought together the expert photographic interpreter and the expert industrialist with very satisfactory results. Apart from the regular reports received, A.I.3c(1) were in daily or hourly touch with C.I.U. asking for checks from P.I. sources of intelligence received from other sources, and throughout the whole war the highest possible degree of co-operation was always received. In war - and in peace - a Target Section must work hand in glove with the Photographic Interpretation Section and enormous mutual benefit will result.
- (b) AGENTS REPORTS. These proved of great value in often fitting in a vital link in a chain of evidence. As was natural from the sources involved, quite a lot of the data was useless and sometimes very old or inaccurate, but it proved well worth while going through each report to separate the chaff from the grain, for when a really valuable piece of information turned up it proved to be of inestimable value. Here again the varying requirements and interests of A.I.3c(1) were made known, and many enquiries instituted which often were successfully answered.
- (c) HEADWORKER OF PLANT INTERROGATION REPORTS issued by A.D.I.(K). These reports were of a very high standard and ~~the enormous trouble and painstaking by the Interrogators enabled information to be obtained which could not be seen from Photographic Interpretation.~~ However A.D.I.(K) could ^{had} not control ^{over the} ~~interrogations~~ ^{about which} plants they obtained information ~~about~~, since ~~this depended entirely upon what plants the P.O.W. was familiar with.~~ Experience soon showed that not only could A.I.3c(1) obtain much useful data from A.D.I.(K) but, conversely, A.D.I.(K) would extract more information from their informants, the more they knew about the plant in the first instance from A.I.3c(1). As a result, A.I.3c(1) made available to A.D.I.(K) an office in their block which was used exclusively for interrogation ^{of civilian subjects} and the whole of the accumulated records of A.I.3c(1) and the experience and knowledge of the A.I.3c(1) Target Officers were made available to A.D.I.(K) both before, during and after an actual interrogation. A.D.I.(K) were thus automatically made aware of the constantly changing interests of A.I.3c(1) and sought out the appropriate sources and information.

The presence of
refugee informant
who happened to
become available
for interrogation

36. Specialist Sources. The other important aspect, as mentioned in paragraph 31, is the sources which were tapped when it was required to gain information on specific problems in connection with the immediate target programme. The sources mentioned under paragraphs 33 - 35 were also fully used in this connection but in addition to these, some of the other sources were as set out below, though the list is not by any means claimed to be exhaustive:-

- (a) Casual Informants. Throughout the war many public spirited individuals came forward and offered information on enemy installations with which they were familiar or about which they had some data, and occasionally wireless appeals were made for any information of use to the Services. The data thus produced varied in value enormously from a highly technical and detailed description of some very important enemy installation, to a picture postcard received from Germany by ~~Aunt Fanny~~ in the year 1876. Following any important bombing operation publicised in the press there was usually a spate of information sent in on similar objectives. The attack on the Ruhr dams was a particular case in point, and after this some hundreds of letters and photographs were received covering nearly every important dam in Europe. As a matter of interest some of these proved very valuable some two years later when some dams had to be dealt with during the Invasion.

One amusing incident, which sheds some light on to the source of this type of information, was the fact that throughout the war the Hydro Electric Installation at Walchensee in Austria kept turning up regularly, quite often with the same picture postcard view. This puzzled the ~~Target Officers~~ for some time - since the installation was not of outstanding importance - until it was discovered that this place lay on the motorcoach route between Munich and Oberammergau where the Passion Plays take place. It appeared that an enterprising German or Austrian had set up a cafe or roadhouse on the route, just near the Hydro Electric plant, and whilst the travellers were refreshing themselves with a sausage thereat, they were invited to purchase a picture postcard of the view as a memento - hence the deluge of pictures!

Often the informants offered to attend an interview to tell their story and in certain cases this led to many subsequent interviews. The informants were all carefully card indexed and over 600 separate correspondence files were opened in connection with this matter. An important point was that an interview often gave rise to a suggestion on the part of an informant that someone else he knew might also be able to help, and this was frequently followed up with success. ~~Another important point in connection with this interviewing of informants was the security angle which was usually covered by telling some innocent white lie, aspect had, of course, to be~~
carefully watched

- (b) Technical Bodies. Great help was obtained from many expert bodies such for example as :-

Railway Research Service
Electricity Commission
Central Electricity Board
Ministry of Transport,
etc. etc.

- (c) Libraries. These proved of great source of information on detailed data on installations. A.I.3c(1) were fortunate indeed in having a small translation sub-section comprising three expert lady translators who between them could cope with almost any known language. These ladies had a very great knowledge of all the principle technical libraries in London and they were able to produce ~~time and again~~ translation extracts, plans, drawings and ground photographs of almost any important target that was required. Amongst the libraries which they used most were :-

The Patent Office Library
The Science Museum
The Institution of Civil Engineers

and it is also only right to mention that the Librarians in charge of these and other libraries gave their unstinting help in the investigations.

- (d) Technical Experts. Frequently it became necessary to seek the technical advice of experts in connection with targets and this help was always freely given.
- (e) Industrial Firms. Assistance was often obtained from the records of manufacturing firms in this country. - particularly those with continental connections. Examples of these were :-

Messrs. Babcock & Wilcox
Messrs. Stewart & Lloyds
Imperial Chemical Industries
The Oil Companies
etc. etc.

- (f) Insurance Companies. These companies, particularly those which handled Continental risks, had extremely valuable records in the form of detailed constructional particulars dimensioned plans etc; this source was continually tapped and help was given unstintingly.

One of the greatest contributors was the Fire Office Committee. ~~to whom no problem was too difficult to solve however much work or investigation it took.~~

- (g) Intelligence Sections of Allied Governments. A close and constant liaison was maintained with these agencies amongst which might be mentioned :-

The Norwegian High Command
The Free French Forces
The Belgian Security
etc. etc.

~~and great help was obtained from them all.~~

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This list is probably not complete, but at least the high spots have been covered and a great debt is due to all these bodies and persons for their continued and ready help in all matters.

37. The above notes will give some indication of intelligence sources used by A.I.3c(1); the important point to stress is that it is the duty of a Target Section continuously to seek out all possible sources of intelligence and ensure that everything of the slightest value comes to the Target section. Also, intelligence of this sort is not to be found all ready made, but has to be sought and analysed. It is unwise to make a hasty decision that a source is of no value - it may appear so of itself but, when added to others, it may prove invaluable.

METHODS OF PRODUCTION AND DISTRIBUTION

38. To appreciate the production and distribution problem which A.I.3c(1) had to handle it is first necessary to give an indication of the Quantities involved, of both Strategic and Tactical material.

39. For Strategic Operations. Complete target material for Strategic Operations was prepared and kept up to date by frequent revisions and re-issues for a total of about 3,000 targets. The main 'customers' for bulk supplies of this material were the two main Heavy Bomber Forces namely :-

R.A.F. Bomber Command
U.S. ~~VIII~~ A.A.F. 8th Air Force

and on an average the quantities required were based on the following distribution per operational Station.

	R.A.F. Bomber Command	U.S.A.A.F. VIII 8 th Air Force
<u>Operational Material</u>		
Target Maps	40	40 - 80
Type 'A' unannotated illustrations (One Vertical and one Oblique)	2	40 - 80
<u>Briefing Material</u>		
Type 'B' annotated illustrations (One Vertical and one Oblique)	2	6
Target Information Sheet	2	2

40. ~~8th~~ In round figures both R.A.F. Bomber Command and U.S. ~~8th~~ ^{VII} Air Force each required a total of about 2,500 copies of all items of Operational Material and some 200 to 500 copies of Briefing Material. Bulk supplies in somewhat smaller numbers and for certain selected types and ranges of targets were required for both R.A.F. and U.S.A.A.F. Fighter Commands, for 2nd Tactical Air Force and U.S.A.A.F. ~~IXth~~ ^{VII} Air Force and ~~IXth~~ ^{VII} Air Force. In addition to this there was a large distribution of single or duplicate copies of all material to planning bodies such as D.B.Ops. various service intelligence sections, etc.

41. The ~~net~~ result was that the printing quantities of material for each target were about as follows :-

Operational Material

Target Maps	7,000 copies
Type 'A' Unannotated Illustrations	6,500 copies

Briefing Material

Type 'B' Annotated Illustrations	1,500 copies
Information Sheets	1,000 copies

42. It will be appreciated that, with an average of about six separate items of material for each target, with the above quantities for each item and with a total of 3,000 targets, the total quantities involved the printing of over 70 millions of items and the consumption of hundreds of tons of paper.

43. For Tactical Operations. Complete material for Tactical Operations was prepared and kept up to date for some 38 Dossiers and also a large number of folders covering a total of over 10,000 individual targets. The main ^{recipients of} ~~customers~~ for bulk supplies of this material were the Tactical Air Forces operating in France and later in Belgium, Holland and Germany, namely :-

R.A.F. 2nd Tactical Air Force
U.S. ~~IXth~~ ^{VII} Air Force

44. In addition, the Allied Heavy Bomber forces required bulk supplies as did the R.A.F. and U.S. Fighter Commands; the ground forces such as 21 Army Group etc. and the Navy both British and American also required supplies, while single or duplicate copies of the Dossiers were required by the various planning agencies - SHAEF, AEF, D.B.Ops. etc. In addition to the complete bound Dossiers themselves, loose copies of the illustrations were required by the four main Air Forces, namely, R.A.F. 2nd T.A.F. and Bomber Command and U.S. ~~IXth~~ ^{VII} and ~~VII~~ ^{IXth} Air Forces.

45. The ~~net~~ result was that the printing quantities of material for each item were as follows :-

Completed <u>Dossiers</u>	- 900 to 1,000 copies
Loose Illustrations	- 2,000 copies

The printing, gathering, binding and distribution of some 35,000 to 40,000 Dossiers and some 7,000,000 to 8,000,000 illustrations was thus a major undertaking in itself.*

* Note: For further information on Tactical Target Dossiers - see Appendix 'B'

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46. Production Centres. These were establishments ^{WHICH} for administrative purposes ~~which~~ operated either under the Directorate of Surveys or under His Majesty's Stationery Office, but all of which were under the direct operational control of A.I.3c(1), as follows :-

TARGET MAPS were produced by 'Hillside' near High Wycombe which operated under the Administrative Control of D. Surveys.

STRATEGIC TARGET ILLUSTRATIONS were produced principally by Messrs. Swaines of High Barnet under H.M.S.O.

STRATEGIC TARGET INFORMATION SHEETS were typed in final form by A.I.3c(1) and were produced in bulk by various printing agencies.

TACTICAL TARGET DOSSIER were produced complete in all respects by the Sun Engraving Co. of Watford under H.M.S.O.

At times of peak load a number of other firms were pressed into service by H.M.S.O. but those mentioned above carried the bulk of the load.

47. Preparation of Target Maps. The procedure for the preparation of Target Maps was as follows. The Target Officer at A.I.3c(1) discussed the matter with the Target Section (T Section) at C.I.U., which section, whilst under the administrative control of O.C. R.A.F. Station Medmenham was, by agreement, under the direct operational control of A.I.3c(1). The C.I.U. Target Officer identified the target on vertical aerial cover and sent the relevant photograph to A.I.3c(1). The Target Officer in A.I.3c(1) then examined this very closely in relation to the accumulated ground data, plans, etc. which he had in his working file for the target concerned and thereby determined accurately, and marked on the print, the exact target area and outline. He then sent this to Hillside, which again was under the operational control of A.I.3c(1), with full details of the pin point, Co-ordinates, Reference Number, Place and Name of Target etc. The Map Drawing Office at Hillside then obtained aerial cover of the whole area of the standard sized target map with the target approximately at the centre and then, proceeding to draw the colour tracings, set up the headings, magnetic borders etc. make the negatives and plates and print the maps, all in accordance with the standards evolved over a long period after detailed consultations with Navigator, Pilots, etc. Further details of these maps are given in Appendix 'A'.

48. Preparation of Illustrations. The procedure was as follows :- The A.I.3c(1) Target Officer advised the C.I.U., Target Section of his requirements and the latter proceeded to prepare duplicate copies of photographic mosaics with highly glazed finish at approximately the standard scales of 1 : 32,000 and 1 : 6,000 as described in Appendix 'A'. The C.I.U. Target Officer then proceeded to annotate one of the 1 : 6,000 scale mosaics, the annotations being in accordance with the standards developed and laid down by A.I.3c(1). These various mosaics which covered a somewhat larger area than the net finished illustration requirements were then sent to A.I.3c(1).

49. The A.I.3c(1) Target Officer first took the 1 : 32,000 unannotated mosaic and proceeded to fix and mark on the photograph the exact limits of the illustration required, determining whether the illustrations should be of the Portrait or Landscape type. He also determined if and what slight annotations were required; he then took the 1 : 6,000 scale mosaics and checked and modified as required the annotation and key. He determined and marked the final extent of the finished printed illustration required and decided how the annotated and unannotated prints should be produced (side by side, or on separate sheets), whether a plan should be made in place of the annotated print etc., etc.

50. He then passed all this material to the A.I.3c(1) Printing Officer who was an expert technical printer in civilian life. This Officer was entirely responsible for all reproduction of illustrations and all dealings with the production centres. If he was not satisfied with the quality of the original he would refer this back to the Target Officer. Further details about these illustrations are given in Appendix 'A'. It should not be inferred from these brief notes that the A.I.3c(1) Target Officer acted merely in an Editorial capacity. In many cases he was the main and only source of Intelligence on the Target and therefore carried out the whole of the work on receipt of the basic photography.

51. A great deal of the success of the final productions was due to the ~~great~~ zeal and technical ability of the Printing Officer. It might be mentioned that A.I.3c(1) specified that only the finest possible class of work was acceptable and the reproductions must be the nearest approach humanly possible to the original photographs. In the initial stages many tests were carried out on Epidiascopes to ascertain the best type of production possible commensurate with the bulk and urgency involved. ~~and~~ The best solution was found to be high fidelity Letterpress Reproductions on Finest Quality Chrome Art Paper using 175 line screen blocks. One secret of the success of the reproductions was the technical skill of the craftsmen employed by the well known and old established firms engaged on the work (Swaines and Sun Engraving) and the ~~great~~ personal help and enthusiasm given to the work by the Managements and employees of those firms. The Printing Officer was in direct daily contact with the representatives of the printing firms with whom he discussed in detail every illustration as he handed over the original copy for reproduction.

52. Information Sheets. These were drafted by the A.I.3c(1) Target Officers from accumulated Working Files supplemented by any additional information which might be required and which would be obtained from the sources as dealt with in Paras.33-37. Very detailed and tight standards were laid down as to exactly what information was to be included and in what form it should be represented as mentioned in Appendix 'A'. The finished, corrected and checked sheet was then finally typed onto a standard proforma and was sent for letterpress reproduction in bulk.

53. Preparation of Tactical Target Dossiers. Most of the principles enumerated in paragraphs (3), (4) and (5) above applied. The main difference in this case were firstly that A.I.3c(1) had its own photographic officers (who worked closely with the Army P.I.s. and Intelligence Officers) instead of using the Target Section at C.I.U. and, secondly, that as the data was issued in this case in the form of books, the whole of the data - maps, schedules, illustrations etc. had to be completed in all respects for a Dossier before the copy could be handed over to the printing officer. Many points in connection with the procedures adopted in the preparation of this material are described in Appendix 'B'.

54. Time required for Preparation. It will be obvious that the best overall time periods taken for the preparation of the material described are obtained if the work proceeds at a steady pace and 'rush' or 'ultra high priority' jobs are avoided. It was for this reason that A.I.3c(1) did all it could to anticipate events and get the work into the machine as quickly and evenly as possible. This matter has already been dealt with in Paras.13-30 above.

55. It was inevitable, however, that special emergency cases arose from time to time; under these conditions, by straight-through continuous working on the part of the A.I.3c(1) Target Officers, the Target Section at C.I.U. and the Production Centres, and by using special road and air transportation, it was possible to prepare, print in bulk, distribute and deliver right down to all stations the complete material for a strategic target in 36 hours. This meant, however, practically everything else stood still in the meantime and the week's production suffered accordingly; it was, moreover, definitely bad from the Security angle, point of view of security.

56. The normal figure varied according to the total load on the complete organisation at the time, but a fair average would probably be about two to three weeks. Every job was given a priority classification and it followed that those in a low class, which were not required for some time, might take six weeks or a couple of months but they could always be pulled up in priority if the need arose. A good deal of tact and judgment had to be used in the ordering of the work, for, human nature being what it is, every responsible took the view that his particular job was much more urgent than that of anyone else.

57. On an average about 20 Strategic Target Maps, about 20 Strategic Target Information Sheets and about 100 Strategic Target Illustrations were produced each week, amounting to the total production of about 560,000 items per week. It must be remembered that these were not all for new targets, as revised material had to be continuously produced for Targets on which full material had already been produced and distributed.

58. It cannot be too strongly emphasised that Target material is not static and it is no good thinking that once material has been issued the target can be forgotten. New Intelligence, altered appearance, extensions, damage by bombing etc., etc. are all causes for the re-issue of up to date material. On important targets new material was issued four to six times during the course of the war.

59. The time required to produce the factual target dossiers was about 2 to 3 months, but this does not mean that there was this interval between each book, since work was going on on several dossiers simultaneously, and the 38 dossiers were produced complete in all respect from scratch in about 8 months. Here again revision was continually necessary and in four cases completely new and revised dossiers were issued apart from additions and amendments to existing dossiers.

60. Security. Security was a most important aspect of all this work, since the work was indissolubly tied up with immediate projected operations and any leakage would have been very very serious. Time does not permit a description of all the subterfuges employed, but a few points can be mentioned.

61. Information of a highly secret nature such^{as} for example, ~~the~~ the projected date and place of the Allied landings in Normandy (which had to be known 8 months before the event) was only in possession of the Head and Deputy Head of the Section. The same limitation was imposed on the handling of certain Top Secret Intelligence. All officers were continually made aware of the secret nature of the work and there was no known case where any leakage occurred.

62. However, strange as it may seem, the best security measure was the existence of large quantities of targets rather than the guarding of a few. The enemy knew perfectly well that we proposed to ~~bomb~~ and were already ~~deluging, harassing,~~ bombing all his important military and industrial plants, but what he wanted to know was which and when. A complete set of target material for 2,000 assorted targets in Germany does not do him much good, but information about 10 targets which it is proposed to attack in the next week gives him just the information he wants. Hence one safeguard was to have going through the machine continuously hundreds of different and widely scattered targets which, to the uninitiated appeared to be completely without plan or object.

63. This yet again stresses the need for a Target Section to use all means in its power to anticipate operations and thereby to be able to jumble low and high priority targets. However, a random effort of this sort can be wasteful, for there was never room for an ounce of waste effort in A.I.3c(1) during the war, and an apparently planless operation must, behind the scenes have a completely planned background.

64. The case of the factual target dossiers was difficult from the Security aspect since, as already mentioned, each dossier had to be put into production in its entirety and it represented a mass of carefully collated material with a very definite plan. However, the order of issue of the dossiers was purposely confused and very special extra security measures were adopted at the production centre in this case. It is an interesting fact to record that of the dozens of operatives employed at that centre, only two persons ever saw in full and final form any of the 35,000 odd dossiers produced.

65. Personnel. The organisation of A.I.3c(1) is dealt with in Paras.104-111. All that it is necessary to do here is to give an indication of the strengths involved; ~~and~~ these were roughly as follows :-

A.I.3c(1) Staff	...	...	80 persons
C.I.U. Target Section	...	...	10 persons
Hillside Staff	...	...	150 persons
Swaines Staff	...	...	55 persons
Sun Engraving Staff..	...	...	55 persons
Sundry and other Printing Staffs	...	...	<u>20</u> persons
Total	...	...	<u>370</u> persons

Thus some 370 persons were engaged ~~100%~~ of their time in the production of Target Material. A great number of other 'part time' workers could be added but the above figures are absolutely net. The production of Target Material for Heavy and Medium Bombers engaged in a World War is an undertaking of considerable magnitude and it is as well that this be borne in mind for any future war.

66. Distribution. The whole of the Strategic material was dealt with by a special section some 20 strong at Hillside. The Target Maps themselves were produced there as mentioned in paragraph 47 above. All the other material - illustrations and information sheets - were sent in bulk to the distribution centre at Hillside where it was broken down, counted, parcelled and listed and distributed to the various Command Headquarters for further distribution to Groups and Stations. Hillside (High Wycombe) was very conveniently situated geographically in relation to the Headquarters of the two main Heavy Bomber Forces - H.Q. Bomber Command at "Southdown" and U.S. ~~With~~^{8th} A.F. at "Pinetree". The material was distributed item by item as soon as possible after it was completed and there was no attempt to issue all the material on any one target at one and the same time.

67. The Tactical Target Material was handled entirely by A.I.3c(1) who carried out all the distribution direct from Lansdowne House.

TARGET NUMBERING SYSTEMS

68. It will be clear that with such a very large number of targets to be dealt with of different categories and in many countries it was necessary to have a reliable numbering system for each target. These numbers were required :-

- (a) for use in Directives and Operational Orders, etc.
- (b) for identifying and filing the thousands of items of target material (maps, illustrations, and information sheets) which were issued during the war.

69. The security aspect of this was very important as it was obvious that the enemy should at all costs be prevented from gaining possession of these numbers. It will be quite clear that some form of reference number had to be printed on each item of target material, and as a large number of these items were taken into the air on operations it followed that, as the enemy salvaged this material from crashed aircraft, he was able to build up an index of the reference numbers and the corresponding targets.

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70. If, therefore, he was able by some means such as interception of Operational Orders, to gain information about forthcoming operations in which these numbers were quoted, he would know the target and would be able to dispose his defences, mobile anti aircraft defences, day and night fighters, etc. ~~in accordance therewith~~ and thereby be able to inflict heavy casualties on the attacking forces. ~~In other words the all important element of surprise would be lost.~~ For this reason a duplicate numbering system for each target was used and these two numbers were called :-

- (a) The Target Operational Number which was secret and was used in Operational Orders, but was never printed on any item of target material which was taken into the air.
- (b) The Air Ministry Number which was the identifying number printed on all target maps, illustrations, or other material taken into the air.

71. These numbers were entirely different from each other both in character and continuity and could not be related except by the use of the secret target indexes which were kept under high security conditions in the Planning, Operational and Intelligence Offices at Command and Group Headquarters and Stations. For examples of such target numbers and for information on Index Books, Station Target lists etc. see Appendix 'C'.

DATA FOR SPECIAL OPERATIONS

72. In addition to the regular Strategic and Tactical Targets already dealt with in this chapter a number of sets of special target material were produced and a few of these may be briefly mentioned.

73. Circus Operations. These operations had as their main object the enticing of enemy aircraft into the air so that they could be destroyed in aerial combat. Experience showed that if our aircraft merely made a sweep over enemy occupied country without making a specific attack the enemy fighters remained on the ground. Therefore a number of semi important targets in Northern France were carefully selected for attack by small forces of Medium Bombers by day, these bombers being accompanied by heavy Fighter escort. As soon as the enemy discovered that an attack was going to be made on a specific objective, the destruction of which would inconvenience his war effort, he sent up his fighters to defend the target and these fighters were then dealt with by the bombers escort. ~~See~~ different classes of targets were selected from time to time and, as far as possible, these were kept in the same category as the main strategic-bombing directive at the time. Most of the Targets were in the Pas de Calais and Northern France.

74. Rhubarb Operations. These operations really constituted secondary targets for Fighters and Fighter Bombers patrolling and sweeping over enemy occupied country on the look out for enemy aircraft. It had been found that if and when these fighters completed their sweep and before they left enemy occupied territory for their return to base, and assuming - as was so often the case - that no enemy aircraft had been encountered, the pilot loosed

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his cannon and machine gun fire at any prominent object before he left. These objects were often beach huts or empty sheds or buildings, the destruction of which in this way did not do the enemy any harm at all.

75. It was therefore decided to consider if and what targets could be selected in the usual areas in which these sweeps were carried out, which firstly had some "target value" and at the same time were susceptible to destruction and damage by cannon and machine gun fire. Some ten to twelve different classes of targets were selected and for each of these A.I.3c(1) produced full target material, the main classes being as follows :-

- Rhubarbs I ... Petrol tank Trains in Railway Sidings.
- Rhubarbs II ... Barges on Navigable Rivers and Canals.
- Rhubarbs III ... Electrical Objectives (Power Stations and Transformer Stations).
- Rhubarbs IV ... Alcohol Distilleries.
- Rhubarbs V ... Radio Navigational Beam Stations.
- Rhubarbs VI ... R.D.F. Stations.
- Rhubarbs VII ... Gasworks.
- Rhubarbs VIII ... Hutted Camps.
- Rhubarbs IX ... Military Headquarters.
- Rhubarbs X ... Coastal ~~Radar~~ Stations etc. etc.

From time to time emphasis was laid on attacks on certain of these classes of targets and others were temporarily removed from the Operational Directive according to conditions, and to the main directives in force.

76. Clandestine Operations. Nos.138 and 161 squadrons were normally engaged upon clandestine and other similar operations, (see Chapter 4), ~~which need not be described here.~~ Generally these squadrons were fully occupied with that work, but occasions did arise over short periods when they required alternative work to keep the squadrons occupied. The crews of these squadrons were very specially trained and included expert navigators who could map read with great accuracy for long distances in moonlight and could identify and pin point very small targets. On the other hand they were so expert and had had such a lot of special training that it was considered that there must not be any risk of them being thrown away on unimportant operations. For this reason a request was received that a series of targets should be selected for attack by these Units, these being important targets but situated away from heavily defended areas. For these operations a series of five very special groups of targets were worked out for which full target material was supplied comprising the following :-

- Group I ... Switching and Transformer Stations in Western France.
- Group II ... Switching and Transformer Stations in Central France.
- Group III ... Railway Targets.
- Group IV ... Traction Sub Stations in occupied France.
- Group V ... Locomotive Facilities.

77. Intruder Operations. Many squadrons were engaged upon night intruder operations which, as is well known, consisted of flying in the neighbourhood of enemy bases and attacking enemy Bombers when taking off for or returning from offensive operations against this country. As in the case of the fighter sweeps mentioned earlier above, it sometimes happened that aircraft engaged upon these intruder operations did not encounter any enemy bombers and there was therefore a request for alternative targets

which the intruders could attack before returning to their home bases. For this purpose complete sets of target material were again supplied and in this case most of the targets were locomotive facilities and transportation.

78. Other Special Operations. Various other special target data was provided for particular operations, as for example the well known raid on the Molybdenum mines at Knaben in Norway; in all these cases, as well as the four main series of operations mentioned above, A.I.3c(1) recommended and selected all the various targets, prepared the target material and issued this in bulk as required.

LIAISON FUNCTIONS AND RELATIONSHIPS WITH OTHER DEPARTMENTS.

79. At various points in this chapter reference has already been made to the vital importance of the Target Section maintaining close liaison with many other Operational and Intelligence Sections. This question can be conveniently considered under four main qualifications indicated in the following paragraphs.

80. With Planning Staffs. The liaison here was under two directions. Firstly, to enable the target section to furnish to these staffs any material which they might require in connection with long range planning, or the formation of Directives etc.etc. and secondly, to obtain from these planning sections an indication of future interests which assisted in ordering the work of preparing target material so that this is readily available at the Operational Stations well in time for carrying out of operations later. This matter has already been dealt with fairly fully in Paras.13-30.

81. With Operational Units. This included Command and Group Headquarters and Stations. The object here was on the one hand to assist and advise the Intelligence Officers on target material and on the other hand to obtain information regarding current thoughts and requirements with a view to constantly improving the form and content of target material so that this was of maximum use to Operational Crews. This could be and was during the war extended to include actually taking part on operational missions so as to gain first hand experience of the needs of the Pilot, Navigator and Bombardier. In certain cases during the war Target Officers from A.I.3c(1) were sent down to Operational Stations to give lectures and additional intelligence data on special series of projected operations such as 'Rhubarb' 'Circus' etc.

82. With Intelligence Sources. This of course was with the object of obtaining all possible items of intelligence which might be of assistance in preparing target material. This has already been dealt with fully in Paras.33-37, and does not therefore require further description here.

83. In the Internal Organisation of the Section. The organisation of the section is covered in paras.104 - 111 from which it will be noted that the branch was divided into a number of technical sub-sections. It was very necessary to guard against these sections becoming watertight compartments and with this end in view weekly meetings were held with the Heads of all sub-sections present so as to ensure that other sections could give any information they might have regarding problems at that moment facing other sections.

84. With M.E.W.* In view of the identity of interest between the Air Ministry Target Section A.I.3c(1) and the Objectives Section of the Ministry of Economic Warfare it was fundamental that there should be the closest liaison between the two sections. Therefore, when in 1941 M.E.W. moved from Berkeley Square House to Lansdowne House, A.I.3c(1) also moved from Houghton House (Adastal) to Lansdowne House and occupied one wing of the floor of that building which was occupied by the M.E.W. Objectives Section. ~~They remained there until the premises were rendered uninhabitable by a Flying Bomb incident in August, 1941.~~ The Officers of A.I.3c(1) and M.E.W. were therefore in continuous and close contact with their opposite numbers, and A.I.3c(1) was the ~~Official~~ Air Ministry Liaison Section with M.E.W. on all matters, and not necessarily just those associated with Target matters.

85. There were many Secret Air Ministry documents of use to M.E.W. and, conversely, there were M.E.W. documents of interest to many Air Ministry branches. To ensure that this interchange took place rapidly, and that the documents were forwarded to the correct officers in respective Ministries, A.I.3c(1) maintained a special distribution section which worked solely on this subject and handled many hundreds of documents weekly.

86. Target Liaison with Mediterranean Theatre. Another important liaison was that between A.I.3c(1) and the Target Section at M.A.A.F.H.Q. When ~~Operation Torch~~ for the invasion of N.W. Africa was being planned in July and August 1942, A.I.3c(1) were called upon to furnish target material in bulk for various targets in N.W. Africa, Tunisia, Libya, Sicily, etc., but these targets were necessarily primarily of a direct military type such as enemy airfields, port areas, etc. During the first few months of the campaign the heavy forces attached to the attacking forces were principally engaged in attacking those targets and in close support work for the ground operations and had little or no spare effort to devote to their more natural role of Strategic Target Bombing as such.

87. However, by the middle of 1943, when Libya and Tunisia had been recaptured, Pantelleria and Sicily taken and the Southern part of Italy invaded, the Heavy Bomber forces were moved over to the large airfields at Foggia in Southern Italy. They then commenced to reconsider their operations, firstly because with the gradual growth of Tactical Air Forces and the shorter front line, they began to have more Heavy Bomber effort to spare over and above close support operations, and secondly because with bases at Foggia they came within range of worth while Strategic Targets in Northern Italy, Southern Germany, Austria and the Balkans.

88. With two growing Heavy Bomber forces available to strike at Germany - one from the west namely the R.A.F. and the U.S. VIIIth A.A.F. and the other from the south namely the U.S. 15th A.A.F. and R.A.F. under M.A.A.F. - it became very necessary to co-ordinate the efforts of the two forces to ensure that their efforts were complementary.

89. Accordingly in August, 1943, an officer from A.I.3c(1) was sent down to M.A.A.F. H.Q. at La Marsa to discuss this matter fully with the Air Intelligence Section. A return visit of M.A.A.F. officers to Air Ministry followed after which a further visit was paid by A.I.3c(1) officers to M.A.A.F. These three visits were consecutive and extended over a total period of about six weeks during which time all aspects of targets were thoroughly discussed and arrangements made for the continuous interchange of

* Note: See also Appendix 'D'

information between the two H.Qs. and for the bulk supply of the A.I.3c(1) Target Material to M.A.A.F. by air. This close liaison was fully maintained throughout the ensuing campaigns, by the continual interchange of officers from and to both H.Qs. by an elaborate weekly interchange of intelligence data by air and by frequent exchange of signals. By both sides having, in this way, an inside knowledge of each other's work and capabilities, the co-ordination of the operations of these two most important heavy bomber forces ran very smoothly.

90. The secret of this success very largely resulted from the personal contacts and liaison between the several officers of the two H.Qs.; it proved conclusively that it is both practical and feasible to co-ordinate the immediate operations of two large and completely self contained air forces separated by some 1,500 miles, provided a live and continuous liaison is maintained and that the matter is not allowed to sink to the easier and more usual method of trying to accomplish this through the medium of long and complicated minutes which inevitably give rise to misunderstandings and friction.

91. With Home Commands. On the question of liaison between A.I.3c(1) and the various H.Q. based in Britain, it became clear quite early in the war that this was most important if the Target Section was going to fulfil efficiently its task of providing the Operational H.Qs. with the best possible material in the form, content and order required for operation, factors which did not remain static but changed continuously as further operational experience was gained. For this reason a regular weekly visit (~~every Wednesday~~) was paid by an officer of A.I.3c(1) to Headquarters R.A.F. Bomber (Southdown) and Fighter (Bentley Priory) Commands and U.S. ~~VIIth~~ ^{VIth} A.A.F. (Pine Tree) and, at slightly longer intervals, to R.A.F. Coastal and Army Co-operation (later 2nd T.A.F.) Commands.

92. On these visits meetings were held with the C.I.O. and Operational Intelligence Sections, and, as found necessary with the G/C Ops and A3 Sections. This enabled A.I.3c(1) to be kept fully up to date with latest interests and requirements of Commands, in all matters such as lists of forthcoming targets, form and content of material, distribution problems etc. ~~As soon as any difficulties became apparent they were immediately thrashed out and settled on the spot, instead of being allowed to develop into the wasteful process of self justification by the interchange of Minutes of gradually increasing vituperation.~~

93. The policy of A.I.3c(1) throughout was that as soon as any difficulties arose with any of the many headquarters or departments with which it had to deal, the best plan was to get out to the H.Q. as soon as possible and discuss the matter fully on the spot; this proved time and again to save much valuable time, ~~in the long run.~~ Misunderstandings so often arise because neither party ~~are~~ ^{is} fully aware of the problem which faces the other.

94. With Production Centres. In Paras.38 - 67 the question of production of Target Material has been dealt with, and it was pointed out that apart from the 80 persons on the staff of A.I.3c(1) there were about 300 other persons engaged at the various production centres on the preparation of target material. It was necessary to maintain a very close liaison with these production centres. ~~For this reason~~ A regular weekly visit (~~every Monday~~) was paid by an officer of A.I.3c(1) to the C.I.U. Target Section at R.A.F. Station Medmenham, and to the ~~Map~~ Production and Distribution Section at Hillside, High Wycombe.

This was in addition to the ~~very close~~ personal liaison which existed between the ~~printing officer~~ and the various ~~printing~~ firms.

35. With Other Departments. From what has already been said in Paras. 33-36 regarding sources of information it will be clear that it was necessary to maintain ~~a close~~ liaison with various other departments and sources of information such as, for example, I.S.T.D., War Office, Admiralty, etc. One of the closest liaisons which of course existed was that with the Directorate of Bombing Operations at Air Ministry, Whitehall, with whom the Target Section was in daily contact.

LIAISON WITH ALLIES

96. Norway. A ~~very close~~ liaison was maintained with H.Q. Royal Norwegian Forces, at Lanchester House, Seymour Street, W.1, where an Air Ministry Liaison Section existed at that H.Q. under A.D.I.(K), its purpose being largely to assist in the interrogation of informants on Norwegian matters. ~~That section was later given a separate identity as A.I.K.(5) and was responsible for many valuable reports on Norway.~~

97. When the ~~Target List~~ for Norway was being compiled, in the Autumn of 1942, the views of Norwegian Headquarters on outstanding targets were sought ~~and from that time until August 1944 (when the loss of Officers from the flying bomb incident at Lansdowne House involved a transfer to the German Section at A.I.3c(1)) a regular weekly visit was made. In addition special calls were made by either side as occasions demanded.~~ The Norwegians sometimes proposed that a particular target be attacked, or reported shipping movements of importance, while they might be asked for reports of current activity at certain plants, etc. ~~They were invariably most helpful and co-operative and even went to the extent of sending an agent into Norway to obtain a plan which was needed.~~

98. One valuable aspect of this liaison was that it enabled Air Ministry to be informed of objectives in Norway which were the subject of plans for attack by Combined-Ops. or S.O.E. forces. A.I.3c(1) informed D.B.Ops. of these cases, so that confusion should not arise between air and ground operating against the same targets.

99. Although there was no direct liaison with the Norwegian Government, ~~the government~~ views on aerial attack against Norway were made known through the High Command, Royal Norwegian Forces. Access to the government records was also obtained through the same channels. Norwegian H.Q. gave the impression of being extremely efficient and well informed. Its contacts with occupied Norway were wide and far-reaching and patriots leaving the country and coming to England at intervals throughout the war maintained a flow of up-to-date intelligence, ~~which was invaluable.~~ Accurate accounts, usually accompanied by plans and photographs, of the results of air attacks on Norwegian targets were nearly always made available. Altogether this was an example of very fruitful and successful liaison.

100. Denmark. No liaison took place between A.I.3c(1) and any Danish authority on instructions which implied that there was less confidence about security in this instance. Information gathered from Danish sources by M.E.W. was, however, available to A.I.3c(1) through its liaison with the Scandinavian section of M.E.W. In 1945 a S.H.A.E.F. Mission to Denmark was formed and its R.A.F. members contacted A.I.3c(1) for information.

101. U.S.A. Liaison with the Americans was so extensive and thorough at every point that one thinks of British and Americans as one integrated force. Outstanding examples of this Section's liaison with U.S. Forces were :-

- (a) The presence of American personnel on the regular staff of the section ranging from the rank of Lieut. Colonel to Enlisted men.
- (b) Visits of the Head of the Section to H.Q. Army Air Forces, War Department, Washington on four occasions, covering a total period of over nine months.
- (c) Visits of the Head of the Section, a S/Ldr. from the German Section and an American Major and Lieutenant from the Italian and Balkan Sections to M.A.A.F., and U.S. 15th A.F. Headquarters on three separate occasions with similar return visits by American Officers from that theatre to A.I.3c(1).
- (d) Regular weekly visits by the Head of the Section to ⁸with A.F.H.Q. and other visits to other American H.Qs. in this country as occasion arose.
- (e) Constant contact with A.I.3.(U.S.A.) and the American representative in D.D.I.3.
- (f) The appointment of an Officer of A.I.3c(1) as Liaison Officer with S.H.A.E.F. - first located at S.H.A.E.F. in England and later paying weekly visits to S.H.A.E.F. in France.
- (g) A.I.3c(1) representation on all the various Working Committees of the Combined Targets Selection Committee, alongside American Forces representatives on these Committees.
- (h) The institution and maintenance of a series of weekly letters exchanged between A.I.3c(1) and M.A.A.F. and H.Q. 15th A.F., dealing comprehensively with all matters of common interest.
- (i) Close liaison with E.O.U./E.W.D. and O.S.S. at the American Embassy in London, on enemy economic matters on the same lines as the liaison with the Ministry of Economic Warfare.
- (j) The frequent visits, calls and special requests received from representatives of various American authorities on a wide variety of subjects.
- (k) The long and intense participation by the Head of A.I.3c(1) in the organisation and setting up of the Joint Target Group in Washington in connection with the Japanese war.

- (l) Subsequent visit of the Head of the Section to A.A.F.H.Qs. in the Pacific including Pearl Harbour, Guam, Saipan, Philippines, New Guinea, Australia, Ceylon, India, Burma and China, etc. in connection with the preparations of Target Material and the planning of Bomber Operations.
- (m) The entire and sole responsibility of A.I.3c(1) to provide all Target Material for use by all American Air Forces based in this country, in common with the R.A.F. for all objectives in the European Theatre.

In general, liaison with the Americans can be said to have been complete and constant and to have operated with the greatest smoothness and success.

102. France. The French Section of A.I.3c(1) had contact on specific questions with the H.Q. of the Fighting French forces in England, where useful intelligence was obtained. Contact was also maintained with the Belgian Headquarters in London.

103. U.S.S.R. A.I.3c(1) had no direct liaison with the Russians but several times sent Intelligence data and target material to the R.A.F. 30 Mission in Moscow, (through D.D.I.3. and/or D.B.Ops.) for submission to the Russians at their discretion. On some occasions this was done as the result of a request from 30 Mission and on other occasions the action was taken on the initiative of A.I.3c(1).

A.I.3c(1) also worked, as occasion demanded, with D.A.F.L. on matters concerning liaison with Foreign Governments.

STAFF ORGANISATION, STRENGTH, ETC.

104. Personnel. The strength of the Target Section of A.I.3c(1) grew continually during the war to cope with the gradually increasing demands. In December 1942, the total personnel numbered 25, in December 1943, it had increased to 50, and by March 1944, it had risen to 80.

105. When the American Air Forces came over to this country towards the end of 1942, they decided to use the R.A.F. Air Ministry A.I.3c(1) Target organisation for the preparation of ~~the~~ material required by them instead of setting up a separate duplicate organisation of their own; they agreed also to provide the additional personnel in the form of Officers and enlisted men as might be required by A.I.3c(1) to deal with the increased requirements.

106. When the heavy Tactical Target Dossier programme was put in hand late in 1943, the bodies most interested in this material such as Allied Expeditionary Air Force, R.A.F. 2nd Tactical Air Force, American Tactical Air Forces etc. agreed to attach certain Officers and men to the Section to assist in this work.

107. The internal organisation of the branch was not rigid, but it had to be varied from time to time to suit the varying requirements and priorities. As soon as one programme was completed the staff engaged thereon were absorbed in other heavily pressed sections of the branch. Strategic Target requirements remained as an ordinary requirement throughout, but the quantities increased continuously.

108. An example of a programme which gradually died out was the Landmark Folders, which were required in the early part of the war covering the complete coastal stretch from Northern Germany to Southern France. Once this programme was completed it did not require very much revision and the staff was absorbed in other sections. Another example was the "Bodyline" and "Noball" Target programme in connection with Flying Bomb and Rocket sites. As soon as the Pas de Calais, and Holland, where these sites were situated, was overrun this programme automatically came to an end.

109. Strength of Section. The typical organisation of the section is shown on the chart attached which applies to the date of March 1944, and it will be seen that this included the total personnel of 80 split up into 13 separate sections.

The sections and the personnel were as follows:-

(a) SERVICE PERSONNEL

(i) Officers

R.A.F. & W.A.A.F.	25	
U.S. Personnel	<u>14</u>	
	<u>39</u>	39

(ii) Other Ranks

R.A.F.	5	
U.S. Personnel	<u>13</u>	
	<u>18</u>	<u>18</u>

TOTAL SERVICE		<u>57</u>
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(b) CIVILIAN PERSONNEL

(i) Technical

Translators	4	4
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(ii) Clerical

Stenographers	9	
Clerks	<u>10</u>	
	<u>19</u>	<u>19</u>

TOTAL CIVILIAN		<u>23</u>
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GRAND TOTAL		<u>80</u>
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110. Duties. Broadly the work can be divided into the following sections :-

- (a) The Operational Strategic Target Staff were divided into six main sections of which four were on a geographical basis and two on a functional basis. The four geographical sections were :-

GERMANY	(including Poland, Czechoslovakia, Austria, etc.)
FRANCE	(and also Belgium and Holland)

Page 10.

- MEDITERRANEAN (including North-West Africa, Italy and the Balkans)
- SCANDINAVIA (including Norway, Sweden and Denmark)

Each of these sections dealt with targets of all types (excepting airfields and flying bomb sites) in their respective territories.

The two functional sections were :-

- AIRFIELDS (including Operational Airfields, Training Establishments, Landing grounds, etc. etc.)
- NOBALLS (including flying bomb launching sites, stores, etc. etc.)

These sections dealt with all targets of the particular type concerned in all countries.

- (b) The Operational Tactical Target Staff comprising some 26 officers and men worked on the Tactical Target Dossier. The staff were split in that some were working alongside the Army, Photo Interpreters and Intelligence Officers at their headquarters, and some on the collating side at A.I.3c(1). The former group worked in 'teams' of about 4 each, each item working on a given Tactical Target Dossier Area.
- (c) There was one Non-Operational Target Staff namely that concerned with the Far East War. It had been agreed, when the American Air Forces came over to this country in 1942, and decided to place the responsibility of the preparation of all Target Material for the European War with the R.A.F. Air Ministry A.I.3c(1) Section, that as and when at a later date the British Air Forces would be taking part in the Far Eastern War then the American Air Forces would be responsible for the preparation of Target Material for that theatre, and supply all the material required by the British Air Forces. Hence A.I.3c(1) did not prepare any original Target Material for the Far East War in London, but the A.I.3c(1) Far East Section dealt with all Far Eastern Intelligence material which became available; instead of proceeding with the preparation of the Operational Material, however, they handed this information to their opposite numbers in the War Department, Washington, who were the American body responsible for this work.
- (d) There were three other Technical Sections of the branch namely:-
- Translation Sub-Section
Publication Section
Drawing Office

These three sections dealt with work as required by all the various operational sections mentioned in (a) and (b) above.

- (e) Finally, there were two General Sections namely :-

- Typing Pool (~~with Stenographers and Copy Typists~~)
Registry (~~for correspondence and mail~~)

111. The above notes deal particularly with the staff and organisation of A.I.3c(1) itself, but in addition to this staff a number of other organisations on map making, printing, publication and distribution sides were engaged wholly on target work. They came under the direct operational control of A.I.3c(1), as mentioned in para.65, the total staff involved being of the order of 370 persons.

CONCLUSION

112. A review of the data outlined in this chapter inevitably leaves with the writer a feeling of dissatisfaction that it deals but sketchily with the subject of target material and all it entails. This is perhaps natural since it is difficult to concentrate in a relatively short space the results of the continued efforts of a large staff working continuously at high speed over a period of five years. However, it is hoped that the 'high spots' have been touched upon and that those who may be really interested in future will avail themselves of the extensive records of A.I.3c(1) which were handed over at the conclusion of the war. Furthermore the late Head of the Section though now back in civilian life has offered to give any further information of which he may be capable if this would be of assistance.

113. If there is any one point which stands out more than any other, it is perhaps the fact that, whilst the preparation of target material (not only in the mechanical processes involved but also in the advisory work which is associated with it) was naturally carried out by an Intelligence Department it is the one intelligence activity which calls for greater co-operation and liaison with the Operational side of an Air Force than any other. It must call for very close contact with continual changing operational experience if it is to be effective, and it does not call simply for the preparation of a lot of prettily bound books prepared by a section which limits its view to the confines of its own office.

114. There are strong grounds for recommending that in peace time there should be a continual interchange of Officers between the Intelligence Target Section and the Training and Operational Stations, which is just as important as the maintenance of a very close liaison with all intelligence sources.

115. Such success as may have been obtained by A.I.3c(1) during the war in meeting the many demands of the several Operational Air Forces which it had the honour to serve was in no small measure due to the unbounded enthusiasm of the Officers and Staff of the Sections, who put in an incredible amount of work over exceptionally long hours. It was a matter of very deep sorrow to the section that five of their members (four Officers and one N.C.O.) were killed, whilst engaged upon their work, by a Flying Bomb in August, 1944. Their names were Squadron Leader J.D.Cowley, Flight Lieutenant W.R.L.Edwards, Flight Lieutenant J.D.Williams, Flight Lieutenant Turpin, and Corporal Hyamson, and a tribute is here paid to the great work which they accomplished in the Section up to the time of their deaths.

AIR MINISTRY INTELLIGENCE IN WARPART III. CHAPTER 12 (ii)A.I.3(c) 1.TOPOGRAPHICAL AND TECHNICAL WORKS OF REFERENCE.MAPS, ATLASES AND CHARTS.

1. Maps. Full use was made of the G.S.G.S.4081 and G.S.G.S.4416 series both of which cover GERMANY, though the 4416 series extends into CZECHOSLOVAKIA, AUSTRIA, HUNGARY and POLAND. For DENMARK G.S.G.S.4210 scale 1:100,000; for HOLLAND G.S.G.S.2541; for BELGIUM G.S.G.S.4336 and for FRANCE G.S.G.S.4429. These four series extend immediately north and west of the main G.S.G.S.4416 series. Further north the G.S.G.S. series was used for NORWAY.
2. A considerable use was also made of the original G.S.G.S.5005 series, scale 1:75,000 for AUSTRIA, G.S.G.S.4060 series, scale 1:75,000 for CZECHOSLOVAKIA, and some use was also made of the G.S.G.S.4177 series, scale 1:100,000 for POLAND. The nine sheets of G.S.G.S. 4156 1:500,000 of the RUHR were found invaluable and G.S.G.S.4414, scale 1:25,000 GERMANY was also found useful.
3. At a later date considerable use was made of the town plans of various German centres compiled and drawn to various scales by A.C.I.U. and War Office, checked with reference to I.S.T.D. * and published by the War Office as G.S.G.S.4840. Similar town plans for DENMARK - G.S.G.S.4260, for AUSTRIA - G.S.G.S.4483, for CZECHOSLOVAKIA - G.S.G.S.4489 for POLAND - G.S.G.S.4435 and for NORWAY.
4. Full use was made of the G.S.G.S. Miscellaneous No.80 Germany Throughway Town Plans of Volumes No.1 and 2, and G.S.G.S. Miscellaneous No.81, and a similar volume for DENMARK and G.S.G.S. Miscellaneous No.100 the volume for AUSTRIA. The G.S.G.S.4438 EUROPE Communications 1:800,000 and G.S.G.S.4478 GERMANY Road Map - scale 1:500,000 were basic maps for all work relating to transportation.
5. Among the smaller scale maps, most use was made of G.S.G.S.4076² - scale 1:500,000 EUROPE AIR MAP, this being the standard wall map on which target groups were pin-pointed. A selected list of smaller areas had regional spas prepared for them off the G.S.G.S.4346 GERMANY 1:250,000.

6. It may be added that the G.S.G.S.2758 - 1:1,000,000 EUROPE was found to be less satisfactory, one of the main troubles being its relative insistence on thickening up and thereby emphasising a number of rail roads known to be relatively unimportant. It was, therefore, found to be somewhat misleading when dealing with transportation problems.
7. The two EUROPE AIR MAPS G.S.G.S.4072 1:500,000 and G.S.G.S.3982 1:250,000, were widely employed.
8. A considerable use was made of all maps and charts produced by G.S.S. Among these the most useful were No.2992 dated 8th April 1944 and 3131 dated 8th April 1944. Both dealt with the railways of Greater Germany, the first showing them by means of ordinary black lines on a white background, while the second used a complex colour scheme to indicate the extent of the administrative districts of the National Rail Roads in 1942. It may be added that these two maps were the standard reference maps used at C.S.T.C. Committee Meetings.
9. Atlases. No special atlas was employed, but the most use was made of two:-
- (a) The Oxford Advanced Atlas published by the Oxford University Press
and prepared by Messrs. Bartholomew Ltd. Edinburgh,
and
- (b) The University Atlas published by Messrs. George Philip Ltd.
London and prepared by Professor H.C.Darby of the
University of Liverpool.

TOPOGRAPHICAL WORKS OF REFERENCE.

10. In as much as most of the work dealt with the physical and economic vulnerability of German targets topographical works were mainly used to control the account of the relief features of the area surrounding any particular target or target group. Three books were in constant use:-
- | | | |
|-------------------|---|----------------|
| (1) O.D.Von Engel | - | Geomorphology. |
| (2) K. Lobeck | - | Geomorphology |
| (3) C.A.Cotton | - | Geomorphology |

These three were privately purchased and von Engel's book was easily the most important.

11. Where references to soil were required full use was made of K.D. Glinka's "The Major Soil Regions of the World". The small book "The Rape

of the Earth " by G.V.Jacks and R.O. Whyte was of value in giving a rough background. Where detail was necessary recourse had to be made to local surveys of German regions for which details could be obtained through the Agricultural Experimental station at Rothemstead by courtesy of Dr.W.G. Ogg the Director, and G.V.Jacks the Director of Soil Survey. Questions of precise pedological nomenclature were usually solved by reference to material published by Professor F.W. Robinson of the University College of North Wales, Bangor, and Director of the British Soil Survey.

12. Little reference had to be made to details of climatic conditions, and where this was necessary the material was obtainable in Hahn's "Klimatologie" climatic regions being obtained from Koppen's Detailed Lists.

13. The economic analysis of target material called for little reference to vegetation but the agricultural pattern of the landscape was normally important. Full details on this were available with little difficulty in standard German reference books, for example Philippon's "Europe", or the group of monographs dealing with The Geography of Germany and edited by Norbert Krebs.

TECHNICAL WORKS OF REFERENCE.

14. Most of the material required dealt with the organisation, location and scope of production of German firms and combines. For this purpose a very considerable use was made of the DEUTSCHE REICH ADDRESSBUCH (D.R.A.) which embraced the whole of Greater Germany. Various INDUSTRIE COMPASS publications, the volume of Kelly's Directory dealing with EUROPE, Telephone Directories, and the BOMBER'S BAEDEKER issued by the Ministry of Economic Warfare, one volume dealing with GERMANY and the other with AUSTRIA, were also used.

15. Numerous publications of the Ministry of Economic Warfare appeared during the war dealing with Coal, Coke and Coke By-Products, Electricity both thermal and hydro-electric, Gas Production and Distribution as well as a group of papers analysing certain outstanding aspects of the German Metallurgical Industry. All these were fully employed at all times.

16. Standard technical dictionaries and reference books dealing with Aircraft Engineering, Locomotive and Marine Engineering, Chemicals, Explosives, Food and Clothing Production, were also used. Most of these books were published in America and were made available to the section on lona. The Head of the Section himself obtained a very considerable number of publications which were of the highest value, more particularly in the field of Power Production and Distribution,

AIR MINISTRY INTELLIGENCE IN WARPART III : CHAPTER 12(111)A.I.3(c)2:ASSESSMENT of DAMAGE (111)1. Origin.

With the German invasion of Norway in April, 1940, and the start of systematic attacks by Bomber Command, an establishment was created in A. I. 3(b) for an officer to collate and summarise all Intelligence received concerning the result of air attacks on all targets whether on land or at sea.

The main work fell into three sections:

- (a) Results of attacks by Bomber Command on land targets.
- (b) Results of attacks on mercantile shipping and enemy naval units.
- (c) Results of sea mining.

2. When reliable Intelligence was received on these matters, it was included in a summary produced by the section, known as the Raid Assessment Summary. In this was summarised not only the damage to all targets attacked by Bomber Command and the 8th Air Force and the results of sea-mining, but also accounts of the reaction of the civilian population, their morale, and the efforts of the authorities to cope with the situation. The preparation of this summary remained until the end of the war a primary function of the section. It had a distribution list extending from the War Cabinet (through the War Cabinet Weekly ^{Resumé} ~~Digest~~) and the Air Staff (through the Air Staff Operational Summary) to the crews themselves (through the Operational Commands). In the middle of 1940, a second officer was posted to the section which during the Battle of Britain, and for some time thereafter, took on the additional function of recording G.A.F. losses.

3. Development

It was not until November, 1942, that the section became a separate entity known as A. I. 3(c)2 dealing with results alone. It consisted of three officers and one clerk. When the American 8th Air Force commenced operations, an American Officer was one of the three, attached to the section to learn its methods and co-operate in the assessment of American results. After six

/months

months this officer was recalled by the 8th Air Force and an R.A.F. Officer, who continued to study primarily 8th Air Force attacks, took his place.

4. At the beginning of 1944, the suggestion whether there should not be a further re-organisation of the section, was raised by Bomber Command. This would have involved a very considerable increase in the staff, and the introduction of experts on statistics and various industries to meet the more detailed information on results that the Command considered was required. The suggested re-organisation did not however take place, but its objects were accomplished in a different way: it was considered that the more detailed statistical and industrial information required by the Command could more easily be collated by the then existing section in the Ministry of Economic Warfare which dealt solely with air raid results and their effect on industry: to meet the demand M.E.W. were asked to and did increase the size of their section. This had another advantage in that being a Ministry independent of the Services they were less liable to attack by the other service ministries on the ground of bias.

Assessment of Results of attacks by Bomber Command on land targets.

5. Early Limitations

The section started with no background of previous experience. What bombing had taken place in the 1914-1918 war did not afford a basis for the assessment of results in the second World war. Only two of the numerous sources of information were ever accepted at their face value: these were (1) photographic interpretation reports and (2) the comparatively rare reports from ~~secret sources such as agents~~ secret sources such as agents on the subject which were graded A.1. No other report was accepted as a fact. The main difficulty encountered in the years 1940 and beginning of 1941 was that virtually no evidence was available as to rates of repair and recuperation of the targets attacked. Photographic reconnaissance was still on a small scale and the few aircraft available were, in the summer and autumn of 1940, employed mainly on priority work concerned with the possible invasion of this country.

6. German Powers of Recovery

Thus at this time it was very rare, once a photograph of the results of an attack had been obtained, to be able to have any further reconnaissance flown to ascertain what repairs if any, had been effected, as in the end of the war became a normal occurrence. The gap was to some

/extent

13

extent filled by the study made of the effect of the German bombing on this country in the winter of 1940/41 and of our own known powers of recovery. From this it became only too clear that with the tonnage then being dropped upon a country the size of Germany few substantial results could be achieved.

7. Difficulty of full Assessment

Prior to the 1,000 Bomber raid on Cologne in May, 1942, which was the first milestone in the growth of the bomber offensive, certain factors had

become apparent:-

Undisclosed Damage:

(a) ~~(A)~~ Photographic interpretation was conservative and hardly did full justice to the results in particular to three classes of targets ^{vis. (A)} ports, (ii) heavy industry and (iii) railways. ~~(A)~~ Rarely was it then reported that damage had been caused to cranes, unloading facilities or to slips at ship-yards, yet ground reports as to cranes being damaged or rendered unserviceable and of bombs falling on slips, were too numerous to be discounted. (b) An example of damage to heavy industry occurred in the iron and steel works at IJnuiden which had been attacked by two aircraft carrying only 250 lbs. bombs. Photographs obtained after the attack showed no damage, but three days later an important official of the works who escaped from Holland the night after the attack and arrived in this country, informed us that he had seen the damage himself, that the bombs had put the blast furnaces completely out of action, and that the works would be closed down for a minimum period of three weeks to a month. (c) An example of damage to communications arose in February, 1942, concerning traffic over the Hohenzollern Bridge at Cologne. Reports began to be received stating without explanation that no trains were passing across the bridge. A careful check upon the photographs showed no trace of damage. There the matter might well have rested, ground intelligence not being disseminated in view of its incompatibility with photographic evidence, had not the story continued to come in. The mystery was eventually solved one month later in a report received from the Air Attache, Berne, containing full details. A bomb had somehow burst under the arches carrying the lines from the main station on to the bridge. The effect of the explosion was not sufficient to destroy the arches, but the structure was so weakened and undermined that no train could possibly be run from the station to the bridge, until repairs were completed. This factor of invisible damage caused

Para leading examples:

Tabulate:

- (a)
- (b)
- (c)

continual difficulty and experience showed and continued to show that ground reports should not be immediately discounted merely because what was reported from the ground could not be seen on photographs.

6. Assessment of Bombing Failures

(2) Notwithstanding the gradually increasing weight of attack during 1941, the scale of damage showed no proportionate increase.

If the work of the section was to assume a constructive character, it was evident that the same attention must be accorded to negative reports as to reports of positive damage. These were incorporated in appreciations designed for limited circulation within the Air Staff, and unlike the routine Raid Assessment Summary pointed out not only what results were being achieved, but what failures had occurred. A particular factor in arriving at the efficiency of the bombing force was the introduction of the night photograph.

Failure to find the original target by no means always resulted in no damage being caused to the enemy, though it was often some time before Intelligence gave an indication of where the bombs had fallen and what had occurred. To take a single instance, Goebbels in a propaganda speech sympathising with the inhabitants of Dusseldorf, and other towns in the Ruhr specifically mentioned the inhabitants of Moers, 3 miles West of Duisburg, and so provided a clue that this mining centre had received serious damage. This was confirmed by photographic reconnaissance despatched immediately after the text of the speech had been received. An outstanding example occurred as late as the 21st/22nd January, 1944, when after a heavy attack on Magdeburg, photographs showed less damage than should have been seen, having regard to the weight of the attack which according to the night plot had fallen mainly to the south. On the 8th February a report was received that the Lignose Sprengstoffwerke at Schoenbeck, 10 miles south of Magdeburg, had blown up in the attack on 21st/22nd January. This was followed by another report in the same sense, and photographic reconnaissance obtained as soon as possible disclosed that the works, believed to be the largest TNT manufacturing plant in Germany, had been very seriously damaged.

8. Assessment of Morale, ARP efficiency etc

The thousand bomber raid on Cologne gave the first indication of what from 1943 onwards became the main tasks of the section - that of trying to assess results which photographs by their very nature could not disclose;

the reactions of the people, the efficiency of the A.R.P., fire-fighting and relief organisations, dislocation to the municipal transport, etc. While this particular attack showed what could be achieved, it was not until the spring of 1943, that the force was really able to maintain large-scale air attacks at frequent intervals. In the intervening period the Germans had learnt a great deal from the Cologne attacks and when in 1943, with the attack on Essen, large scale area bombing began, it met an efficient and highly organised repair and relief service. A considerable amount of information was obtained from the local German Press, where relief arrangements were naturally publicised. It was of special interest to note the distribution of extra rations of food and alcohol that were allotted after attacks. These gradually increased in amount as the weight of the attacks grew, until the middle of 1944 when the deteriorating transport position and the overall lack of supplies prevented effective relief.

9. During 1943 when the main effort of Bomber Command was on areas, a special study was made ^{by Bomber Command} of civilian morale in conjunction with A. I. 3(a) 2 and with the German Section of the Political Warfare Executive. By this time the German communiques received by noon of the day following the attack, were beginning to provide the first indications of success. From past experience it was possible to divide the wording into roughly 5 categories, the difference between an admission of "scattered bombing in N.W. Germany" and "a highly concentrated terror attack with severe damage to cultural monuments and heavy casualties to the civilian population in the town of 'Blank'" is obvious. To gauge the remaining categories was not quite so simple, but some guide was nearly always obtained. ^(As usual) ~~This was usually followed by the~~ night plot or on many occasions by an immediate daylight photographic reconnaissance. — By then the picture had been obtained and ground Intelligence began to fill in the details of what had occurred. Our knowledge of the movements of the fire brigades began to increase and it proved possible to estimate from what distance fire brigades had been called, and hence to appreciate the gravity of the crisis facing the relief organisations. It was during the series of attacks on Berlin in the winter of 1943/1944 that it became known that a large part of the fire brigade from Leipzig had been

transferred to the capital. At an appropriate moment the bomber force was suddenly switched from Berlin to Leipzig, which was very heavily damaged by fire.

10. When targets in German-occupied territory were the subject of attack, a careful watch was maintained not only on the damage caused, but also on casualties and general reactions amongst the population in the districts concerned. This was especially necessary in the heavy attacks on the French railway system before D-Day when targets near built-up areas could not be avoided. Information when collected was passed to A.C.A.S.(I) and D.C.A.S. to enable the Air Staff to judge whether the continuance of the policy outweighed any political implications that might arise.

Special reports were also made concerning the intelligence received when new types of weapons first came into use.

Assessment of Results of attacks on shipping. →

11. (i) Mercantile shipping.

In the summer of 1941, No. 2 Group Bomber Command commenced systematic attacks against shipping mainly off the Dutch coast and Frisian Islands, using as their weapon the 250 lb. bomb. As Intelligence on these attacks came in, it was apparent that this bomb was not the effective weapon the Group thought it to be. Their claims were based on the assumption that a hit by one or more 250 lb. bombs on a merchant ship of under 4,000 tons would render the vessel destroyed or a total loss. This was found not to be the case and in conjunction with N.I.D. a formula was agreed upon which served as a basis for assessment for the remainder of the war.

12. Shipping Assessment Committee

A Committee was set up in Air Ministry to deal specifically with attacks on shipping. While in the Admiralty such a Committee was run by N.I.D., in Air Ministry it was set up under an Operational Director, notwithstanding the then D. of I.(O)'s objection that it was fundamentally unsound for Operations to assess their own results.

13. The assessments of the Air Ministry Committee went before the N.I.D. Committee for final incorporation with the results of attacks by naval forces and close liaison was maintained with N.I.D. in these final stages, a representative of AI3(c)2 attending the meetings of the N.I.D. Committee.

14. This Committee assessed results not only in Home Waters but also in the Mediterranean, and experience in attacks in the latter theatre was a most useful guide. Among the many sources of information, considerable assistance was derived from the Red Cross. When ships were sunk, especially in the case of Italian shipping, a request would be received, almost invariably within a fortnight or a month after the attack had taken place, for particulars to be given of any survivors of 'such and such' a ship that had sailed on a given date for some North African port and had not been heard of. With this information it was possible to inform crews that the ship they had attacked, had later sunk, giving them its name actual tonnage, and on many occasions the cargo it would have been carrying.

15 (ii) Enemy naval units.

On all questions of damage to naval units, liaison was maintained with N.I.D.1. who had a special section dealing therewith. A quite natural difference in view point existed between the Air Ministry and the Admiralty, and agreement as to the effect of attacks on naval targets was not always easy to reach, especially at the height of the U-boat offensive in 1942 and 1943. The Admiralty ^{were} ~~was~~ most interested in the assistance the R.A.F. could give them in the prosecution of the war at sea, and were therefore inclined to ask for priority in the bombing of naval targets.

16. target. The Air Staff on the other hand had to weigh the results of attacks on naval targets against what might be achieved on other types of target. An important instance in this respect arose on the question of subjecting to area attack the four main U-boat bases at Brest, Lorient, St. Nazaire and Bordeaux, in the hope that this would help to reduce the efficiency and speed of U-boat turn-round. The Air Staff maintained that with bombs then available, no substantial advantage would arise having regard to the special concrete shelter facilities which had been erected in these ports. The Admiralty contended that the effect on morale would be considerable and the lack of facilities would dislocate the turn-round. Lorient and St. Nazaire were in fact subjected to area attacks but by then sufficient intelligence information had become available to confirm the opinion of the Air Staff, and upon an agreed statement of facts, the Chiefs of Staff decided that this policy should not be continued.

/Result

17 Results of sea-mining.

By their nature, sea-mining results were not as easy to come by as results of attacks on land targets, but on this aspect of the work of the section there was a guide in that experience after the last war showed clearly that the dividends received from mining operations far exceeded what wartime intelligence had thought to be the case. The Admiralty again had a special section studying this subject with which the closest liaison was maintained to ensure that as far as possible no evidence of results should escape us. It was natural that information on results in areas bounding neutral territory would be more easily obtained and the staff of the Ministry at Stockholm and Foreign press and broadcast announcements were a fruitful source of information. It was not possible at any time during the war to give accurate figures of the tonnage sunk. After a considerable lapse of time evidence of the existence of wrecks was received by the Admiralty, frequently in areas where sea-mining operations had taken place. While it could not be said with certainty that these were the results of sea-mining, there was a strong indication that when particulars became known they would prove so to be. The number of these wrecks was considerable but the names or tonnages of the vessels being unknown no accurate statistics could be formulated. In the early years, results were collated in secret publications produced by the Air Staff. In the later stages of the war, when the effort had increased considerably all results were passed to the Naval staff at Bomber Command who became responsible for their collation, publication still being made through the Raid Assessment Summary.

18 Ancillary Tasks: Target Intelligence.

In 1940 a Committee was formed of representatives of Air Ministry Plans, Intelligence and M.E.W., known as the German Bomb Target Information Committee. An officer of the section was appointed as Secretary so that results known could conveniently be brought before the Committee. The officer remained Secretary until the removal of Intelligence from Whitehall to Monck Street in 1942, when it was considered more convenient for one of the officers in Bomber Operations to act as Secretary, especially in view of the fact that the Committee, then under the Chairmanship of D.B.Ops. was

/becoming

What did it do?

SECRET.

19/2
 becoming gradually more operational and as by then Intelligence was fed from day to day direct to the operational directors.

In liaison with A.I.6. it was one of the duties of the section to assist in checking the accuracy of press releases of all kinds dealing with the achievements of the bomber offensive.

19. With the adoption of specific target systems dealing with the aircraft industry, oil, etc., working committees of experts were set up ^{under the Combined Strategic Target Committee} and the duties of A.I.3(c)2 were confined to attending the meetings of the Jockey Committee on the ^{German} aircraft industry, ⁽⁴⁾ and to ensuring that all information received on other subjects was passed to the Chairman of the Working Committees. The head of the section attended the Combined Strategic Targets Committee in which reports of the Working Committees were considered from the point of view of future policy.

(1) See Chapter II (iv) paras 50-53. ^{See} ^{Chapter III (iv), paras 50-53.}
 * Note

A.I.3.(c)2.

20.7.45.

INTELLIGENCE ON ENEMY SCIENTIFIC DEVELOPMENT

(Developed by R.V. Jones)

INTRODUCTION.

1. This Chapter is in the nature of a scrap-book illustrating the growth of the work in pure Intelligence carried out by A.D.I.(Science) from 1939 to 1945. It is not a complete history of the Department, nor even of its work: it is only a summary of selected phases showing the main lessons to be learnt. An historical approach has been adopted, however, because it provides an evolving series of working examples showing how we learned our lessons and applied them; and we know of no more convincing way of presenting these lessons to others.

2. We must apologise at the outset for the fact that this Chapter is neither as complete nor as concise as it might have been had we had more time in which to examine the contemporary German records and, particularly, to draw our own thoughts together into a coherent philosophy of Intelligence. We can only here remark that Intelligence is a subject which deserves a great deal more thought than anyone has devoted to it, and that several years of peace must elapse before we can fully digest the many lessons which the past war provided. This Chapter, although written nearly a year after the end of the war with Germany, is therefore only an interim statement.

3. We shall inevitably make remarks regarding the contributions of various types of source, and we should perhaps point out that our remarks apply to the value of the sources to Scientific Intelligence in particular and not necessarily to Intelligence in general. Further, in several of the Intelligence problems discussed, other Intelligence branches made contributions within their own spheres. From the present Chapter these are largely omitted, not because their importance is not realised, but because we are here concerned with experiences inside Scientific Intelligence, and it is neither our purpose nor our place to assess the relative contributions of A.D.I.(Science) and other Intelligence branches.

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1935 TO 1939.

4. The meetings of Sir Henry Tizard's Committee for the Scientific Survey of Air Defence between 1935 and 1939 showed that we were then obtaining very little information about foreign scientific and technical developments. It was therefore proposed (~~Air Ministry files S-50573 and S-50602 refer~~) that a scientist should be attached for a trial period to Air Intelligence in order to stimulate the flow of information. ^{Delay in securing Treasury} ~~approval~~ ^{opposition} to the proposal resulted in the appointment of a scientist being so delayed that, in the meantime, war broke out.

OUTBREAK OF WAR - THE "SECRET WEAPON".

5. The first scientist was appointed on 11th September 1939 - eight days before Hitler's famous "Secret Weapon" speech, in which in fact he made no reference to a secret weapon; the subsequent scare owed its origin to an error in the published translation. This error, however, focused attention on the need for sound scientific analysis of Intelligence, and the first task of Air Scientific Intelligence was to search all the ~~Secret~~ ^{Secret} ~~Int. S.~~ files for pointers to possible new weapons. The first ^{Air Scientific Intelligence} ~~Int. S.~~ Report, dated 11.11.39, described the results of this search, and concluded that, while Hitler was clearly referring to the Luftwaffe as a whole, "there are a number of weapons to which several references occur, and of which some must be considered seriously. They include..... Gliding Bombs, Pilotless Aircraft, Long Range Guns and Rockets".

GROUNDWORK WITH THE S.I.S.

6. The search through the Intelligence files at once revealed the main deficiency in the Intelligence system at that time. This was the absence of information, and was due to two causes: first, the S.I.S. had no scientifically qualified agents, no scientific headquarters section, and indeed no scientific background at all and, secondly, the Service Intelligence Departments had no scientific sections to stimulate the S.I.S. and

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to collate the information coming out of it. As the Treasury had only allowed one officer for all these tasks, he could not execute them separately. It was obvious that to consider collation would be academic until satisfactory arrangements had been made for collection; hence it was better that this one officer should sit with the S.I.S. to help with collection, and as far as possible perform his Air Ministry collation duties from an S.I.S. chair. This practice, largely dictated by circumstances, was later to prove of considerable benefit.

7. The search through the S.I.S. files also produced a liaison, which afterwards became invaluable, between Scientific Intelligence and ~~G.I.S.~~ ^{Most Secret Intelligence,} G.S., (~~for the S.I.S. files were housed at Bletchley Park,~~) and some of those ~~G.C. & G.S.~~ officers ~~stationed there~~ had helped the Secret Weapon investigation by linguistic criticism of Hitler's speech and its official translation.

8. The quiet period up to April 1940 nearly resulted in Scientific Intelligence being abandoned, for there were few visible results to show, since all the effort was going into spadework with the S.I.S. Moreover, there was a school of opinion, mainly outside Air Ministry, which held that there was no need for a scientist to work inside the Intelligence organisation, and that all problems could be solved by quickening the flow of information between S.I.S. and the Research Departments, which would do their own collation. This viewpoint was important, because it was to prove the main obstacle to the growth of Scientific Intelligence throughout the war. It contained a fallacy, not obvious except to an experienced Intelligence officer, in assuming that because a scientist was a leading expert in our own development, he was necessarily the best man to collate information about the corresponding enemy development. As a result of opposition based on this argument, a proposal to establish Scientific Intelligence on an inter-Service basis (~~A.S.I. Report No. 2 - A Scientific~~

~~Equipment Codes and Cypher School,~~

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Intelligence Service, 7.12.39) was turned down, and the one officer had to proceed alone. Among other things, this resulted in the Air Ministry having the only Scientific Intelligence Section for the first four years of the war.

THE KNICKEBEIN, BOMBING BEAMS.

9. In March 1940, Prisoners of War began to indicate that the enemy had developed methods of blind bombing using radionavigational aids, one known as "Knickebein" and the other as the "X-Gerät". It became a principal object of Scientific Intelligence to discover the nature of these aids.

10. In June 1940, we received a copy of a single short message sent on 5.6.40 by the Chief Signals Officer of Fliegerkorps IV. This ran: "Knickebein Klevé is directed (the German word was "eingerichtet", which could also mean "set-up") at $53^{\circ} 24' N, 1^{\circ} W$ ". The importance of this message lay in the fact that from the way in which it had come into our hands, we could be reasonably sure that it was genuine and that it therefore formed, despite its shortness, a worthy basis for exhaustive deduction. The most plausible explanation was that a signals transmitter at Klevé had been aimed at the above coordinates, which refer to a point near Retford, and that it could be received by aircraft of Fliegerkorps IV. This could be completely squared up with an entry on a captured document of two months before, and with some remarks by prisoners which indicated that Knickebein might be a radio beam. Now Fliegerkorps IV possessed only He 111 aircraft, with standard radio equipment, and this must therefore be capable of receiving the Knickebein transmissions. The most likely part of the equipment appeared to be the blind landing receiver, a conclusion which was confirmed by R.A.E.'s observation that this receiver possessed unnecessarily high sensitivity for its declared purpose. The use of the blind landing receiver determined the frequency band within which the Knickebein beam must operate; this was between 28 and 35 Mc/s. An aircraft could therefore be detailed to search on this band. The beam was immediately discovered.

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11. The Intelligence work behind the Knickebein discovery ~~has been recapitulated in some detail (it was given in full in A.S.I. Report No. 6, of 28.6.40), for in many ways it~~ was the first application to a major problem of techniques fundamental to the collection and collation of Scientific Intelligence. In particular, the attention to detail such as the abnormal sensitivity of the German blind landing receiver, and the use of every scrap of information contained in the message, together with the collation of facts from widely different sources (some of which, such as the type of aircraft flown by Fliegerkorps IV, were hardly likely at first sight to be of much importance to Scientific Intelligence), were techniques which applied to nearly every subsequent problem. Apart from the Fliegerkorps IV message, the contribution ^{by the interrogation of prisoners} of ~~A.I.I. (it)~~ was very important, and the success achieved in this investigation stimulated that source to a high level of efficiency which was maintained throughout the following five years. The success of the listening flight to find the beam demonstrated the possibility of airborne Y work, and largely from this sprang a new source, technical radio listening.

12. The discovery of Knickebein, after a leading radio expert had said that the system was technically unfeasible, was in time to enable countermeasures to be developed, so that as soon as the Germans attempted to use it on a large scale against this country (23.8.40) it could be jammed. Thus began the close and essential connection between Scientific Intelligence and Radio Countermeasures.

13. The German aircrews soon discovered that Knickebein was jammed, but they had some difficulty in persuading senior officers that this was so, because nobody would face the issue of having to tell Goering about it. Ultimately the Germans sent out special listening sorties to check the crews' reports, and their scientists came to the conclusion that the beams were not merely jammed but bent; this was stated by Dr. Plendl, the chief

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German radionavigational scientist, in an unreported interview in November 1945. ~~Dr. Pendl's statement is borne out by one made by Dr. Kotowski, of Telefunken, to the Americans, and reported by the Enemy Equipment Intelligence Service, Detachment No. 11, Signal Section, H.Q. Seventh U.S. Army, on German Signal Research and Development Facilities, dated 15.8.45:~~

~~"From the results of Knickebein I heard that it operated well but that it was soon known to the British and that the enemy fighters came on the high-frequency sheet against our bombers. Therefore it was in later time switched off in a great part of air raid time. Jamming and anti-jamming which was a disguising so that our bombers always followed the high-frequency sheet, never saw the target, they should bomb out and suddenly were out of England, so that they involuntarily flew a semi-circle".~~

14. Thanks to the timely warning and to the consequent countermeasures, the Germans did not achieve their intended bombing concentration during the first two months of the night Blitz, and many of the bombs aimed at such a large target as London fell in open country. This dividend had repaid the investment of a single Scientific Officer in Intelligence, showing that here was a field worthy of intense exploitation.

15. It was, perhaps, ^{paradoxically enough} the fact that the importance of Scientific Intelligence had hitherto not been generally realised that enabled Knickebein to be so quickly unravelled, for owing to lack of external interest, the one officer could work unmolested; this condition was ~~unfortunately~~ no longer to obtain when the problems of the Rocket and the Flying Bomb were tackled, *and investigators of these weapons may well have suffered from a surfeit of cooks.*

THE NIGHT BLITZ.

16. The other navigational beam systems such as X and Y were duly solved. Had we had the nightfighters, there might well have been heavy losses in the Luftwaffe, for it was possible on many occasions to

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forecast the exact target, and the time, route, and height of attack, and all the radio characteristics necessary for countermeasures. Fighter dispositions were made on the basis of this information, at first with little success; but results became better with the improvement in nightfighting technique towards the end of the Blitz. All the time, of course, the information had been very useful to Civil Defence in giving a sufficiently advanced warning to enable firebrigades to be concentrated. It was largely the fact that the scientific basis for interpreting the information rested in the head of a single officer in London during the Blitz that resulted in the recruiting of a second officer to Scientific Intelligence as an insurance policy.

17. The X System was the most dangerous which we had to face. It consisted of a guiding beam laid over the target, with cross beams laid across the guiding beam in advance of the target, thus enabling the bomb aimer to work out automatically the correct release point for the bombs. Although only one Gruppe, K.Gr. 100, used the X System, this unit was made to act as fire-raising pathfinder for the de-Knickebeined Luftwaffe, after operating for nearly three months in an independent and desultory manner. Coventry, on 14/15th November, was the first target attacked by the new method. Thenceforward the success of the whole German bomber force depended crucially on the working of the X System.

18. It took some time for radiocountermeasures to become effective against the X System: only when an aircraft of K.Gr. 100 crashed in November was a serious error revealed in our jamming. The error was due to an incorrect measurement of the beam modulation frequency, and only after this had been corrected by the examination of the captured equipment by R.A.E. did the jamming succeed in blunting the X Beams. It was at this time that we learned the value of the British system of having a free Intelligence reporting independently to the appropriate Chief of Staff and not (as in Germany or America) reporting through the Countermeasure authorities. A Countermeasure officer has to be almost superhuman

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to avoid 'pulling' the Intelligence to make it appear that he is doing as well as possible, whereas information must be assessed impartially if it is to be of maximum use. Moreover, Intelligence conducted under the direction of Countermeasure authorities frequently tends to become too short-termed in nature, because these authorities are necessarily closely concerned with day-to-day operations. A wise Countermeasure officer, however, welcomes an independent Intelligence organisation, because if he is making mistakes, sound Intelligence will enable him to correct them, and if he is really doing well, he will gain true credit from an assessment by an independent and impartial organisation.

19. The Y System was largely unravelled before it was used by more than a very few aircraft, and satisfactory countermeasures were devised from the start. In this case, rather more weight than before was given to the advice of Scientific Intelligence as to the most suitable countermeasure to use. The resulting success was so great that the Germans had to abandon the system. According to General Martini, the German Director-General of Signals, they did not realise that the ^{"High Frequency War"} ~~"Hochfrequenzkrieg"~~ had started, and they made errors in their strategy which, if they had reckoned with an alert Intelligence and Countermeasure organisation, they would have avoided. (A.D.I.K. 334/1945).

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20. We can elaborate Martini's remark. The date of the first A.S.I. Report (No. 7) on the Y System was 17.7.40. This report correctly guessed the method as one involving the bombing aircraft flying down a guiding beam, and being told when it was at the correct distance from the target for bomb release by a ground station which found the range of the aircraft by a new radio method; ^{the} A.S.I. Report No. 7, ~~thanks to the Oslo Report (see p~~ even guessed the nature of this method. Now Dr. Flendl, the inventor of both the X and Y Systems, stated that he only started to develop the latter in June 1940. So, if his memory is correct, we had guessed the nature of his new system within a month of his conceiving it. In any case, we were fully expecting it when III/K.G. 26 made the first experimental flights over

England with the Y System in November 1940. We did not jam at once, partly because our technical listening service had not interpreted its observations, and partly because all our available jamming effort was needed for Knickebein and the X System. As a result, III/K.G. 26 made a few successful experimental flights, and the Germans therefore decided that, since first Knickebein and then the X System were jammed, they would extend the fire raising pathfinder technique to III/K.G. 26, who could take over from K.Gr. 100 when it became impossible to use the X System. Being roughly aware of this situation, Scientific Intelligence advised that radio countermeasures against the Y System should be on more skilled lines than had been those against the other beam systems. As a result, subtlety was introduced into the countermeasures against the Y System and, as a matter of good luck, it turned out that the effect of these countermeasures first became evident to the Germans on the very first night on which they had ordered III/K.G. 26 to operate as pathfinders for a large raid: (~~Statement of Dr. Flendl in C.I.C.S. Report XXXI-37~~). The Y System came instantly into disrepute, from which it never recovered; towards the end of the Blitz it was finally abandoned as a first-line radionavigational method against England.

PHOTOGRAPHIC INTERPRETATION.

21. In the course of the investigation of the beam systems, contact was established with the Photographic Reconnaissance Unit. The beam transmitters represented a new type of radio station, and it was therefore not unnatural that the specialist background of Scientific Intelligence should have been found necessary for their original detection on photographs. Scientific Intelligence therefore constituted in some respects a fourth phase on the normal interpretation then done by P.I.U. at Wembley, and later by C.I.U. at Medmenham. The first Knickebein station was, for example, found by the fact that it had rotated between successive photographs, a technique which was later to become applicable to many types of

radio station, and which was discovered by Scientific Intelligence. At the same time, the overwhelming bulk of the interpretation was done by Section G of C.I.U., which was completely devoted to radio and the interests of A.D.I.(Science), and it is a pleasure to acknowledge the enormous amount of painstaking work carried out by Section G with loyalty and with conspicuous success throughout the war.

ESTABLISHMENT OF A.D.I.(SCIENCE).

22. By the end of the beam war, a change had occurred in the organization of Scientific Intelligence. O.A.S., largely as a result of experience over the beams, decided that this form of Intelligence was so important to the Air Staff that in January 1941 he proposed that the personnel involved (by that time, three officers) should be transferred officially from M.A.P. (to which the Research Directorates had been detached) back to the Air Staff, and should form the nucleus of a Deputy Directorate, (Air Ministry File GS8531 refers), the head of Air Intelligence being then a Director. However, ~~through some miscarriage of paper work~~, this plan was not completely executed, and instead, Scientific Intelligence became an Assistant Directorate under A.C.A.S.(I). ~~The direct allegiance of A.D.I.(Science) to A.C.A.S.(I) throughout the war, instead of to one of A.C.A.S.(I)'s Directors was the sole relic of O.A.S.'s original proposal.~~

23. The rather larger establishment (one Assistant Director, one Senior Scientific Officer and four Scientific Officers) then allotted to A.D.I.(Science) gave scope for the bringing in of further scientists, but in many ways it was already too late. The war had been in progress for eighteen months, and the best men had long before been absorbed by the Research Directorates, who would not release them. As good Intelligence officers have to possess rather rare qualities, apart from being scientists, it was inevitable that recruitment should be slow, and generally occur only when suitable men became available by accident. The organi-

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sation was so small that one unsuitable man could have seriously jeopardised it. Thus, all through the war, Scientific Intelligence was often in the position of a man trying to catch a bus travelling rather too fast for him: to meet all demands was nearly always beyond the capacity of the small staff. It was therefore necessary to concentrate only on problems of major importance, and at times to take risks by neglecting quite important problems for others still more important.

24. There was, of course, much to be said for a small organisation; this view was expressed in a memorandum to A.C.A.S.(I) on 20th November 1942:

'It has been part of our policy to keep the staff to its smallest possible limits consistent with safety, because the larger the field any one man can cover, the more chance there is of those fortunate correlations which only occur when one brain and one memory can connect two or more remotely gathered facts. Moreover, a large staff generally requires so much administration that its head has little chance of real work himself, and he cannot therefore speak with that certainty which arises only from intimate contact with the facts. Therefore, apart from any overworking or economy of staff in the country's apparent interest, it has been a point of policy to keep the staff as small as possible.'

GERMAN RADAR.

25. For the first three years of the war, the most important applications of scientific developments by the Germans lay in radionavigation and in radar. While a study of the former had led to the first successful results of Scientific Intelligence, the latter had been no less closely, though less dramatically, followed. The existence and rough performance of German radar had already been deduced in Summer, 1940 (~~A.S.I. Reports No. 5 of 25.5.40, No. 7 of 17.7.40, and No. 8 of 14.8.40~~) and transmissions from radar of coastwatching type in the Gris Nez area had

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been observed by T.R.E. on 28th September 1940; but despite this evidence there still remained some expert prejudice against believing that the Germans had radar.

26. Disbelief was only dispelled in February 1941 when, in a moment of respite from the beams, it was noticed that photographs of two small objects near Auderville on the Cap de la Hague (to which attention had been drawn by P.I.U.) showed minute differences of shadow which indicated that one of the objects had rotated (Figure 1). Since a similar discovery had led to the finding of Knickebohn, we hoped that here was a radar station for which we had been seeking since the preceding July when we had heard that a "Freya Gerat" had been installed near Auderville. A photographic search in July had failed because the high level photographs taken with the then standard 8" lens were of poor definition, and it was only when 20" focus lenses came into service that the Auderville objects became visible. A low oblique was ordered and, after one unsuccessful sortie, was obtained by P.R.U. The resulting photograph (Figure 1) was the first of its kind, and demonstrated the valuable results to be gained from close cooperation between pilot, interpreter, and Intelligence officer. In general, the closer the collating officer can get to the actual source, be he pilot, interpreter, secret agent, ~~cryptographer~~, intercept operator, prisoner interrogator or equipment examiner, the greater the enthusiasm of the source and the better the appreciation by the collating officer.

27. The Auderville Freya photograph was obtained almost on the same day as that on which one of the A.D.I. (Science) officers himself intercepted the transmissions. This problem had proved too difficult for the Y Service of the day by itself, and was only solved by a scientific officer familiar both with radar technique and the Intelligence problem involved. The successful interception, together with the photograph, produced the final evidence for the existence of German radar; and a search for further stations, and the design of countermeasures, could begin.

GERMAN NIGHTFIGHTERS.

28. The satisfactory establishment of Intelligence regarding German radar was important for two reasons. First, we should have to counter individual radar equipments sooner or later; secondly, we might be able to step off from our basic knowledge of German radar to investigate the tactical use of that radar in the German night defence system. By the middle of 1941, the R.A.F. was committed to the policy of heavy night raids on Germany, and knowledge of all aspects of the German methods of night defence might well prove a vital factor in maintaining our night offensive. ~~Air Vice Marshal Medhurst, who had recently been appointed~~ A.C.A.S.(I), therefore asked A.D.I.(Science) to assume responsibility for compiling the Intelligence picture of the German night defences. The soundness of this decision will be evident when it is realised that when you are fighting, the first things you need to know about your enemy are the scientific principles and technical details of his equipments; for these are the things in which you have to find the basic weak points, and which you must understand if you are to make sense of such matters as his Order of Battle. The technical capabilities and limitations of equipment largely determine its method of use, and this generally determines the organisational set-up.

29. The German night defences were likely to depend very largely, as ours did, upon radar; and therefore our study of radar, though perhaps a somewhat oblique approach, was likely to give us the key more quickly than any other. The latter half of 1941 was therefore spent mainly in building up the radar picture in the hope that it would lead to the discovery of the fundamental control equipment for both nightfighters and Flak. In the course of this work, A.D.I.(Science) broke a small code giving the positions of British aircraft on daylight sweeps as plotted by German radar stations on the Channel Coast. This information was taken to Fighter Command, where for a few weeks a current plot was kept showing the up-to-the-minute situation as it appeared to the German controller, to be com-

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pared with Fighter Command's own situation plots. Special probe sorties at specified heights were also flown, so that by noting the extreme range at which they were plotted by the Germans, we could find the performance of the Freya type of station.

30. A special arrangement was made with P.R.U. so that reconnaissance aircraft always took photographs as they crossed the French coast. If, as sometimes happened, they were plotted by a German radar station at that time, the plotted track could be superimposed on that shown by the photographs, and the position of the radar station discovered. By such techniques was our knowledge of German radar increased.

THE BRUNEVAL RAID.

31. It was soon obvious that apart from the Freya apparatus already photographed, there was another type known as "Würzburg", which was used for Flak control. The evaluation of the characteristics of the Würzburg would therefore give us our first real insight into the German night defences. In attacking this problem we had to go to the Balkans, where we found that one Freya and one Würzburg were to be sent to Roumania, and two Würzburgs to Bulgaria, for coastal protection. Now, as the Germans were short of radar equipment, they would probably stretch it out to cover as much coastline as possible. Thus, if F be the range of a Freya, and W of a Würzburg, $2F + 2W$ must cover the coastline of Roumania (260 km.), and $4W$ the coastline of Bulgaria (150 km.). Working this out, the range of a Freya must be about 100 km., and that of a Würzburg about 40 km. As we had independent confirmation of 100 km. for Freya, we felt some confidence in accepting the 40 km. for Würzburg. This range agreed with that deduced for some radar transmissions on the French coast, which we therefore concluded were from Würzburgs. The important thing now was to obtain a photograph and, after some tedious interpretation work, a promising speck was found on a photograph of a radar station near Cap d'Antifer (Figure 2).

file

The same Figure also shows the well known oblique which was subsequently obtained by a P.R.U. pilot. The story behind this oblique is too long, although not too dull, to be repeated here. It led to the Bruneval raid of 27/28th February 1942, the raid which Burckhardt, the German paratroop leader, cited as outstandingly the best, both in conception and in execution, of our Combined Operations in France. ~~The story of Intelligence leading up to the raid, and its Intelligence results, were given in A.S.T. Report No. 15 of 13.7.42.~~

^{WE}
THE GLANT WÜRZBURG.
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32. In September 1941, before even the Bruneval low obliques were taken, an indistinct photograph reached us through RAFDEL, Washington; this had been taken by the Americans in Berlin (they were still out of the war at that time), and showed an apparatus mounted on a tower in the Berlin Tiergarten. Unfortunately, there was nothing from which we could deduce the scale of the photograph, and we could guess little beyond the possibility that it might be a radar equipment working somewhere between 5 and 50 cms. It was the evidence of a Chinese scientist who had seen the apparatus in Berlin, and who had subsequently come out of Germany, that led us to examine the photograph again in December 1941. He stated that it was of wire-mesh construction, a fact not obvious from the photograph; and in our subsequent reexamination we found that good vertical photographs had recently been taken of Berlin by P.R.U.. From these we could obtain the scale of the American photograph, and could thus find that the paraboloid was at least 20 feet in diameter. Very shortly before this we had received the Bruneval photographs, which showed the Würzburg to be only 10 feet in diameter, and so it was obvious that we had yet another apparatus to track down.

33. The new apparatus remained a mystery for nearly three months, until one of our Belgian agents reported the existence of a German Freya station near St. Trond in Belgium. As this was in the middle of a

declared nightfighting area, we hoped that here was a German G.C.I. station. P.R.U. therefore photographed the site; the picture showed an equipment similar to that seen in the Tiergarten, and we were then reasonably sure that we had found the fundamental element in German nightfighter control. Thenceforward clues assembled quickly. In April 1942 we found a further station at Domburg, on Walcheren: it was well placed for a low-oblique photograph to be attempted. On 2nd May Squadron Leader A. Hill, D.S.O., D.F.C., of P.R.U. succeeded in taking the photograph shown at Figure 3; he was also responsible for the Bruneval obliques, and for many other of the most valuable and spectacular photographs taken in the interest of Scientific Intelligence. This Chapter makes little reference to personalities, but in Squadron Leader Hill's case this reserve must be broken. None of the very large number of unacknowledged colleagues who served the cause of Scientific Intelligence will begrudge this open tribute to Squadron Leader Hill; he died of wounds received in photographing Le Creusot on 21st October 1942.

34. The Domburg photographs showed the external detail of the Giant Würzburg, as it was called, as clearly as the photographic equipment supplied to P.R.U. would allow. We here ought to remark that British photographic equipment for high vertical reconnaissance had by 1941 gone ahead of its German counterpart, although it had started well behind. In low oblique work, we were always ahead of the Germans, thanks to the courage and skill of a few pilots like Squadron Leader Hill, who with inadequate equipment achieved remarkable results with the sideways-facing oblique camera. But their work would have been much easier and the photographs would have been sharper and more intelligible had the forward-facing stereo-oblique camera been adopted earlier, as it easily could have been. As it was, it was not adopted until 1944, after the Americans had shown its value. The delay was unfortunate, particularly since the idea was certainly discussed in our own Intelligence organisation as early as

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1942. Figure 3 shows a photograph taken with the forward-oblique camera for comparison with the Domburg photograph.

35. The main gap in our knowledge about the Giant Würzburg was now its actual radar transmission. This might have already been detected by an alert listening service, for by the time Domburg was photographed, two Giant Würzburgs had been working there for some months; but in fact it was only when detailed instructions about the expected transmissions were given to the listening service that they were detected. We had first to deduce the characteristics without listening evidence in the following way. We knew from other evidence that the maximum service range of a German G.C.I. station was about 60 km. We knew also that the maximum range of an ordinary Würzburg was 40 km. Therefore, if the radio equipment of a Würzburg could achieve 40 km. when mounted in a 10 foot mirror, it could easily achieve 60 km. in a 24 foot mirror. As we knew from examination of the Bruneval equipment that the radio parts were mass-produced, there was no need to look anywhere else for the radio parts of the Giant Würzburg; they were probably identical. The radio frequency was therefore likely to be about 560 Mc/s, and we had now to guess at the pulse repetition frequency. In this connection, we observed that the Germans had made a practice of linking the p.r.f. with the maximum useful range of their equipment. Freya, for example, with a maximum range of about 100-150 km. had been designed with a p.r.f. of 1000, while the small Würzburg with a maximum useful range of 25-40 km. had a p.r.f. of 3750. The Giant Würzburg had a maximum range of about 60 km., and so we could say that if the Germans followed their normal practice, they would have placed the Giant Würzburg p.r.f. about 2000 or less.

36. We could thus instruct the listening service first to put up a directional aerial pointing at Domburg, and then to listen on about 560 Mc/s for a transmission with a pulse recurrence frequency of 2000 or less. Transmissions were soon found on 560 Mc/s with p.r.f. 1875, and shortly identified with the Giants.

TECHNICAL LISTENING.

37. The investigation of the Giant Würzburg, with its interplay of evidence from many different kinds of source, was a typical detailed problem in Scientific Intelligence. Technical listening, as often happened, was the blind man of the party, and to avoid labouring the point in subsequent sections of this Chapter, it will perhaps be well to deal here once and for all with the shortcomings of technical listening in the past war. This is not to be considered in a spirit of recrimination, but as an indication to any future Scientific Intelligence officer of the difficulties which he is likely to encounter in dealing with technical listening evidence

38. Technical listening had been somewhere at fault in the Blitz, when the X Beam modulation frequency was inaccurately measured; it was similarly at fault in the Baedeker raids when it failed to detect the supersonic modulation frequency of the revised X System, despite a five months' warning of the exact frequency which the Germans would use. It also failed to find the Y Beams until very late in the Blitz. It was late in detecting the Freya transmissions; on the other hand it did detect the Würzburg transmissions, and their 'split' characteristics, quite early. The special drive described above was required before the listening service detected the Giant Würzburg transmissions, and a drive with Prime Ministerial weight behind it was necessary before German A.I. transmissions were found. A similar drive failed in the case of German A.S.V., which remained undetected almost throughout the war. Later in the Bombing Offensive, after Window, the new German A.I., Lichtenstein SN2, was only detected after details of both radio and modulation frequencies had been obtained from a captured aircraft. A warning that it would probably be about 100 Mc/s (actually it was on 91 Mc/s) had previously proved insufficient. Finally, for six months before D-Day, the failure of T.R.E.'s best D/F system to produce accurate bearings on certain German radar

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transmissions resulted in our wrongly concluding that these transmissions must come from the "large coastwatcher" equipment, whereas in fact they came from modified Freyas used for aircraft reporting.

39. Perhaps the failures of technical listening are the more obvious because they refer to important evidence. It is certainly true that technical listening evidence is the last necessary link before radio-countermeasures can be undertaken, and the failure of this last link is all the more disappointing. A Scientific Intelligence officer who did little more dangerous than to remain in London throughout the war is not qualified to make criticism of those who risked themselves on listening flights and failed to find SN2: but many of the failures occurred when the listening could be done from our own shores, and they are therefore the more difficult to understand. At first sight, technical listening had a good chance of drawing 'first blood' on many German radio developments; in practice it had often to be put-on in detail by evidence from other sources. Perhaps technical listening is more difficult than it appears, but the most likely cause of trouble lies in the lack of a clear division of authority between A.D.I.(Science), D.D.I.4., and the Y Communication-listening service, the R.C.M. organisation and T.R.E., with the result that the actual operators and equipment designers were rather more remote from the Intelligence picture than they need have been, and priorities for listening often conflicted between the long-term needs of Scientific Intelligence and the short-term needs of R.C.M. There was also a failure to recognise that technical listening and communications listening had little in common beyond the fact that both employed the properties of electromagnetic radiation; otherwise they were little more alike than any other two sources, and might well have been administered separately. Over a considerable period of the war, confusion was caused by the Y-Service endeavouring to act as a collating and disseminating authority for information from all other sources about German radar. This overlapping with the

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functions of A.D.I.(Science) merely made the work of both departments more difficult. We do not conclude that A.D.I.(Science) should have had more control over technical listening than he had, say, over P.R.U.; but we do warn posterity that for some reason the arrangements made for technical listening in the past war did not always produce the results which might have been expected and that better ones need to be made next time.

THE CHANGE TO OFFENSIVE INTELLIGENCE.

40. The Bruneval raid was one sign of a change which had come over our Intelligence methods. Before, we had been fighting a defensive war, with German aircraft coming over this country and being shot down. Thus, whatever other sources failed, we had a steady flow of prisoners, of equipment, and of documents, and from these we could construct a fairly sound picture of developments in the German Air offensive. This was relatively easy since Air prisoners were generally more intelligent and inquisitive than those from the other Services, and hence knew more about forthcoming technical developments. In the purely Air offensive of Bomber Command, however, these convenient sources were almost entirely denied, and Intelligence had itself to become offensively minded and go out to get its raw material.

41. Bruneval was perhaps the highlight of offensive Intelligence, but no less spectacular in results was the work of our secret agents. The establishment of the great defence line of nightfighter control stations from Schleswig Holstein to the Franco-Belgian frontier late in 1941. offered a promising objective for investigation by secret agents, who by this time were beginning to undergo a systematic training in which special radar briefing was included. This briefing afterwards produced such results that, out of all the agents' reports on all subjects which were sent to O.I.U. to assist in photographic interpretation, more than a half were concerned with German radar. One of the finest pieces of work was done by a Belgian agent who in April 1942 relieved a German H.Q. of its battle map showing the deployment of an entire searchlight regiment with its associated radio and radar stations.

42. The searchlight map, together with further reports from agents, our own bombers' combat reports, air photographs, R/T intercepts, and reports even from pigeons (which were dropped in areas where agent cover was bad, asking for details of any local radio or radar station) were all combined together with several somewhat lucky guesses to give a very satisfactory picture of the whole German night defence system. The results included the technical details of the control equipment, the layout of individual control stations, the tactical handling of nightfighters, the strategic deployment, the order of battle of nightfighters and ground signals staffs, the relative importance of fighters and flak, and - most important of all - the weak points of the system. All this was done by a headquarters section of not more than four officers, collating the information from, and directing the activities of, a large number of sources of different types. It would be unfair, of course, to claim more than a small share of the credit on behalf of this nucleus of four, and credit should particularly go to the Belgian agents of the S.I.S., to the pilots of P.R.U., and to the appropriate sections of ^{Not Secret Intelligence} G.C. & G.S. and of C.I.U.; but this investigation shows what can be accomplished by a small and wieldy staff.

43. It was clear towards the autumn of 1942 that the enemy then had an A.I. coming fairly widely into service, and that this might do much to improve his results. It was therefore necessary to find its characteristics rapidly. The matter came to the notice of the Prime Minister, whose vigorous interest accelerated the investigation in the same way as it had accelerated the listening work on the Knickebohn beam two years before. A combined effort was now made to determine the A.I. frequency, starting on the guess that it might be about 500 or 600 Mc/s. By listening from the East Coast, T.R.E. heard transmissions having the expected characteristics on a frequency of about 480 Mc/s, and these were then confirmed by an outstanding flight on 2nd/3rd December 1942 by an aircraft of 192 Squadron which was repeatedly attacked by a nightfighter radiating

the suspected transmission. Despite the facts that the aircraft had to be put down in the sea and that members of the crew were wounded, the results of the observations were brought back safely to this country.

44. The last major gap in our knowledge of the German night defences was thus closed.

REPORT POLICY.

45. The results of the nightfighter investigation were embodied in one large report (~~A.S.I. Report No. 11~~¹ of 29.12.42). Similar large reports had been previously published on the X-Gerät^a (~~A.S.I. Report No. 10~~, of ~~12.1.41~~), German Beam Policy (~~No. 12~~, of ~~23.7.41~~), and German Radar (~~No. 13~~ of ~~10.1.42~~). This type of large report was sometimes criticised, on the grounds that information was held up while the report was being compiled. It is undeniable that such reports took a long time to write, but they dealt with large subjects. In the process of assembling the facts for these reports, gaps in our information were realised, and many finer points hitherto unappreciated were readily seen once all the facts were brought together. Moreover, as a matter of policy, it was found better to risk delay in placing a picture before the operational staffs, and ultimately to give them a well coordinated picture upon which they could immediately act, than to give them premature dribblets which generally served first to alarm them, and then through constant alarm to deaden their appreciation of genuine danger. For a further expression of this policy see paragraph 48.

EXPANSION OF SCIENTIFIC INTELLIGENCE.

46. Towards the end of 1942, it was obvious that the staff could no longer cope with the amount of work caused by the extensive applications of science by the Germans, by the improved flow of information from the collecting organisations, and by the increased number of customers for

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Scientific Intelligence. The total staff was five officers, and the daily input of raw material amounted to about a hundred and fifty sheets of foolscap; they were all read. A paper was therefore submitted to A.C.A.S.(I) on 20th November 1942 pointing out that the situation really demanded the establishment of a complete Directorate, since without a large increase in staff

"there is an extreme danger that something vital will be missed. In view of Hitler's recent statement that German inventive genius had not been idle in developing new weapons of offence against this country, we cannot afford to relax our watch as we have been forced to do. The array of radionavigational stations along the coast of Europe is a sufficient reminder that Hitler's statement is not empty. At the same time, we must at highest priority, do all we can - and we can do much - to analyse the German air defences and so provide a sound basis on which neutralising action can be taken. The small margin between our losses and those which would defeat our bombing effort demands that we shall maintain a dynamic picture of German night-fighter defences as they are reorientated to counter our changing tactics. These two considerations alone have already heavily oversaturated the effort of Scientific Intelligence and, unless some relief is forthcoming, the present Assistant Directorate cannot accept responsibility for the surprises which are likely to be sprung upon us by the enemy without the timely warning which has been achieved in the past."

The result was some, but not sufficient, increase in staff authorised seven months later; the establishment then provided for one Assistant Director, three Principal Scientific Officers, three Senior Scientific Officers, and three Scientific Officers.

THE ROCKET ALARM.

47. The early part of 1943 was concerned largely with two things: the long range Rocket, and Window. Despite the extraordinary arrangements made regarding Intelligence for the former, it really fell within the proper scope of Scientific Intelligence, which therefore organised its attack by normal methods, as far as the multitude of parallel organisations and committees would allow.

48. The premature alarm caused by the Rocket was largely due to Scientific Intelligence being by-passed, and an immature account being presented to the Chiefs of Staff. Actually, there was a fundamental difference in philosophy; the same facts went to ^{all departments} ~~War Office and to A.D.I.(Science)~~. ~~The former warned~~ ^{(was consequently immediately warned through AD(Sc))} The Chiefs of Staff, ~~the latter~~ decided that, while there was definitely something behind the early Rocket story (as it had already done three years earlier), there was nothing which would enable counter-measures to be undertaken, although it would almost certainly raise a scare, and that the important thing was to obtain more information through a planned Intelligence attack. ^{or} ~~The War Office~~ line of thought was probably one which ~~is~~ often expressed by Staff officers ^{is} that Intelligence should pass on information, as near the original as possible, to operational departments with minimum delay. The A.D.I.(Science) line of thought was that Intelligence, like a watchdog, must arouse its master when genuine danger is ascertained, but should not keep him constantly awake by barking at false alarms, or by barking too early. This policy had been expressed to A.C.A.S.(I) in the paper of 20th November 1942 (before the Rocket alarm started) on the need for an expanded Scientific Intelligence:

"The committing of our deductions to paper in the above forms naturally involves the preexamination of these deductions from all possible aspects in order to anticipate the criticisms which too easily arise from Branches outside Intelligence, and - more important - to provide the Air Staff with a sound basis for its

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operational policy. We are sometimes criticised for withholding information, but while no instance has ever been proved, we reserve our right to do so because (1) to spread half-truth is often to precipitate erroneous action by the Air Staff, and (2) the steady and immediate broadcasting of each insignificant and uncollated fact automatically and insidiously acclimatizes the recipients to knowledge of enemy developments, so that they feel no stimulation to action. Moreover, it shifts the onus of interpreting facts on to branches of the Air Staff less technically qualified to evaluate them. At the risk of criticism, it is considered the duty of Intelligence to collect these facts and only issue them when a reasonably complete or important picture is obtained. This policy invariably meets with the objection that various points of any picture might have been broadcast earlier, but the presentation of the complete picture of an enemy development is the best way of stimulating the appropriate authority to action. The production of such pictures involves much effort, but it has been justified by results."

"Although we think that the above policy is the best, it obviously has some defects, which we try to remedy by frequent oral communications to the appropriate bodies."

The result of the ~~War Office~~ ^{actually taken} action ⁺ was the setting up of the 'Crossbow' organisation. The history of this organisation (which deserves to be adequately recorded, since it constitutes an outstanding example of ^{departing from normal} ~~the mishandling of an~~ Intelligence ^{procedure} ~~problem~~) is still sufficiently well known for it to be unnecessary to labour the merits of the Scientific Intelligence policy quoted above. The 'Crossbow' example, however, points the need for close cooperation on Intelligence policy in the future; and, more important still, it points the need for this policy to be thought out with care and circumspection.

+ Codeword used for the long-range rocket.

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49. The Scientific Intelligence plan of attack was fairly simple. Peenemünde could be photographed and agents could be briefed. Moreover, our long study of German radar gave a faint chance of an enfilade. The argument was this: if the Germans were developing a long range missile, be it rocket or pilotless aircraft, they would want to follow its flight. As it would go out of sight, they would probably try following it by radar. If they used radar, they would want the best available, and the most experienced observers. These, we know, were in two companies of the ^{German Air Force} ~~GrArP~~, Signals Experimental Regiment, and by following these companies we might gain some side-light on any long range missile activity. This oblique line of investigation was followed quietly for several months.

WINDOW.

50. In the meantime, the Window controversy had come to a head. The interest of A.D.I. (Science) was twofold: first, it was obvious from studies of the German nightfighter system that some violent countermeasure was required if our bomber offensive was to be maintained and, secondly, that Window, which had been suggested by A.D.I. (Science) himself in 1937 was the only technical countermeasure which would by itself seriously upset the German defences. There was long argument, in which it was necessary for A.D.I. (Science) to prove first that the Giant Würzburgs used for plotting our bombers would be seriously vulnerable to Window owing to inherent technical weakness, and secondly that the Germans knew of the Window principle, and therefore their failure to use it must be due to their fear that they were more vulnerable than we were. Both these facts were repeatedly challenged, but ultimately C.A.S. approached the Prime Minister for permission to use Window. At the resulting Staff Conference (23rd June 1943), C.A.S. introduced A.D.I. (Science) as his authority on the probable effect of Window on the German night defences, and on the ability of the Germans to retaliate. The result of the meeting was that the Prime Minister gave permission for Window at last

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to be used, and it was first dropped operationally in the Hamburg raid of 24/25th July 1943. The result as seen from the German side was summarised in a paper entitled ~~"Anlage zu Chef-NW-Abt. 4/1B - IIB, Nr. 2170/43"~~

"A study of the present Window situation." It said:

"Since July 25, the enemy, first at night - in isolated cases in daylight too - combined with the raids into Reich territory, the dropping of "Hamburg bodies". The technical success of this action must be designated as complete..... By this means the enemy has delivered the long awaited blow against our decimetre radar sets both on land and in the air."

General Martini, the German D.G. of S., also made similar statements when interrogated after the war ~~(A.D.I.K. 334/1943)~~

51. It will be noticed that the conclusions of Scientific Intelligence, both as to the effect of Window, and as to the German expectation of it, were borne out completely. The document went on to state "The enemy must, through ^{means} ~~means~~ of propaganda, (newspapers, radio, etc.) be encouraged in the opinion that his measures are unsuccessful."

52. During the critical period of the first few weeks of Window two A.D.I.(Science) officers gave lectures on the German night defences at all the stations in Bomber Command in order to acquaint the aircrews with the scientific principles and Intelligence reasons behind the new counter-measure, so that the crews would use it at best advantage. At the same time other A.D.I.(Science) officers spent many nights ^{with the Y Service} ~~at Kingsdown~~, in order to gain first hand knowledge of German reactions as revealed by the R/T instructions to nightfighters. Once again, this was a case where close contact with the original source was important. Naturally, the main work of reporting on the nightfighter R/T was done by ^{the Y Service} Kingsdown through the R.A.F. Signals Intelligence Service, in a manner which was outstandingly efficient; but listening with the R/T intercept operators themselves gave added colour to the appreciation of their teleprinted

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reports, and brought home far more vividly the time sequence of events during raids. This was particularly important when it became obvious that the German controllers, having been forced to abandon their former rigid system, were trying to identify the target and then to direct their fighters there. In view of the confusion of their radar system, they were often only able to identify the target when our first bombs went down, after which there would be a hurried scramble by the German night fighters to get there in time to intercept the later waves of our bombers. As this frequently took twenty minutes or so, it was obvious that if we made our raids of shorter duration than this, they should often escape with low losses. An A.S.I. Interim Report of 4.10.43 suggested this measure, which met with fair success.

53. At the same time, it was clear that while waiting for the target to be identified, the German nightfighters were directed to strategically placed beacons. Almost immediately one of our Belgian agents sent to us some documents which he had removed from a bag dropped by a German airman while making a parachute descent from a nightfighter which had been shot down in daylight during an American raid. These documents included navigational instructions which enabled us to work out the positions of the beacons. This work was done so rapidly that the knowledge of the beacon positions was being used in the interpretation of the R/T traffic on the same night as the agent's report was received, ~~in S.I.S. H.Q.~~ On the basis of this knowledge it was possible in advance of a raid to hazard a fair guess as to the particular beacons to be used by the nightfighters, and so to direct our own long-range nightfighters to these beacons. Unfortunately, although this was tried, with A.D.I. (Science) making the forecasts, we had so few suitable nightfighters that good results were not obtained. But it was one of the steps towards the formation of a specialist force to upset the German nightfighters.

^{NE}
THE PEENEMÜNDE RAID.

54. While all this work was proceeding, the threat of a long range bombardment of England was being watched. The photographic sorties over Peenemünde soon began to reveal interesting activity; curiously, the first rocket was only identified when the photographs came into the hands of A.D.I. (Science), although they had already been circulated widely. It perhaps demonstrated the need for a fourth phase interpretation of photographs by officers with the fullest Intelligence background. As the combined result of the early agents' reports, the photographic evidence, and remarks by prisoners of war, the Defence Committee of the War Cabinet on 29th June 1943 decided that Bomber Command should make the heaviest possible attack on Peenemünde at the earliest opportunity.

55. The attack took place on 17/18th August 1943. We now know that it seriously hindered the German long range rocket programme, by destroying many of the blue prints which had been prepared for series production, by damaging the experimental series factory, and by causing the Germans to decide to remove their production underground and their experimental work to Poland. The result was a delay of several months which, as it turned out, probably made a great difference to the success of the rocket campaign. The Germans would have been able to fire the rockets from France with greater accuracy than they achieved from Holland, they would have been able to bombard London for a much longer time, and they might have achieved a larger production; and as the Rocket attack would have then been synchronised with that by the Flying Bomb, our countermeasure effort would have been divided.

THE ROCKET CONTROVERSY.

56. Much opposition to the belief in the Rocket threat had been created by the surprising figures claimed for it by some of its exponents. The dimensions of the Rocket as seen on the Peenemünde photographs had led

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them to conclude that its total weight might be as much as 80 tons, with a warhead of 10 tons. It was suggested by way of counter argument that such a heavy rocket was so far out of question as to throw doubt on its supposed existence, and that it was part of an elaborate German spoof to cover the production of another weapon, a radio controlled pilotless aircraft.

57. Both before and after the Peenemünde^e attack, there was much argument as to whether or not the object seen on the photographs was a rocket, although to a trained Intelligence officer there could be very little doubt. But doubt there was in many minds, particularly when German propaganda began to boast of impending retaliation, and so confused did the evidence become that its clarification demanded the most skilful collation. In September 1943 it was necessary for Scientific Intelligence to write a paper for the Chiefs of Staff [(592-(0)-43)] summarising the case for the reality of the Rocket threat; this concluded:

"15.1. Much information has been collected. Allowing for the inaccuracies which often occur in individual accounts, they form a coherent picture which, despite the bewildering effect of propaganda, has but one explanation: the Germans have been conducting an extensive research into long range rockets at Peenemünde^e. Their experiments have naturally encountered difficulties which may still be holding up production, although Hitler would press the rockets into service at the earliest possible moment; that moment is probably still some months ahead. It would be unfortunate if, because our sources had given us a longer warning than was at first appreciated, we should at this stage discredit their account.

15.2. There are obvious technical objections which, based on our own experience, can be raised against the prospect of successful rockets, but it is not without precedent for the Germans to have succeeded while we doubted: the beams are a sufficient example.

15.3. It is probable that the German Air Force has been developing a pilotless aircraft for long range bombardment in competition with the rocket, and it is very possible that the aircraft will arrive first."

THE 'TOUCHSTONE' TECHNIQUE.

58. It is worth drawing attention to the technique by which the above conclusions were extracted from the mass of conflicting evidence. Some of this evidence had been manufactured by agents anxious to earn a cheap reward and some had been intentionally planted on us by the Germans, while some was the distorted result of German propaganda designed primarily for raising the morale of their own people in the face of our mounting air attacks. Almost every report was therefore to some extent suspect, and the problem was to find some internal check on each report which would constitute a touchstone as to its reliability. ^{The} Chiefs of Staff Paper ^{of September 1943} 592 (A) ~~43~~ described such a touchstone in the following manner:

"Since Peenemünde was of so much importance ^a, it was very unlikely that the Germans would carry a hoax so far as to incite us to attack it; therefore any secret reports mentioning Peenemünde were very probably made in good faith, and any development seen there was very probably genuine."

The application of this touchstone singled out many reports which were of good faith, from many others which were suspect. It was not necessarily true, of course, that every report was false which did not mention Peenemünde before we attacked it; the touchstone process therefore rejected a number of genuine reports, some of which could be recovered through the application of external checks. It was well worth rejecting the remaining few genuine reports along with the large number of false ones, with the assurance that the overwhelming proportion of those reports which withstood the touchstone test were very probably genuine. The collation of these reports could therefore be effected with some confidence regarding the

* Evidence of Peenemünde's importance came, for example, from circulars from the RLM to the experimental establishments on such trivial matters as petrol coupons. Peenemünde was second only to Rechlin in a long distribution list. The clerk who compiled the list was therefore an 'unconscious witness' to the importance of Peenemünde; the merits of such a witness are well set out in Belloc's 'Six British Battles' (Arrowsmith, 1931) p.15.

Intelligence picture which could be synthesised out of them, while the rejected reports could be analysed for possible trends of German spoof, which in turn might throw light on the development which it was intended to hide.

59. The touchstone technique is perhaps the most powerful one that can be applied to a mass of conflicting evidence. Reports even from a source who has proved reliable in the past should if possible be submitted to the touchstone test; for even a good source may have information planted on him; or he may be captured by the enemy and used for deception purposes.

THE APPEARANCE OF THE FLYING BOMB.

60. The power of the planned enfilade through the ^{German Air Force} G.A.F. Signals Experimental Regiment (paragraph 49) lay in its being independent of the nature of the missile, providing that this missile was of long enough range to require radar plotting. In October 1943 the radar attack yielded its first result: one of the two signals companies which we were minutely watching started its own line of W/T traffic. Fortunately the Germans were indiscreet enough to use a low grade code which, though relatively uninformative in single messages, became very revealing under a complete watch. From the contents there could be no doubt that radar stations had been set up along the North German coast, and that these stations were plotting a pilotless aircraft known as FZG 76. The plots from the radar stations were received by the Y-Service and, once we had located the stations, could be plotted as quickly by us as by the Germans. We could therefore work out full details of the performance of the weapon, and watch its improvement during trials. The results were passed to our Defence authorities, who were thus in a position to plan countermeasures.

61. About the same time as the Flying Bomb was discovered at Peenemünde the work of our French agents began to show important results. As soon as the Rocket alarm had started, we had briefed them to watch closely for any

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sign of German constructional activity which might be concerned with launching sites for a long-range weapon. During September 1943, reports began to come in about new sites being constructed in North France; but they were not sufficiently advanced to show up on aerial photographs. Towards the end of October, however, a fuller report came in from one agent stating that important work was proceeding at Bois Carré near Yvrench, including a 'concrete platform with centre axis pointing at London'. The same agent also gave several other sites, and his report was fully confirmed by a P.R.U. sortie on 3rd November; all the sites possessed a number of standard buildings, the most prominent being the 'Skis',[†] some 270 feet long and 15 feet wide. At first there was not enough evidence to determine exactly the purpose of these 'Ski-sites', but from their deployment it was fairly clear that they were intended for a long range bombardment of Southern England. It was also fairly clear that they were not intended for launching the rocket seen at Pecquande,[‡] because the curve at the end of the Skis was too sharp to permit the passage of such a missile. This fact, however, did not prevent the exponents of the Rocket in this country from associating it with the Ski-sites, and much argument ensued.

62. Now when there is much argument about an Intelligence conclusion, it is frequently a criterion that enough facts have not been collected. For the fewer the known facts, the more theories there are that can be made to explain them, and the protagonist of one theory will not be able to refute the protagonist of another theory; nor can he himself be refuted. As a result, a large amount of inconclusive argument can follow. This can only be resolved by seeking fresh facts. In the case of the Ski-site controversy, it was clear where such facts might be found. At Zempin, near Pecquande,[‡] Flying Bombs were being launched; this we knew from the W/T evidence. Therefore, if we could photograph Zempin and there find buildings such as were found on the Ski-sites, the identification of these sites

[†] so named because of their resemblance in shape to skis.

with Flying Bombs would be almost complete. Unfortunately, the necessary photographic reconnaissance was delayed for nearly a month by bad weather, but on 28th November 1943 sortie D/980 succeeded in photographing Zempin, and showed the existence of the essential elements of Ski-sites there. With this discovery, it was possible to state fairly definitely that the first threat which London had to face was the Flying Bomb and not the Rocket.

FLYING BOMB ESTIMATES, DECEMBER 1943.

63. By December 1943, it was possible to issue an A.S.I. Report (No. V) giving the following estimates, which are compared with what actually transpired in operation.

	<u>Estimate</u>	<u>Fact</u>	<u>Remarks</u>
Type of Propulsion	Probably Rocket T & Z used somewhere.	Argus Tube	T- & Z-Stoffe used for starting.
Weight of Warhead	1000-3000 lb.	2000 lb. (1800 lb. H.E.)	Estimate later finalised at 1 ton.*
Speed	Varying between 200 & 400 m.p.h.	Varying up to 400 m.p.h.	German intention 370 m.p.h.
Height	Generally about 6500 feet, but sometimes as low as 1500 feet.	1000-4000 ft.	
Range	Generally 120-140 miles. Maximum 155 miles.	Generally 120- 140 miles. Maximum 155 miles.	
Wing Span	Probably 19-22 feet.	17 ft. 4½ ins.	
Length	Probably 17½-20 feet.	25 ft. 4½ ins.	
Root Chord	Probably 4-5½ feet.	4 feet.	
Control	Magnetic	Magnetic.	

* e.g. A.D.I. (Science) paper on "The possible effect of Crossbow on Overlord", of 11.3.44. Incidentally this paper concluded: "Even against Overlord, the Germans would probably select London as the Crossbow target."

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The accuracy could also be assessed, but it improved during the trials, and estimates naturally had to be changed. In ^{a chief of staff} C.O.S. Paper (44)419(0) of May 1944, A.D.I. (Science) gave the ultimate accuracy as likely to produce 42% inside the built-up area of London, if the trials accuracy could be reproduced in operations. Figure 4 shows the prediction compared with event on a map.

64. Once the radar plots started to flow in we were able, of course, to build up a complete and current account of the Baltic trials, and comparison between our records and those of the Germans at this time shows them to be identical. Before, however, the W/T evidence became available we had to rely mainly upon deductions drawn from rather slender photographic evidence, and the following table shows how these deductions, made in December 1943, compare with statements made by a prisoner ^G in A.D.I. (K) Report-387/1945 or with the Germans' own records.

	<u>A.S.I. Report V.</u>	<u>German Statement.</u>
<u>FIRST SERIES</u>		
Date	First half of 1943	24th December 1942 (first shot) to Mid-May 1943.
Direction	"Almost due North ... skirts East Coast of Rügen."	"Northerly direction along East Coast of Rügen."
Range	"Not much greater than 70 km."	"Up to 60 km."
<u>SECOND SERIES</u>		
Date	Probably February/March 1943 to September 1943.	Mid-Day to September 1943.
Direction	45°.	45°.
Range	150 km.	120 km.
<u>THIRD SERIES</u>		
Date	September onwards.	September onwards.
Direction	52° to 72°	About 72°.
Range	180, 200, sometimes 250 km.	185 and 225 km., sometimes 250 km.

On
1st

65. A.S.I. Report No. V also gave the scale of attack, based on deductions from a study of the Ski-sites and their method of operation. As the Ski-sites were not operated under the conditions intended by the Germans, it is impossible to compare estimate with fact, but comparison between the estimates of A.D.I. (Science) and the German intentions as stated in S.R.G.G. 1377-(9) by Colonel Eberhardt, the chief technical officer of the Wachtel organisation (which operated the sites), shows:

	<u>A.D.I. (Science)</u>	<u>Eberhardt</u>
Capacity of site.	20.	20.
Maximum Rate of fire.	1 in 30 mins.	1 in 30 mins.
Time to fire all stored missiles.	10 hours.	10 hours.
Replenishment period.	2 days.	1½ days.
Total number of sites operating in one attack.	50 - 100.	64.

66. The estimates were published six months before the campaign opened, and the agreement, although perhaps somewhat fortuitous, is satisfactory, particularly when the figures are compared with those made by other authorities. The fact is that "problems such as scale of employment, deployment, and places of production, are generally quickly solved once the technical nature of the weapon is fully understood, so that the main responsibility lies on those investigating the basic scientific and technical facts" (Extract from minute to Chairman J.I.C. and A.C.A.S. (I) from A.D.I. (Science) 15.11.45, expressing belief that the normal Scientific Intelligence organisation had a better chance of solving the Flying Bomb problem than a proposed ad-hoc Committee).

THE DANGERS OF HALF-TRUTH.

67. It may have been noticed from the table in paragraph 63 that we were somewhat in error about the nature of the propulsive system. It may well be worth explaining this error, as it arose in a way typical to the synthesis of Intelligence pictures. We know that in the HS 293 there were two liquids, T-Stoff and Z-Stoff (which we afterwards found to be hydrogen

† The German radio-controlled ^{anti-submarine} glider bomb

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peroxide and calcium or sodium permanganate solution) which were mixed in the rocket combustion chamber, where they reacted with great heat. We knew also that, for obvious reasons, the Germans took extreme care that T and Z Stoffe should never come into contact prior to use. Now we noticed on the plans of the Ski-sites stolen by our agents that there was a building called the "Stofflager" and further that this building was divided into two carefully separated portions. We therefore argued that it was intended to store two fuels which were to be kept separate, and therefore that these fuels were probably T and Z. So far we were perfectly correct. We were also correct in assuming that because T and Z were stored on the Ski-sites, they were essential to the Flying Bomb campaign. But we were incorrect in assuming further that the Flying Bomb propulsion unit would be a T and Z Rocket of similar construction to that used in the

Ms. H.S. 293. In fact we had good reason for coming to this erroneous conclusion, for there was no other fuel store on the Ski-site, and it is only since the war that we have found that the Flying Bombs were to have been delivered to the Ski-sites already fuelled. The T and Z Stoffe were used only in the launching gun. What has to be pointed out here is that we had reasoned accurately on a slender fact to a conclusion that was wholly true, i.e. that T and Z played some part in the Flying Bomb programme, but that we had inaccurately concluded that this was quite probably the whole truth, i.e. that the Flying Bomb was to be propelled wholly by T and Z Stoffe. Technically it could have been, but it was not. The error was of no operational significance, as we had the exact performance of the weapon from other evidence, and the only operational conclusion which could be drawn from it, i.e. that we could upset the Flying Bomb programme by knocking out T-Stoffe production, was correct. Although we did not give the erroneous conclusion more strongly than 'seeming likely', it demonstrates the possibility of a collating officer being misled by a conclusion which is itself wholly true, but not the whole truth. This was a snag which beset almost every investigation undertaken by Scientific Intelligence, and which could on occasion defeat the most careful vigilance.

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68. It may be worth pointing out here that the 'halftruth' technique is a very powerful one to employ in any attempt to spoof the enemy. If he receives information which in itself is wholly true, but which nevertheless creates a misleading impression, he may well construct an erroneous Intelligence picture; but should he later make a post-mortem into the cause of his error, he will find that the information supplied by the misleading sources was in itself completely accurate, and he will have great difficulty in blaming them for having supplied him with correct, though incomplete, information.

"OCCAM'S RAZOR."

69. We made our error in deducing the function of the T and Z Stoffe through the rigorous application of "Occam's Razor". This philosophical principle, enunciated by William of Occam (1280 - 1349), states that hypotheses must not be unnecessarily multiplied. In Intelligence, this amounts to explaining the collected facts by a minimum number of hypotheses. It is probably the most valuable single principle that can be applied to the process of collation, and it stands a better chance than any other of producing the right answer. Sometimes, however, as in the present case, it may lead the collator astray; it is worth seeing why.

70. The facts to be explained were (1) the presence of T and Z storage on the site, (2) the absence of any other fuel store, (3) the provision of sufficient fuel to launch about twenty bombs, the number stored on the site, and to propel them to London. The simplest hypothesis was undoubtedly that T and Z Stoffe should have been used both to start the Flying Bombs and to propel them; there was space in the T and Z store just sufficient to accommodate the necessary quantities of fuel for both purposes. This simplest hypothesis, judged by the facts as we knew them, was therefore satisfactory in explaining them all, and we should have been unjustified, on Occam's principle, in accepting a more complicated explanation. For immediately you admit the possibility of more complicated explanations, there

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is no end to hypotheses, and you will rapidly lose yourself in fantasy. Nevertheless, in the case under discussion, Occam led us to the wrong answer. A more complicated hypothesis was in fact true. Why, then, did we go wrong? The answer lies in the phrase "the facts as we know them". Our knowledge was incomplete, and by chance (as must occasionally happen), we had gathered just those facts for which the more complicated explanation was unnecessary. The remedy, as in the case of most other collation troubles, was to seek more facts, until one should be discovered which conflicted with the simple hypothesis.

71. This experience, and others like it, did not shake our belief in the use of Occam's razor; there were far many more occasions on which it produced for us the right answers while other authorities beguiled themselves into a realm of fantasy. Our considered principle was first to collect some facts; when sure of these facts, we applied Occam's razor; it then either led to a simple explanation, or to a small number of equally plausible explanations; in either event, we then sought fresh facts, for in the first case we needed them to see whether they conformed to the unique simple hypothesis, and in the second to see whether they would reject some of the alternative hypotheses. Our principle therefore came down to collecting the maximum possible number of facts, and to collating them with the minimum of hypotheses.

THE I.F.F. MENACE.

72. With the solution of the Flying Bomb Intelligence problem (for all the sources were now working well, and it was almost a matter of routine to analyse the trials currently, to follow the Ski-sites, and so forth) counter-measures could be taken, and more of our Intelligence attention could be returned to the Offensive. Here, a peculiar side-light came out of the German Signals Experimental Regiment. It may be recalled that in planning our attack upon the Rocket, we had set ourselves to watch two companies of the Regiment, and one turned up the tracks of the Flying Bomb. The other

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turned up a different kind of track, which ~~G.O. & G.S.~~ soon identified as plotting of our own aircraft. The problem for A.D.I.(Science) to solve was: how were these plots being obtained? In this matter, long experience was helpful, for in 1941 A.D.I.(Science) had been seriously in conflict with H.Q. Bomber Command regarding the superstition that the switching on of I.F.F. by our bombers dowsed the enemy searchlights. The A.D.I.(Science) view had been expressed in a minute to A.C.A.S.(I) on 12th September 1941:

"Philosophically, it is easy to see that if the switching on of I.F.F. is proved to be followed by the dowsing of searchlights, the effect can only be harmful to ourselves. For it proves that the enemy has some method of detecting I.F.F. radiation. As he would soon ascertain from prisoners the regular practice of switching on I.F.F. when caught in searchlights, he would then possess the advantage of being able to induce our aircraft to give a positive indication of their nationality and position. This automatically relieves him of the fundamental bogey of the recognition problem: having to take grave positive action on a negative result. If possible, the enemy would clearly encourage the practice of switching on I.F.F. by obligingly dowsing his searchlights. The fact, if it be true, that he is able to do so shows that he must then have an alternative and better method of identifying and locating our aircraft, which is bound up with I.F.F. Therefore, either I.F.F. has no effect, or it contributes to our losses: we should refrain from the use of this treacherous device over enemy territory."

The same view was presented at a meeting at Bomber Command on 26th September 1941, but the Command nevertheless insisted that captains of aircraft must be allowed to switch on I.F.F. if they wished. Memory of this controversy led A.D.I.(Science) to think that I.F.F. might be the cause of the tracks now being plotted by the Germans. Experiments by

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192 Squadron soon proved this to be the case. Its importance lay in the fact that after Window the Germans had temporarily lost almost all means of tracking and identifying our aircraft by normal radar: but since some of our aircraft kept their I.F.F. on, they could be challenged and plotted all over Germany, and Window and other countermeasures were thereby rendered useless. As we were at that time raiding in a single concentrated stream, a few offending aircraft in the stream effectively betrayed all the others. This fact in part accounted for our heavy losses in late winter 1943-4, because although the German stratagem was quickly discovered, it was some time before I.F.F. silence was enforced among all our bombers.

THE ATTACK UPON THE CHANNEL RADAR, D-DAY.

73. The Spring of 1944 involved much work for D-Day, the A.D.I. (Science) interest being mainly concerned with Intelligence regarding the radar and jamming stations along the Channel coast. This interest had been alive ever since the German occupation, sustained by the hope that our information would be sufficiently precise and complete to enable all types of countermeasure to be undertaken when the time came for our Forces to return to the Continent. It formed part of the commitment of A.D.I. (Science) to cover, both on an Inter-Service and on an Inter-Allied basis, all aspects of Intelligence concerning German land and air radar, including its technical construction and performance, its deployment and its use in operations.

74. The commitment was hardly a light one. During the technical investigation throughout the war, forty-eight different types of ground radar were identified and their characteristics elucidated, leaving three rare types to be discovered after the German surrender (there were of course several experimental prototypes which we did not discover, but these had not progressed beyond the single-specimen stage). Over the same period various methods of Intelligence led to the pinpointing of

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seven hundred and forty radar stations in Western Europe (reference to Figure 1 will show their degree of visibility on a photograph), and we subsequently found no more than six unknown to us by the time they were overrun by our ground forces.

75. In the particular case of the Channel coast radar, the main source of information was air photography, supplemented by Y-Service D/Fs as reduced by the Noise Investigation Bureau. No operational demand was ever formulated, but it was clear that without due attention being paid to German radar, the success of the landing might be prejudiced. A.D.I. (Science) therefore undertook as a private venture the compilation of a series of reports intended to provide the attacking forces with all necessary information for the neutralisation of the radar stations. The series included ~~A.S.I. Reports No. 20~~, a technical illustrated summary of all known types of German radar equipment, ~~Nos. 22 and 24~~, lists of pin-points of all known radar stations on the German-occupied coast, and ~~No. 24~~, a collection of photographs and drawings to enable pilots to recognise the various types of equipment. In addition, ~~Rhubarb Operations Appendix XII~~, a complete operational target dossier, contained all the briefing data for attacks on all stations in the ^{invasion} ~~Overland~~ area; in this, C.I.U. did most of the work.

76. The preparation of all the above material was an example of a case where Intelligence, from its appreciation of the importance of an enemy activity, could foresee a need which was not realised by the operational staff until the last moment. The question of attacking radar stations had been under discussion for nearly three years without a definite conclusion being reached. The decision for a large attack was given only a few weeks before D-Day (and even then largely at the insistence of Intelligence), and the preparation of the target material then would have taken so long that operations would have been impossible. Fortunately, all the material was already prepared, and attacks could begin at once. Thanks

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to the amazing skill of the Typhoon pilots of 20 and 22 Sectors and to the enthusiasm of the Sector Intelligence Officers, the attacks against these difficult targets were so successful that on the night before D-Day, little more than half a dozen out of forty seven radar stations were operative; and these were so shaken that they fell easily for a spoof attack launched eastwards of Fécamp. The feat of neutralising the whole early-warning radar system (Figure 5), which included a hundred and twenty major pieces of equipment between Calais and the Cap de la Hague, had appeared impossible in advance, but had effectively been achieved. Of these hundred and twenty pieces of equipment, all had been located by Intelligence; six were misidentified as to type. *(Sector Intelligence Report)*

THE DESTRUCTION OF THE JAMMERS, D-DAY.

77. About two months before D-Day, A.E.A.F. asked A.D.I. (Science) to undertake the task of sorting out the evidence regarding the locations of jamming stations on the Channel coast. These stations were a potential threat to our fighter control during the early stages of the invasion, since they could have neutralised our radar control ships and thus left the invasion force without effective nightfighter cover. They were an even more serious threat to our Gee radionavigational system, on which the seaborne expedition was largely depending for making its landfalls with precision. If the jammers were able to operate on D night, our landings might easily become confused.

78. The D/Fs of the J Watch indicated about twenty three separate jamming sites: this evidence was unreliable, but had nevertheless formed the basis of A.E.A.F.'s plan of eliminating the jamming stations. By combining photographic evidence with information gathered as far back as 1940, however, it was possible to identify one site positively and, having thus established the type, to recognise four further sites and no more. As this was very much short of the twenty three previously mooted, there were

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misgivings at A.E.A.F. as to the efficiency of the photographic search. However, the five identified sites were attacked and, as a result, our radar and Gee were undisturbed on D-Day; the jammers had all been found and eliminated,² and someone was able to claim that D-Day should have been called "G-Day".

THE FLYING BOMB ATTACK.

79. The Flying Bomb campaign started one week after D-Day. The bombing of the Ski-sites had immediately led the Germans to realise that they were vulnerable, and Colonel Wachtel and his officers planned a new and more easily constructed type of site. While the new sites did not begin to appear until May 1944 (and unfortunately we had no warning until the Germans began to build them), they were so rapidly constructed that the first opened fire on 13th June. In the meantime, the original Ski-sites had been obliterated by bombing, but in ^{a Chiefs of Staff Paper} ~~in O.C.S. Paper (44) 449-(0)~~ of the 13th May 1944, A.D.I. (Science) concluded:-

".... These announcements, coupled with the generally high rate of activity during April and early May, imply either an increased degree of urgency in the trials, or that they have now reached the stage where sustained rate of fire is being tested, the missile itself having been proved satisfactory".

80. As soon as the bombardment opened from the new sites it was clear that bombing, so effective against the old sites, was almost useless; we should therefore have to find some more vulnerable part of the system, such as the main distribution depots in France. These were almost immediately found to be large caves mainly in the Paris area. The Bomber Command attacks were soon switched to these caves, as were a few of the American attacks. The principal depot, that at St. Leu d'Esserent, was eliminated by Bomber Command. It had storage space for 2000 Flying Bombs,

* This is a simple example of Occam's Razor working correctly.

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but we do not know how many were actually destroyed through the raid. Our knowledge of the other main depot, at Nucourt, is more complete. According to German records subsequently captured, it could have stored 1000 Flying Bombs; when it was destroyed in an American attack, 241 Flying Bombs were irretrievably buried, and another 57 seriously damaged. At the same time the U.S.A.A.F. succeeded in very seriously upsetting German production by attacking the Fallersleben factory, which had been identified with FZG 76 production. The cumulative effect of these attacks on the focal points of the FZG 76 organisation led to a serious reduction in the scale of effort, and forced the Germans to use some of the earlier production series of Flying Bombs, which they had previously rejected as unsatisfactory.

81. Our defences soon improved greatly. The improvement was due partly to a redeployment of guns on the coast, and partly to the introduction of American proximity fuses and electrical predictors. The Americans had produced these items in time for the campaign entirely on the basis of the data gathered by Intelligence six months previously regarding the size, speed and height of the Flying Bomb. The small size of the missile showed the need for the maximum sensitivity of the fuse, while the speed and height showed the need for a new type of predictor. According to Dr. Selant of the American O.S.R.D., who was responsible for the fuse, neither item could have been ready, even for the latter half of the campaign, without the six months' detailed warning. In turn, the campaign itself might not have come so late unless the original Ski-sites had been knocked out by bombing, and this again would have not been possible without early Intelligence.

THE GROWTH OF ROCKET INTELLIGENCE.

82. The opening of the Flying Bomb attack brought home the fact that there was indeed substance behind Nazi threats of retaliation, and

restarted the general alarm about the Rocket. The latter weapon had been eclipsed by the rapid growth of Intelligence about the Flying Bomb, but all the time it was clearly being tried at Peenemünde, because the radar stations which were plotting the Flying Bomb were also sometimes warned to try to plot a Rocket. They rarely succeeded, but it was sufficient for the Intelligence case that trials were still proceeding.

83. Advances in Normandy led to the discovery of rocket storage and launching sites, while the threat to the launching area hastened the trials at Peenemünde; one rocket went astray and fell in Sweden. There is a good story behind this incident: the experimenters at Peenemünde had decided to try out the possibility of manual steering. For this they fitted an A4 rocket with manual remote control of the Hs 293 type. They obtained the services of an expert Hs 293 operator, and placed him in a good position to watch the rocket from the start. The Peenemünde experimenters themselves were well accustomed to seeing a rocket rise and it had not occurred to them that the Hs.293 expert would be surprised by the spectacle. But surprised he was - so much so that he forgot all about his own part in the procedure; in his astonishment he pushed the control lever well over to the left, and kept it there. The rocket obediently kept turning to the left, and by the time the expert pulled himself together the missile was out of control range, and heading for Sweden.

WORK IN POLAND.

84. At the same time, the work of our Polish agents, combined with other Intelligence material such as the discovery of a rocket on air photographs (once again by A.D.I.(Science), whose interpretation is attached to this paper as Figure 8 - it was borne out completely by subsequent inspection of the site) showed that rockets were being tried in Poland. This discovery was particularly satisfactory, for

"As a result of the Peenemünde raid in August 1943 the Führer Hitler ordered that all further firing trials were to be conducted in

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an area further East and safe from air attack. ~~The Reichsführer~~
SS. Himmler, placed at the disposal of the rocket organisation for
this purpose the S.S. training camp Heidelager in Galicia, 65 miles
East of Cracow" ~~(M.I.4/14 Report of 30.10.45)~~

In recommending the Peenemünde attack, an A.S.I. Interia Report of 26.6.43.
had stated:

"Peenemünde would demand considerable priority over all other places,
despite our curiosity to watch the development of the trials.
Intelligence would be prepared to take the risk of the work being
started elsewhere."

In moving to Poland, the Germans had done as we expected; in finding them
again, we had kept our word.

THE PREMATURE REPORT.

85. Suddenly, therefore, several lines of investigation were opened up
at once, and by 10th August most of the evidence had fallen into place.
Before this happened, however, A.D.I. (Science) had been ^{asked} ordered to present
a report to the Crossbow Committee about the Rocket, and under protest
wrote the only report which he regretted during the war. The report was
premature, and contained two serious errors: first, the warhead was given
as probably between 3 and 7 tons and, secondly, the main fuel was said to
be based upon hydrogen peroxide. The evidence for both these conclusions
looked good at the time. The weight of the warhead was that given by
explosive experts as necessary to cause the craters of such size as had
been photographed in Poland; this moreover, agreed with the estimate of
^{Air Technical Intelligence}
10,000 lb, given by A.I.2-(g) officers who went to Sweden to inspect the
remains of the rocket. The evidence for hydrogen peroxide was that this
material had been found in the remains of a rocket by the Poles, and in the
Swedish rocket, and would have provided sufficient energy to have given the
Rocket sufficient range. This second error was of the same type as that
which made us think that hydrogen peroxide might be the main fuel in the

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Flying Bomb. It is another example of the misleading nature of half-truth.

86. Immediately, however, the fuel error was shown up by the detailed examination of the Swedish rocket, in which ^{Technical Intelligence} A.I.2-(g) found that there were two main fuels, one of which had abnormal lubrication arrangements. These were explained by an A.D.I. (Science) officer as indicating that one of the main fuels was a low-temperature fluid such as liquid oxygen. The peroxide was only used to drive a turbine for operating the main fuel pumps. The published error had only a life of two days, but was regrettable. It demonstrates the need for resisting to the uttermost all demands to produce reports prematurely, because they are almost certain to contain misleading conclusions. Such reports almost always absorb time in their preparation which would be better spent in getting further information, and so reaching the truth more quickly.

THE ROCKET TOUCHSTONE.

87. Once we could be reasonably certain that liquid oxygen was one of the main fuels, we could apply this fact as a test to the many agent and P/W reports concerning the Rocket, because accuracy on this point would show that the source was probably better informed than the average. In fact, we had a good touchstone at last. Intelligence reports, although concentrating on the lower weights, had mentioned almost all weights up to 120 tons for the whole rocket and 10 tons for the warhead. Expert opinion in this country favoured the higher weights. The application of the touchstone, however, singled out five reports. Figures in these reports are tabulated below:

<u>Date</u>	<u>Origin</u>	<u>Length</u>	<u>Diameter</u>	<u>Total Weight</u>	<u>Fuel Weight</u>	<u>Warhead</u>
15.2. 44.	Agent	14 m.	-	7	-	1 ton.
22.2. 44.	Agent	12 m.	1/1 1/2 m.	11/12 tons.	8 tons.	2 tons.
3.4. 44.	Agent	12 m.	1 1/2 m.	11 tons.	8 tons.	1 ton.

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<u>Date</u>	<u>Origin</u>	<u>Length</u>	<u>Diameter</u>	<u>Total Weight</u>	<u>Fuel Weight</u>	<u>Warhead</u>
21.5. 44.	P/W ²²	more than 9 m.	1½ m.	-	-	1, 1½ tons.
2.8. 44.	P/W ²²	16 m.	1½ m.	8	-	1 ton.

≠ both from Peenemünde.

The best agent and P/W reports therefore pointed to a warhead weight of one ton, or less probably two, and a total weight perhaps as low as seven tons, but more probably about twelve. These figures were far below those suggested by our own rocket experts, but two further lines of Intelligence produced corroborative estimates. ~~(The full argument was given in Appendix D of A.S.I. Interim Report on the V-4 rocket, 26.8.44).~~ Simultaneously, the studies of photographs of Peenemünde and Blizna, in Poland, combined with consideration of the light weights indicated by the foregoing analysis, led to the deduction that the Rocket required no elaborate launching mechanism, but merely a simple table on a flat wooden or concrete platform. The vertical launch was rendered possible by the invention of "jet-rudders" placed in the main jet for steering. The discovery of these "jet-rudders" by Scientific Intelligence made its case for the vertical launch more plausible.

88. The rather surprising results of the Intelligence investigation were presented by A.D.I. (Science) to a meeting of the War Cabinet Crossbow Committee on 10th August 1944. The Committee did not accept the results immediately, because our own rocket experts had forecast total weights ranging up to 80 tons, and warheads up to 10 tons. Fortunately, reconstruction of the Swedish rocket at Farnborough soon indicated that the deductions of Scientific Intelligence were approximately correct. These were stated in an A.S.I. Interim Report of 26th August, and are below compared with figures since gathered from official German documents:—
(Rocket firing tables, produced by Wa Pruf 10, August 1944).

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	<u>U.S.I. (Sc.) Estimate</u>	<u>German Statement</u>
Total Weight	11½-14 tons. probably 12-13.	12.65 tons (experimentally down to 11.2 tons).
Warhead Weight	1 ton nominal	1 ton (down to .97 tons sometimes).
Liquid Oxygen Weight	4.5 tons.	4.9 tons.
Alcohol Weight	3.5 tons.	3.8 tons.
Carcass Weight	2.6 - 3 tons.	2.87 tons.
Maximum Range	200 - 210 miles.	207 miles.

89. Diagrams of the Rocket as given in the U.S.I. Interim Report before the attack opened, and as drawn by ^{Technical Intelligence,} U.S.I. 2 (G), after several rockets had been recovered are shown at Figure 6. Further diagrams (Figure 7) show the trajectory as given in the U.S.I. Report and in an album of diagrams from Peenemünde. The German intentions had been divined almost exactly, although in practice the trajectory was somewhat different. The album also shows the date of the first successful practice shot with the V4 - 3rd October 1942, compared with 10th October 1942 reported in 1943 by one of our agents. It is interesting that our first warning of the activity arrived on 18th December 1942, after only three rockets had been fired.

90. The U.S.I. Interim Report also gave forecasts of scales of production and total stocks. These were frequently criticised at the time, but can now be compared with German statements collected after the war.

	<u>U.S.I. (Sc.) Estimate</u>	<u>German Statement</u>	<u>Source</u>
Total Stocks	perhaps 2000 (on 26.8.44)	1800	Interrogation of the Ritzke (Director of Niedersachswerfen Rocket Factory) A.D.I.K. 356/1945.
Monthly production.	About 500 (on 26.8.44)	300 in May 1944 Average 618 (Sep. 1944 to March 1945).	Niedersachswerfen records (U.S.I. 4/14 Report-30.10.44).

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91. The forward storage capacity in France, and the intended scale of attack were also estimated. They are below compared with figures given ^{in interrogations} in GSDIC/SER-1703, by a supply adviser to the Rocket organisation.

	<u>Estimate</u>	<u>German Statements</u>
Total Forward Storage	About 400.	320.
Intended Monthly Rate of Fire	About 800.	900 as "target figure".

92. In the A.S.I. Interim Report, almost the only problem outstanding was that of the radio control; this was never solved in sufficient detail for countermeasure action, although its general principles were elucidated. Our failure was due at least in part to the small use which the Germans made of radio control in operations. Our opportunities for penetration were therefore confined to a rather limited experimental stage, and although we sometimes succeeded in gathering details of other weapons at such a stage it was a performance which, with our late start in the war, we could not guarantee.

93. Apart from its control, however, the Rocket was no longer a problem in Scientific Intelligence when it came into operation on 8th September 1944.

THE GERMAN NIGHTFIGHTER ECLIPSE.

94. During all the time that the Flying Bomb and Rocket were attracting so much attention, and during the Invasion preparations, the work of Scientific Intelligence in support of the Bomber Offensive was steadily proceeding. The addition of an officer who had completed two operational tours as a bomber pilot greatly helped the work of Scientific Intelligence in this field, and enabled the watch to be maintained at a time when otherwise it would have conflicted with the defensive work.

95. The sources which had been set up in 1941 and 1942 continued to work well, and the Intelligence problem in 1944 and 1945 largely reduced

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to collating the inflowing information with sufficient speed to enable Bomber Command to counter with minimum loss the changing tactics of the enemy defences. No. 100 Group had been set up at the end of 1943 mainly for the purpose of neutralising German nightfighters, both by radio countermeasures and by direct attacks upon the fighters themselves. A rapid flow of information to the Group was therefore necessary, and soon began to yield results which were gratifying to see after the years of work which had gone into the building of the Intelligence system.

96. After the first three months of Window, radiocountermeasures seemed to lose their efficiency; this, as we saw, was largely due in the first place to German exploitation of our I.F.F. After March 1944, when the I.F.F. menace was practically eliminated, the Germans relied upon plotting our bombers by listening to their H₂S transmissions. So successful were they that they decided to build up a special Raid Tracking Organisation (which was immediately revealed by Intelligence) plotting all the radiations from our bombers. This danger had already been foreseen, and a warning issued in ^{an} S.I. Report No. VI of 8.1.44. "They will probably try other radiations should we now thwart them on I.F.F., and we shall therefore need to be even more circumspect than before in our use of all radio equipment which involves continual transmissions from our aircraft". Nevertheless it took positive proof, ^{from interrogation of German night fighter aircr.} of the German H₂S exploitation to induce Bomber Command to curtail the use of this valuable navigational aid. The German Nightfighter Commander, General Schmidt afterwards expressed the opinion that the use of H₂S was our greatest mistake, because it betrayed us so consistently. ~~(S.R.G.C. 1331(e))~~. This opinion may justifiably be challenged, but it shows how impressed he was by the results of H₂S tracking. At any rate, the more circumspect use of H₂S immediately reduced our casualties. Thereafter attention was always paid to Intelligence regarding the activities of the Raid Tracking Organisation, and its threat thereby foiled.

97. The German loss of France and Belgium deprived them of much of their early warning system and thorough exploitation of this situation by the Command, and particularly by 100 Group, led to a period of outstanding success that lasted from July 1944 to the end of the war. It was now possible to write a report which showed why things were going wrong for the Germans, instead of for Bomber Command; this was A.S.I. Report No. 79 of 16th November 1944. It concluded:

"It is one duty of Intelligence to discover the reasons why the enemy is succeeding, or may succeed, against us; this has been the origin of several A.S.I. Reports in the past. The present Report has had the pleasanter duty of recording a picture which shows that gaps in our bomber defence revealed by past Intelligence have been filled, and that weak points of the enemy are being thoroughly exploited by Countermeasures. The future may hold difficult problems for the Bomber Offensive, but few will be insoluble if Intelligence can provide, and Countermeasures can use, information regarding the enemy defences to the same extent as in recent months."

98. The work of Intelligence in support of Bomber Command had been more difficult and less spectacular, had extended over a wider field, and had lasted longer, than any other; and when independent officers from *Director of Air Tactics*, ~~Director~~, Bomber Command, and 100 Group, examined the German nightfighter system in Schleswig Holstein at the end of hostilities, they stated:

"We heard of no equipment in operational use of whose existence indications had not been given by our Intelligence. Our Intelligence had clearly fulfilled its role admirably".

(Report on the G...F. Nightfighter System, 14.6.45). Bomber Command's main report "The War in the Ether", October 1945 expanded this comment:

"384. It is, indeed, of the greatest interest to study the mass of information provided by the examination of documents and key personnel on the German side. The outstanding impression which such a study leaves is of the extraordinary range and accuracy of the

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technical Intelligence with which Bomber Command was provided for the conduct of the R.C.M. offensive. No praise can be too high for those responsible for producing this Intelligence, without which no worthwhile R.C.M. effort could have been possible. Nor is there any need to ask indulgence for labouring this point, since the critical reader cannot have failed to have been impressed by the importance which attached to the possession of accurate information regarding the enemy's methods and equipment."

LESSONS.

99. The foregoing account is not comprehensive, for it only skims over a few of the more important aspects of the main subjects covered by Scientific Intelligence, and it completely omits reference to work on many subjects such as the U-Boat war, infra-red, guided missiles, atomic energy, and biological warfare. Nor does it mention the work of the A.D.I.(Science) field party and liaison officers in the European and African theatres; and it leaves undescribed the interesting work which was done to mislead the enemy by the production of technical spoofs. In even a summary history all these aspects, which were very different, would have to be treated, for they were important and they absorbed much effort. The purpose of the present story, however, is merely to demonstrate the evolution of the work in pure Intelligence, and to draw from it the lessons which we have learnt. Some of them we have already mentioned, and it may now be worth while to point out others.

X
INTELLIGENCE
PLANNING THE ATTACK.

100. Perhaps the most important advance in Intelligence technique during the war lay in the deliberate planning of attacks on specific problems. We were conscious of a gradual evolution in this respect from Knickebein through the Radar problem to the Nightfighter and Rocket and Flying Bomb problems. We were able to develop our tech-

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nique largely because of the variety of new sources at our disposal; these sources originated partly from the developing nature of warfare (the use of W/T, R/T, and Radar, for example) and partly from the application of new methods in the service of Intelligence itself, such as photographic reconnaissance, microphoned P/W conversations, and radio communications with secret agents. All these sources sprang ultimately from new applications of Science to warfare.

101. The ability to plan, to carry out, and to exploit, a concerted attack is probably the truest criterion of a good Intelligence organization; during the war we learned several lessons essential to the design of such an organization in Scientific Intelligence.

102. It seems axiomatic that it is impossible to have too many sources, and that it is unwise to build an Intelligence system too much around any one source, however good that source may be. For some reason, not always predictable, any one particular source may fail, and an Intelligence attack should always try to make several approaches, using each source to gather that type of information for which it is best suited. This is one reason why the collating officer needs to be skilled in, or at least to understand, the individual methods of all the sources. The Intelligence attack should be so framed that even if one or two sources fail the others will provide sufficient information to construct a fair Intelligence picture, with as many cross-checks as possible between the reports of individual sources. Thus, during the war, photography was a good source; but we always directed the Intelligence attack so that if photography failed, as well it might, sufficient information would arrive from other sources, admittedly impaired but nevertheless indicative of enemy intentions. At some time or other during the war each kind of source was vital to Scientific Intelligence, and few pains spent on the encouragement of sources went finally unrewarded.

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BASIC ORGANISATION.

103. It is essential that at the centre should be a single collating and planning section, the 'mind' of the organisation, while at the periphery should be a number of different types of source, the 'senses' observing the enemy. The sources should be in two-way contact with the centre, reporting what they see or hear, while the centre tells them to look or listen in a particular direction.

104. We found, for example, that the investigations which produced the best results in Scientific Intelligence were those in which A.D.I. (Science), as the central collating section, was fed exclusively with the information from the collecting agencies. It was necessary not only to maintain the closest contact with these agencies, but also to achieve some degree of competence in their activities. A.D.I. (Science) was occasionally able to improve on the photographic interpretation of C.I.U. and on the emending of ~~Secret Intelligence~~ ^{Not Secret Intelligence} ~~G.O. & G.S.~~, in the light of a fuller knowledge of the Intelligence picture. These examples are not intended to imply that A.D.I. (Science) could have done the work of the collecting agencies better, or as well. They merely show that the work of these agencies can be advantageously extended by a collating officer skilled in their techniques. Moreover, far from seeking to suggest that A.D.I. (Science) or any other collating branch should assume permanent administrative control over any one collecting agency, we believe that in general collection is such a specialised task that the practice of having special collecting organisations is probably the correct one.

105. There are two difficulties in separating collection from collation administratively. The first is that there needs to be a single authority over both sides to which either can appeal in case of dispute, and this authority should preferably be a single man. The second is that each collecting agency is only responsible for collection by its own

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technique, say by secret agent, or by photographic reconnaissance. It is nobody's responsibility on the collecting side to develop an entirely new source; the stimulus will most probably come from the collating side, and it would therefore be well to allow the collating section some latitude in experimenting with new sources, to be set up later as separate agencies should they prove successful.

SIZE OF STAFF.

106. We have already pointed out the merit of using the smallest possible staff (paragraph 24), although we have elsewhere also pointed out that the staff of A.D.I. (Science) was generally too small, due to a tardy appreciation of the importance of Scientific Intelligence. In a future war, and indeed in peace, it would be desirable to obtain Treasury authority for a somewhat larger establishment than would fulfil foreseen demands, so that there were always some posts in reserve which could be offered to suitable individuals as they appeared, or which could be used for new tasks which might unpredictably occur. Intelligence is waging a perpetual attack against the Security of foreign powers, and in any attack a certain amount of extemporisation must be expected. This extemporisation can only be achieved if there is a reserve.

REFERENCE FACILITIES.

107. Intelligence was handicapped in the past war by an almost complete absence of reference facilities; even such standard works as "Wer Ist's" (the German Who's Who) were very scarce, and scientific works of reference were unobtainable. Any self-contained Intelligence unit such as A.C.A.S.(I)'s department should keep its own reference library for day-to-day use, and there should be at least one central Intelligence library with the more obscure reference works. In addition, the Air Intelligence library should include all past Air Intelligence reports. Without a

library, the Air Intelligence 'brain' is largely deprived of its memory.

103. To some extent the lack of reference facilities was offset by the memories of individual officers, of whom several survived in Intelligence throughout the war; and continuity of experience, particularly in Intelligence method, is even more necessary than a library. This continuity can only be ensured by personal contact between old and new staff.

INTERNAL RELATIONS.

109. We now discuss the relation between the various components of the Scientific Intelligence organisation. The solution which the war showed to be best was to have sections dealing with particular subjects administratively inside the collecting agencies, but with a very strong moral responsibility towards the collating sections dealing with their particular subjects. For the future, therefore, it would be desirable to have a Scientific Intelligence outpost with each collecting agency, administratively responsible to the agency, but responsible for Intelligence to the central collating section.

110. Normally, information from the collecting agencies should flow primarily to the central collating section, which must carry the responsibilities of planning the general Intelligence attack, of briefing the collecting agencies, of fitting together the individual pieces of information into a coherent picture, and of presenting this picture to the operational and research staffs. The collating section should not be by-passed through reports being sent direct to operational staffs from collecting agencies, except by its own approval in cases where these reports are operationally urgent or sufficiently complete in themselves to give a fair picture. Otherwise the collating section may have to spend much time correcting the false impression given by a report from a single source

which may be wholly true but not the whole truth. The collating section must therefore generally be the mouthpiece of the Intelligence organization; but this function must be performed with scrupulous acknowledgment to the work of the sources, and no credit must be claimed by the collating section for work which others have done. Whenever such an arrangement of good faith prevails, the best work is likely to result. ~~This was certainly true of the relationship between A.D.I. (Science) and the S.I.S., G.C. & C.S., and O.I.U.~~

111. An organisation of the above type, where everyone has a separate and known function, may be guaranteed almost always to produce better results in Intelligence than a committee, however large and however talented the committee may be, where every member has an identical responsibility in all the quaquaversality of committee proceedings. This statement is not a diatribe against committees. They have their proper functions, as Lord Hankey has pointed out in his 'Government Control in War'; but these functions do not normally lie in the solving of Intelligence problems. Rather, the head of the central collating section is in the position of a commander in the field waging a perpetual war against the enemy's security; and he must be allowed the traditional rights of a commander in the field.

112. The merits of the organised attack system, dependent on a central collating section directing a number of collecting agencies with which it is in two-way contact, were already proved, so far as Scientific Intelligence was concerned, before the end of 1942. In particular, it had been demonstrated by the Beam and Nightfighter investigations. Its most exacting test, however, came in the Rocket and Flying Bomb investigations, where innumerable committees were set up to do what Scientific Intelligence was already doing.

113. The main effect was to make the work of Scientific Intelligence much more difficult; nevertheless, our results have borne comparison

in this Chapter with facts subsequently established. It is left to others to subject the results obtained by the Committees to the same comparison, but if this be done, there will be no doubt as to which is the correct method of tackling Intelligence problems.

BRIEFING.

114. A vital part of the internal relations between the various components of an Intelligence organisation is the briefing of the collecting agencies by the collating section. The orthodox method here is for the collating section to produce written briefs and detailed questionnaires for the collecting agencies. But, looking back on what we did in Scientific Intelligence, it rather surprisingly appears that we rarely used this method. We instead depended almost entirely upon personal contact and telephonic conversation, our method being to select one competent officer to act as our representative in each collecting agency, and then to take him completely into our confidence, so that he knew exactly our objectives and plan of attack. We then left it to him to acquaint other sections of the collecting agency with our requirements, once again mainly by personal contact, and to bring any of our Headquarters collating staff into contact with other officers inside the collecting agency as he, our trusted representative, thought fit.

115. There were many reasons why we resorted to the personal method of briefing described above. At times we were almost forced to it, for it was the only method which could cope with the speed of the war. It cut down paper-work enormously. In general, we had only to give strategic directives to our representatives, and could then leave it to them to work out the detailed tactics of the individual questions. Everyone felt that he was a thinking and essential member of a coordinated team, and worked with far greater enthusiasm than he would have done had he only received an impersonal brief to which he had to find cut-and-dried answers. It might

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be objected that such a system could not work unless the individual officers were well above the average; the answer to this is that Intelligence officers should be well above the average.

116. We made almost no use either of pro forma questionnaires to sources or of pro forma criticisms of their reports; and we seldom saw good results following from their use by others. The reason for their failure probably lies in their extreme impersonality, which stifles the enthusiasm both of the source and of the collating officer.

117. We do not conclude that written briefs and questionnaires are entirely dispensable; there are occasions, particularly when the source is inaccessible, where written briefing is the only method, and there are other occasions when it is a useful supplement to personal contact. But our war experience leads us to believe that, while there may well have been occasions on which we did insufficient written briefing, the importance of the written brief is commonly exaggerated, and that had we depended upon this method we could not have achieved our results so quickly or with so much enthusiasm on the part of our sources. The best method, of course, is to give your source written or verbal directives as he himself prefers; in order to give either of these effectively, you must get to know your source personally; and when you do know him personally, you will often find that frequent personal contact will suffice. The main point then in written briefing is to provide an historical record; this is valuable, but in wartime it is almost a luxury. It is generally only needed to settle points of dispute between collecting and collating sections.

A PROFITABLE ANOMALY.

118. As we have previously noted, the relationship between A.D.I. (Science) and the S.I.S. was a special one. From the point of view of orthodox organisation, it was an anomaly; but an anomaly so profitable

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is worth thinking about. It originated partly accidentally and partly because S.I.S. was the only case where a collating section could sit in the Headquarters of a collecting agency without serious prejudice to its collating work. Hence, in the case of S.I.S. it was possible to achieve such close contact between collecting and collating agencies that one section could largely perform both functions. Moreover, sitting with S.I.S. also gave special access to ^{Post Secret Intelligence} G.C. & C.S. since both organisations have ^d a common Head. At the same time, contact with the other sources, such as photographic interpretation and prisoner interrogation, which were out of London, could be performed equally well from S.I.S. H.Q. as from the Air Ministry. Thus, although apparently anomalous, placing the collating section with S.I.S. satisfied the important condition of maximum contact with sources; for it gave increased contact with the secret sources, while it did not diminish contact with the others. In addition, the 'free' atmosphere of the S.I.S. organisation, as compared with the 'civil service' atmosphere of the normal Departmental offices, undoubtedly provided better conditions for constructive Intelligence work. The success of Scientific Intelligence was therefore partly due to the liberality of C. in allowing the section to use his accommodation and facilities, and of A.C.A.S.(I) in allowing one of his sections to spend most of its time outside his offices.

119. The success of this anomaly is an illustration showing the need for flexibility in Intelligence organisation. In general it is possible to state the rules which an Intelligence organisation should observe in order to function best, but it should always be possible to modify these rules in particular cases to take advantage of any exceptional conditions which may occur.

EXTERNAL RELATIONS.

120. It is important to achieve a proper relationship between experts in our own developments and the Intelligence organisation. Intelligence

is in its way just as much a specialist occupation as the development of new weapons, and the research expert is likely to take as much time to become competent in Intelligence matters as he would to learn a new line of research. Expert advice acts as a source: it is really that source which provides information on the fundamental laws of nature and how they may be applied to military purposes. The closest cooperation between research expert and Intelligence officer is essential, but their respective responsibilities must be mutually recognised if they are to obtain the best results.

121. A similar relation must exist between Intelligence and Countermeasure Officers. The most successful Countermeasure campaigns of the war were those in which mutual trust prevailed between Intelligence and Countermeasure Officers, each reporting through their own channels to C.A.S. But while there should be a clear division of responsibility between the two, this does not mean that no suggestions should pass from one to the other. It sometimes happens that Intelligence, through its continuous study of the enemy, can alone appreciate some of his more obscure weak points, and it is a matter of duty to draw attention to them, if necessary with suggestions as to how they can be exploited. Similarly, Countermeasure Officers may from their experiences produce valuable items of Intelligence

REPORTING.

122. Although it has already been remarked in the body of the Chapter, it deserves to be reiterated that considerable attention must be paid to the method of presenting the results of Intelligence investigations to those responsible for operations and research. Perhaps the best single counsel is for the central collating section to regard itself as the discriminating watchdog of these officers; it should not bark unnecessarily but in justice to its masters and to its sources it should bark loudly

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when genuine danger is detected. While, however, this counsel is excellent so long as Intelligence is sufficiently competent to detect danger, there will arise occasions when its cover is not good enough for it to make a definite pronouncement. A prudent Intelligence service will therefore not confine its utterances only to its definite discoveries, but will also warn its customers from time to time of its own deficiencies, so that operations will not be planned on the assumption that the enemy does not possess a particular weapon when in fact it is merely the case that Intelligence has failed to discover it.

123. In talking of briefing procedure, we recommended personal contact as the main method. This contact is essential, too, for reporting procedure when operational staffs must take quick action on Intelligence results, and there is little time in which to write reports. But in general we believe that information flowing back from sources through collecting agencies and collating sections should be as fully documented as possible at every stage. The compilation of a collated report, as pointed out in paragraph 45, often produces new conclusions which only become clear once all the known facts are assembled together; and the operational staffs find it easier to take action upon a clear, comprehensive, and fully-collated report. Moreover, there can be no subsequent question about the amount of information provided by Intelligence.

124. While we do not recommend extravagance in the writing, the illustration, or the production, of reports, we believe strongly in taking great care in all these respects to ensure that Intelligence reports should reach the highest possible standard of clarity and attractiveness commensurate with speed of production. Good draughtsmanship, photography, and reproduction facilities are therefore important. It is also necessary to write the reports so that various types of reader, notably operational officers and research staffs, should be immediately able to select those features particularly relevant to their interests. It is quite possible

to write such reports, even at the height of war.

125. In all our major reports we included an account of how we had pieced the Intelligence picture together. We found that this helped to convince our readers of the soundness of the picture, because we were taking them over the same route as that by which we ourselves had been convinced. It also provided a useful historical record.

126. Our belief in the value of written reports may appear at variance with our belief in unwritten briefs; but the cases are not the same. In the case of briefing, the information is proceeding from the collating section, which has many Intelligence problems to face, to a source which generally only has a few specific problems. The source can therefore absorb and memorise the information contained in his few briefs, whereas the collating section has so many types of information coming in that a written record is essential. We do not, of course, believe that either written reports or unwritten briefing should be taken to extremes, but on the whole the bias is as we have stated.

INDIVIDUAL QUALITIES.

127. One of the most important conditions to be fulfilled by an Intelligence organisation is that it should provide a flexible, unobtrusive, background against which the individual officers can work. Everything depends upon those fortunate correlations between say, decoded messages, ^{interrogation of prisoners,} prisoners' statements, and aerial photographs, which can only occur when the necessary items have been absorbed by the mind of one man. This cannot be done by an elaborate organisation of card indexes, nor by any other form of mechanical reference, although such devices are often necessary adjuncts. The quality of the individual officer is therefore of overwhelming importance, and an Intelligence Service in which organisation became a fetish regardless of individuality would soon stifle itself.

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128. Scientific Intelligence demands high qualities in the individual officer. Among the more important are: a wide knowledge of the fundamental laws of nature, a ~~W~~ legal faculty for the critical appreciation of evidence, an imaginative ability to synthesise an Intelligence picture from the correlation of a few vital facts, a powerful memory, a command of English, a command of foreign languages, and an ability to handle other individuals. The last is frequently necessary to convince sources that their tedious and dangerous work is worthwhile, and to convince the operational and research staffs that an Intelligence picture is sound. It is, of course, not essential that every officer should be outstanding in all the foregoing qualities, but the average for the organisation as a whole should be well above normal.

129. Then there is Kipling's

'If you can keep your head when all about you

Are losing theirs and blaming it on you'.

Perhaps this ability to keep one's head in a crisis is the most important single quality which an Intelligence officer should possess. It is certainly needed in the face of a threatened new weapon, when anyone in charge of Scientific Intelligence in the future will find that a faculty for losing one's head is apt to appear at any level in civil and military administration. He will find himself confronted by many frightening chimaeras conjured up from the slenderest evidence by the agile imaginations of men often at higher levels than himself. He will be unable to destroy all these chimaeras at once, because to prove a negative case is one of the most difficult of Intelligence exercises. But if he is wise, he will select the most common-sense hypothesis and stick to it until he finds something better, however eminent an authority is attached to some alternative theory. In this, he will find Occam's Razor useful. He will find himself blamed for not producing more information, and then, when by correlating two facts he succeeds in synthesising a third, he will find

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himself blamed again for not having told the world about it before he even thought of it. He will find himself accused of hoarding information, even though he hasn't, and even though hoarding information is often a legitimate thing to do. At the same time as he is accused of hoarding information on the one hand, he will on the other hand find himself reprimanded by the Security authorities for indiscretion. He will find everyone insistent on having every scrap of undigested information. He will then find himself forestalled by others with scatterbrained interpretations of this undigested information; and he will learn that in the Intelligence world there is an enormous premium placed upon going off at half-cock. For the world seems to prefer a busy show of promptness, however immature, to quiet and mature action, however timely. In retrospect, of course, it recognises the greater value of the latter, but it always falls for the scatterbrained alarm again next time.

130. In a crisis, the Intelligence officer will find that these distractions may easily take up to 80% of his time. His nights (or what is left of them after he has done the work which he should have done in the day but for the distractions) will often be sleeplessly spent in wondering whether this time he has not been too phlegmatic in decrying other people's flights of fancy, or too rash in extrapolating from too few facts in building up his own picture. But if, in all this, he can keep his head and use the remaining 20% of his time in stimulating his staff and his sources to gather fresh facts, in correlating the information for himself, and in presenting his results in the form of logical and clear reports, he will usually find himself vindicated by events. And if in the meantime he manages to persuade the operational staffs to take suitable countermeasures, he may have the satisfaction of seeing danger averted for many of his unsuspecting countrymen.

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EPILOGUE.

131. New techniques so widened our range of sources that the scope of Intelligence in the past war far transcended anything previously known. The men and women who constituted these sources earned our thanks, our confidence, and our respect; but this Chapter, while mentioning a few of their feats, conveys no account of their continuous efforts. Our pride in the results of Scientific Intelligence here presented springs largely from the demonstration that in collating and presenting their information we kept faith with our sources.

132. It is difficult to predict the future of the struggle between our Intelligence system and the Security covering foreign scientific developments. In the past war, the nature of the developments, the brilliance of our sources, and the mistakes of our enemies, alike contributed to turn the balance in favour of Intelligence. It may well not remain so in the future. While there will arise techniques of Intelligence beyond our present knowledge, the nature of future weapons may render them easy to conceal and difficult to counter. Yet, though the fortunes of Intelligence may fluctuate and its methods change, its principles will remain the same; and if during the past war our work helped to clarify those principles, this may well prove its most permanent contribution.

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ANDAL (Science).



CAPTIONS TO ILLUSTRATIONS FOR "WORKING
METHODS OF INTELLIGENCE IN RELATION TO
TECHNICAL DEVELOPMENT"

(A) Para 5b.

A lapse by the German censor. An early photograph of the Fw 190 from a magazine; the muzzles of the wing guns have been "touched out" but are clearly visible on the cast shadow (arrows).

(B)

146 A page from the Technical Intelligence publication "Vulnerability and Armament of German Aircraft". The main points illustrated are positions of guns; quantities of ammunition; distribution of armour; positions of tanks; and crew stations.

(C)

A selection of photographs taken from Ps/W. The upper pictures show a Me 110 with Flak 18 gun and a He 111 Z "Siamese twin" glider tug. The bottom pair show the method of starting the engines of an He 110 in cold weather, and two He 110's in flight.

(D)

"Cuts" from combat films. The top left-hand print of the He 262 was of great value in recognition training. The view of the He 177 (top right) shows the location of turrets and the Fowler flaps. The close-up shows strikes on an Fw 190 A.

para 52

(E)

para 66-69 The story of the Do 335 in pictures: Fig. 1 is the first sketch received from an agent. Fig. 2 is a later agent's drawing, crude, but showing more details. The wash drawing (top right) was prepared by Technical Intelligence to illustrate a preliminary report on the aircraft; how accurate this was, despite lack of precise data, will be gathered by examining a photograph of the aircraft (bottom right).

(F)

para 74-82 Solving the mystery of the "Peenemunde 30": Fig. 1 is an early P.R.U. photograph of Peenemunde showing "Peenemunde 30's" (A and C) and a jet mark on the airfield surface (B). In Fig. 2 a "Peenemunde 30" is seen on an experimental launching rail. Fig. 3 is a reproduction of notes and sketches of the He 163 by an escaped French worker. The fragment from a notebook (Fig. 4) was picked up on a captured airfield. A handbook dealing with the transportation of the He 163 produced the first clear photograph of the aircraft (Fig. 5) and soon the type was encountered in

/combat

combat (Figs. 6 and 7). During the same period it was photographed during low-level attacks on enemy airfields (Fig.8). Fig.9 is the official German recognition silhouette.

(G)

Representative crashes examined by Technical Intelligence officers. Top left, wreckage of a Ju 88 G-6 intruder scattered over a field near Scampton, Lincs. on the 4th March, 1945. On the previous night the aircraft had crashed into a private car while making a low-level attack. Despite its complete destruction it was established that FuG 220 radar was carried; that the armament was four MG 151/20 guns and one MG 131; and that the engines were Junkers 213 A-1.

The top right-hand view shows a typical crash in the Western Desert - a He 111 H forced-landed east of El Alamein in July, 1942, and largely destroyed by the crew.

The belly-landed Fw 190 A-8 (bottom left) was inspected at Manston on the 30th August, 1944.

para 124

The fourth photograph shows one of the biggest prizes secured during the war, an intact Ju 88 G-6 with full night fighting equipment, which made a wheels-down landing at Woodbridge on 13th July, 1944.

(H)

para 146

A specimen of the wash drawings which accompanied the interim reports on enemy aircraft issued by Technical Intelligence.

(I)

A specimen of the coloured sectional drawings of enemy aircraft issued by Technical Intelligence. Such drawings were well received by aircrew and technical establishments.

105

The Hs 293 radio-controlled glider bomb. Fig.1 is the first photograph of the new weapon, secured during an attack on light Naval craft in August, 1943. Fig.2 shows an intermediate stage in the reconstruction of Hs 293 wreckage; this assisted in the preparation of the silhouette (Fig.3) issued in April, 1943. Fig.4 shows a complete Hs 293 found in an unexploded ammunition dump in France.

(K)

para 109 - 114

The FX radio-controlled armour-piercing bomb. Fig.1 shows typical fragments of an FX bomb recovered after a direct hit on H.M.S. Warspite. Reconstruction of fragments is shown in Fig.2 and the first "artist's impression" of the complete

109
 110 missile is shown in Fig.3. Fig.4 illustrates the control "spoilers" discovered
 111 on an airfield at Foggia, and Fig.5 is a later picture issued on November 1943,
 112 illustrating the main technical features. A complete FX, discovered in a German
 114 ammunition dump, is shown in Fig.6.

(L)

para 118, 119
 Reconstruction of the Fug 200. The upper view shows components recovered
 from the sea off Spurn Head. Equipment from a crashed Fv 200 ^{crashed in Ireland} ~~is shown~~ is shown
 in the lower left-hand view. The third picture shows a damaged aerial array for
 Fv 200. This was found in Sicily.

(M)

para 123
 A combat film of a Ju 88 G fitted with an aerial array for the Fv 220.

(N)

Illustrating the manner in which counter-measures lagged behind the enemy's
 introduction of new electronics equipment.

AI2(9)

TECHNICAL INTELLIGENCEIntroduction

1. By the end of the war it was clear that the principal function of Technical Intelligence was to process technical data supplied by miscellaneous agencies rather than to report first-hand on the examination of enemy aircraft and equipment. Nevertheless, for the first two years the latter was its primary concern. At the time the equipment of the Luftwaffe was highly standardised and detailed improvements in equipment and armament were certainly of relatively greater importance than latterly; even so, the wisdom of subordinating the work of appreciating abstract intelligence must be questioned. Not until the Battle of Britain had been won and officers were released from field duties did constructive assessment of agents' reports commence in earnest. Although sparse, nebulous and only superficially appraised these reports and other evidence had, for example, already established that a four-engined bomber was on test in Germany and that Focke-Wulf were designing a promising radial-engined fighter; but they had not notified the first flight by a German jet aircraft. Fortunately late in 1939 an escapee gave a preliminary description of the jet-propelled He 280 so that it was at least possible to forewarn the Air Staff of the enemy's interest in the new propulsive system.

2. As the responsibilities for Technical Intelligence became more definite, full use was made not only of agent's and P/W reports, but of reconnaissance photographs, captured documents, combat films and combat reports, the press, patent specifications, postal intercepts and several "casual" sources. Although these sources are elsewhere discussed individually brief reference must be made in the present chapter to their bearing on Technical Intelligence work; but first Technical Intelligence will be considered as a source in its own right.

3. No useful purpose will be served by describing in detail the evolution of its internal organisation and establishment; it will suffice to record that throughout the war the two major sub-divisions were the Headquarters Staff and the Field Staff. The former comprised sub-sections responsible for aircraft and power plants, air armament, and radio and radar while the composition of the Field Staff was periodically adjusted to the war situation. Integral with the Headquarters Staff and directing the activities of outstation officers in Great Britain was the "Operations Room"; this was further responsible for

/relaying

relaying reports and physical specimens submitted by Field Teams overseas and for co-ordinating the activities of the Enemy Aircraft "Circus Flight" (1426 Flight) and mobile exhibition vans. ^(See pp. 39-40) The Technical Intelligence Library of captured documents and handbooks originated as an offshoot of the "Aircraft and Power Plants" filing system but gradually assumed an importance of its own.

Examination of Enemy Equipment →

General (See Illustration 6)

4/ However detailed and well-authenticated were the reports from miscellaneous sources, there was often an element of doubt and some gaps remaining to be filled, whereas the inspection of a crashed or captured aircraft however comprehensive or however meagre, gave concrete and indisputable results. If any item from a single round of ammunition to a complete engine was new to the inspecting officer then obviously there was something to be learned. Even the proverbial "hole in the ground" in which an aircraft had been almost totally destroyed might yield fragments which could be turned to account.

5/ It soon became clear that every enemy aircraft which made a forced landing or was captured should be inspected immediately by competent specialists. Guarding was never entirely successful and the one sure way to foil the souvenir-hunter was to "get there first."

6. Probably the most valuable of all captured ^{equipment} during the war, having regard to time and circumstance, was an Fw 190 fighter. During the latter part of 1941 and early 1942 this type had achieved considerable notoriety, and its introduction imposed a temporary check on Allied technical superiority. The normal sources of technical intelligence yielded insufficient results and although the salient characteristics had been gradually established, there were still ample grounds for speculation. On June 23rd 1942 the whole situation was changed. An enemy pilot in combat over the Devonshire coast lost his bearings, and, having run short of fuel, made a wheels-down landing in his ^{FW} 190 on Pembrey airfield. He surrendered to the duty pilot without attempting to destroy his aircraft. A Technical Intelligence report based on a preliminary inspection and indicating all the principal features, with special emphasis on armament and armour, was issued two days later. Shortly afterwards a more comprehensive description was distributed, accompanied by a vulnerability diagram. From Pembrey the aircraft was flown to R.A.E. for performance tests and at the beginning of August it was possible to issue a further report giving the results. Simultaneously with the performance tests,

/tactical

-4

tactical trials were carried out by pilots of the Air Fighting Development Unit. To save time the trials were conducted at Farnborough and although they could not be completed due to repeated engine troubles, they afforded much valuable information. Thus within a period of about six weeks Technical Intelligence acquired a comprehensive knowledge of the characteristics and potentialities of the Fw.190, which, without this lucky capture, might not have been available until much later in the war.

7. More often than not the value of physical examination lay in the discovery of some new item of equipment. For example, early in the war a crashed He 111 was found to be carrying interesting oxygen apparatus functioning on the lung-controlled principle in which suction during inspiration controlled the oxygen flow and a valve adjusted by hand controlled its admixture with air at varying heights. The system proved to be very efficient and influenced the design of our own equipment. Examination of the bottles, however, showed that they were dangerously vulnerable to gun fire and this knowledge was effectively used until the enemy modified them.

8. Particularly good work was done by a Technical Intelligence officer during the examination of a crashed Ju 88 bomber early in 1944. He discovered amongst the wreckage components of British "Gee" equipment which the Germans had been trying out. The news of this find was immediately made known to Bomber Command who instituted the necessary countermeasures.

Crash Inspection Officers

9. The full implications of the work involved in the field examination of crashed and captured enemy aircraft are not generally recognised so some account will be taken of the working methods of the Outstation Staff operating in the U.K. and the Field Teams overseas.

10. A scheme was drawn up early in the war, which, with slight modifications, proved satisfactory throughout for dealing with enemy aircraft crashed in the United Kingdom. Crash inspection officers were attached to selected Maintenance Units and were responsible for reporting on crashed E/A and what were officially described as "objects dropped from the air". The scheme was flexible so that if the enemy suddenly raided a fresh area officers could quickly be transferred to assist. Only when an officer had been stationed in a locality for weeks or even months could the best results be obtained. It was imperative for him to establish liaison with

/organisations

the

organisations which could assist by supplying prompt information on the location of a crashed aircraft. The civil police were especially useful and co-operative. Other valuable contacts were A.R.P. Headquarters in the larger towns, Royal Observer Corps Centres and Posts, A.A. Headquarters and Batteries and Army Units, particularly Base Troops who were not moved too frequently. It was, of course, essential for the officer to have a telephone at his billet and to have a car instantly available should he be (as he very frequently was) called out during the night.

Crash Report: Pro Forma

11. To facilitate systematic reporting to Technical Intelligence H.Q. the following proforma was used. Initially the report was dictated over the telephone, to be followed in special cases by a written report.

- (a) Date and location of crash and map reference.
- (b) Type of aircraft.
- (c) Identification and distinguishing marks.
- (d) Type of engine/s.
- (e) Cause of crash, type and distribution of bullet strikes and condition of aircraft.
- (f) Armament:-
 - (i) Guns, all types, installation positions, quantity.
 - (ii) Ammunition; state number of magazines.
 - (iii) Bombs and bomb installations.
 - (iv) Mines and mine carriers.
- (g) Armour plate: Quantity, positions, thickness, if penetrated.
- (h) Number of crew and fate.
- (k) Leading edge: if protected against balloon cables by cutters, strengthening, or other devices. De-icing?
- (l) State if sample can be obtained of
 - (i) petrol
 - (ii) oil
- (m) Internal equipment: Condition, bombsights, navigational wireless and other instruments. Wireless settings.
- (n) General remarks and special points.
- (o) Recommended disposal.

4

Specimen Crash Report

12/ The following is typical of a "Crash Report" based on a completed pro forma and issued to all interested formations:-

SECRET

CRASHED ENEMY AIRCRAFT

Report Serial No. 240 dated 26th June, 1944.

Report B/146 - Ju 188 F-1

At 01.10 hours on the 21st June a Ju 188 on reconnaissance hit the top of the hill some 1,200 feet high about four miles W.N.W. of Rothes, Morayshire, Map reference J.7572. The wreckage was partly buried in a peat bog and widely scattered. There was no fire and the remains of the equipment were smashed but recognisable.

The standard cameras, one 50 x 30 cms. and the other 30 x 30 cms., together with films, were recovered. There were also hand cameras, size 12.5 cms. in the wreckage. The films were delivered to R.A.E., Farnborough, who have since reported that they are too badly fogged for any results to be obtained, whilst the film in the undamaged hand camera had not been exposed.

Identification Markings:

A6 + HH

Works No. 280608.

Camouflage - very dark olive green on upper surfaces, duck egg blue on lower surfaces. The outer 4 ft. of the undersurface of the wings were painted white.

Engines:

BMW 801 G-2.

These were partly buried in a bog and no further data could be obtained during the site examination.

Armament:

- 1 x MG 131, 13 mm. calibre, in dorsal turret.
- 1 x MG 131 in rear dorsal ring.
- 1 x twin MG 81 (presumed ventral)

/Loading

SECRET

Loading order of ammunition:

- 13 mm. 1 AP/T
- 1 HE/T repeating.
- 7.9 mm. 2 AP
- 2 AP/T
- 2 AP/I repeating.

Two ETC 1000 bomb-carriers, fitted with slip 2000/XIII, were installed under the wing.

Crew: Four, all killed in crash.

Internal Equipment:

The radio equipment carried was FuG 10 P, FuG 101 A, FuG 16 and FuBl 2F.

The 'S' compass installation was fitted.

Two fuselage petrol tanks were carried.

A balloon-cable cutter was fitted to the leading-edge of the mainplanes and the usual hot air de-icing system was employed on both main and tailplanes.

Function of Crash Inspection Officers.

13. Although an Outstation Officer had an all-round knowledge of the main features of German aircraft, he was not expected to be, for example, a Signals specialist. If an aircraft was found to have been carrying a new type of radio or radar, brief particulars were immediately telephoned to Headquarters and a specialist officer was despatched to make a preliminary examination, after which the equipment was carefully removed and consigned to an Establishment for stripping.

14. On receipt of a preliminary report on a crashed aircraft, certain information was immediately disseminated prior to the issue of a general report covering the incident. Thus, Fighter Command, Balloon Command and A.A. Command were informed of the location of the crash and type of aircraft involved and certain Air Ministry Sections were interested in the identification and distinguishing marks of the aircraft to serve as a check on their order of battle.

15. Frequently it happened that conflicting claims were submitted by Fighter Command, A.A. Command and occasionally by Balloon Command for having destroyed an aircraft and it was often necessary for the inspecting officer to go to a great deal of trouble to establish the cause of the crash. Technical

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Intelligence was the arbiter on other occasions. A pronouncement on the origin of a piece of wire, for example, determined whether or not a farmer was entitled to claim that the death of a cow was due to enemy action.

16 Special investigations were made on behalf of the Ministry of Economic Warfare who discovered in 1942 that each enemy aircraft tyre carried a serial number and code letter. The code was broken down and it was established that it indicated the exact amount of natural rubber, synthetic rubber, cotton, rayon, etc. used in the manufacture of the tyre, and the location of the factory.

17 Another task which assumed increasing importance as the war progressed, was the collection of aircraft and component nameplates. Until the middle of 1941, these were stamped with the manufacturer's name, but subsequently a three-letter code was substituted. This code was ^{also} ~~seen~~ broken down and bulky packages of plates were shipped from overseas to the appropriate Air Intelligence Section for study.

18 By the beginning of 1943, enemy air operations against this country had diminished in scale and there was comparatively little work for Outstation officers, so by arrangement with the Operational Research Sections of Fighter and Bomber Commands these officers were called in to airfields in their areas to examine British aircraft damaged in air-to-air action. Bullet strikes were photographed and useful information afforded on the types of guns and ammunition responsible for the damage. Reports on more than 360 damaged British aircraft were issued to Departments of Air Ministry and M.A.P.

Crash Inspection: Overseas

19 ^{required} Difficulties and interest attaching to crash inspection overseas ^{was} such that special consideration ^{is} ~~will~~ be given to this work. ^A 20. Mediterranean: In 1941 a party

U20.

Par 19 section 19.

The precaution was taken of ensuring that all A.T.I. personnel were held against an Air Ministry Establishment. This was to facilitate the movement of officers from one theatre of operations to another with the changing course of the war and to preclude their misemployment when campaigns were drawing to a close, and when difficulties might arise in effecting their transfer to other theatres.

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page 7

and were in no way subordinated to the local Command.

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In the U.K. although similar difficulties existed, there were at least civil police and military guards, but in the Middle East, outside the Delta area, no facilities for guarding were available.

21 In the late autumn of 1941 two technical intelligence teams ^{comprising a total of six officers} were organised, equipped, and attached to forward desert units in readiness for the advance. After the fall of Capuzzo and Bardia, the teams were well forward and were among the first to arrive on captured airfields. The landing grounds in Libya and Cyrenaica, which were later to become such familiar names - Tobruk, Gambut, El Adem, Derna, the Martubas, Benghazi and El Agheila - were then inspected for the first time. The teams operated under what were practically battle conditions, there was constant danger from mines and booby-traps and from strafing by enemy aircraft. At Sidi Rezegh a Technical Intelligence team occupied one end of the airfield as the Germans left the other.

22 In Libya the sand and dust of the desert impeded progress, while in Cyrenaica, the winter rains set in and travelling conditions went from bad to worse. To keep up with the advance under these conditions while inspecting hundreds of captured aircraft imposed a very heavy strain, but the teams reached Benghazi, having completed their task, and by January were back in Cairo. Some 500 enemy aircraft had been inspected, many of which were intact. The MC 200 and MC 202 fighters were examined for the first time and captures included the then-new GO-242 twin-boom glider, which was of special interest because of the possibilities of German airborne invasion.

23 Some tons of technical documents were recovered. The more important were translated immediately and any information of immediate ^{local} operational value was circulated throughout the ^{Middle-East} Command. Then the documents were passed by the quickest means to Air Ministry, where handbooks on such new aircraft as the Fw 190, He 177, Hs 129, Bv 222 and Ju 86 P were eagerly received.

1962
1975
X The book dealing with the Ju 86 P was of particular interest and later, when aircraft of this type made a series of stratospheric reconnaissance flights over the Delta area, a Spitfire flight, utilising information from the handbook, prepared special aircraft and shot down at least two of the high-flying Junkers into the sea.

-b-

Technical Intelligence

24 When Rommel attacked, ~~the~~ units in the desert were withdrawn to El Alamein. It was during this period also that an He 111 crashed in about 20 feet of water in the Gulf of Kenya^s. One of the crew maintained that a new radio device had been carried. No boat was available, so a German aircraft dinghy was employed to locate the wreck. The Navy being too busy to assist in diving operations, a Technical Intelligence officer borrowed a shallow-water diving helmet and successfully carried out a number of protracted dives from the dinghy, recovering valuable items of equipment.

25 In March, 1943 when North West African Allied Air Forces came into being an expanded Technical Intelligence Section, composed of both British and American personnel, was set up and by the time the fighting at Cap Bon had ceased the figure for enemy aircraft examined since El Alamein had risen to over 2,000. The most important captures in the final stages of the North West African campaign were Me 323 six-engined transports, the 4-engined Ju 290, Ju 52 with magnetic mine-sweeping ring and an Me 109 G with pressurised cabin.

26 It had been expected that Sicily would yield good results, but the rapid progress of the campaign netted an unprecedented haul of about 1100 aircraft, the coverage of which imposed a severe strain upon the teams. True, they were well equipped by comparison with earlier operations, but their ^{strength of four} ~~numbers~~ ^{officers was} ~~was~~ entirely inadequate. Reinforcements could have been obtained, but the military authorities restricted the disembarkation of additional personnel. Accordingly work was concentrated on the newer designs, like the first specimen of the Me 410, of special interest at the time as this type was being used for the bombing of London.

27 In Italy inspection of the Foggia area proved exceptionally profitable. Here were discovered the first traces of installations for carrying and controlling radio-corrected FX high-altitude armour-piercing bomb and the Hs 293 glider bomb. ~~while~~ A 21 cm. rocket mortar installation was reconstructed from components. The report on this latter installation was welcomed by the Americans whose four-engined bomber formations had already been subjected to attacks with the new weapon.

28 Renewed enemy activity over this country during the early months of 1944 provided a valuable refresher course for Technical Intelligence officers who

/had

-40-

had been withdrawn from the Middle East and Italy to prepare for D-Day. American officers, destined to operate in the U.S. Army Zones were also attached to Technical Intelligence H.Q.

France and NW Europe

29 The first Team was landed on D-Day +2 and others followed at close intervals, ^{bringing the strength to fourteen officers} The unexpected weakness of the G.A.F. reaction produced many fewer aircraft for inspection than had been hoped for; nevertheless, some useful information was soon obtained on a new sub-series of Me 109 (G-14). A specimen made a belly-landing about 800 yards from the lines near Caen. It was inspected after a covering artillery barrage had been requested, salvaged and shipped back to R.A.E., arriving at Farnborough within eight days of its delivery from the factory.

30 Soon after D-Day the enemy started his flying bomb offensive and outstation officers in U.K., still at their posts, were kept busy examining the wreckage of these missiles. One officer landed on D-Day +2 with the Naval and Royal Marine Commando "30 Assault Unit" with orders to press forward and inspect the flying bomb launching sites and the large constructional works at Sottevast. Mopping up in the area was far from complete and protection and patrols were provided by an armoured squadron of the R.A.F. Regiment.

31 An important acquisition during the same period was the first specimen of the German MK 108 30 mm. aircraft gun recovered from the wreckage of a Me 109. This weapon was of exceptional interest to our Armament Design Staffs because it represented an entirely new departure, being a low-velocity, high-capacity gun, roughly constructed from steel pressings welded together.

32 The Seine was crossed by Field Teams on September 1st and the first operational site for flying bombs was discovered 12 miles north of Rouen. Numerous A-4 rocket-firing and storage sites were located.

33 The first enemy jet-propelled aircraft, an Me 262, was shot down in the Nijmegen area on September 8th. Although the airframe was almost entirely destroyed, one Jumo 004 jet unit was salvaged in fair condition and flown to U.K. for detailed examination by Power Jets Ltd.

/During

-14-

14 During the autumn and early winter the advance slowed and, as the G.A.F. was operating on a modest scale, few crashes were inspected, but on 1st January, 1945, about 400 single-engine fighters and a few Me 262's made their ill-fated raid on airfields in Holland, Belgium and France - the biggest venture by the G.A.F. since D-Day. After this attack Technical Intelligence reported on the remains of 96 aircraft - more than 70% of the total claimed destroyed. It was on this occasion that the Fw 190 D-9 with Jumo 213 liquid-cooled engine first operated in force, and a good specimen was secured for R.A.E.

15 In April a team which had been attached to the Canadian Army moved north-west to inspect the long-range rocket-firing area in north-east Belgium. Firing and storage sites were plentiful but most of the projectiles had either been expended, evacuated, or destroyed. Valuable information was, however, recovered on the methods of firing and transport, and a special "Meilerwagen" trailer for carrying and upending the rockets was found in fair condition.

16 After VE-Day air reconnaissance showed that ^{some hundreds} ~~many hundreds~~ of German aircraft in good condition were parked on airfields north of the Kiel Canal and in Denmark, having been flown into the area during the previous few days to escape the advancing Russians. Specimens of the Me 163, Me 262, Ar 232, Ar 234, He 162, He 219, Ta 152 and Ju 388 were included.

Sixty-two airfields and 2950 aircraft were examined during May in North Germany, Belgium and Denmark.

Agents' Reports.

INTELLIGENCE SOURCES

17 Reports from agents varied widely in the quantity and usefulness of their subject matter but in the aggregate provided a worth-while contribution. Apart from the difficulties and dangers under which the agent necessarily worked he was frequently hampered by lack of technical knowledge and briefing to enable him to appraise the significance or veracity of his information, and to a large extent he worked in the dark, spreading his net as widely as possible and reporting all his information.

18 An excellent piece of work was done by an agent in connection with a project for a jet-assisted He 219. A description of the installation,

/accompanied

accompanied by an illustration, was submitted and aroused considerable
 * interest at Air Ministry and no little anxiety in view of its implications.
 Months went by and nothing more was heard of this project and inevitably
 some doubt arose regarding the authenticity of the report. It was not
 until the war had ended that it was confirmed that Heinkel did experiment
 with such an installation. The project was soon abandoned and no jet-assisted
 He 219 ever went into operation. Nevertheless the timely information
 submitted might have proved of great importance.

39. Sometimes the first indication of the existence of a new type of
 aircraft was provided by an agent although his report might have been so
 garbled that its significance did not become apparent until later. Thus an
 agent reported as follows:

"There is no firm in France producing Fw 190's. SNCASO are,
 however, making components and sub-assemblies for these
 aircraft. Actually the Fw 190 is known as the Fw 152;
 already the wing span of this aircraft has been increased;
 eventually it will be known as the Fw 154 and will be
 equipped with an 18-cylinder radial engine".

40. This was a curious mixture of fact and fantasy. At the time the
 Fw 190 was, of course, well known and some information had been received on
 the Ta 154, a twin-engined day or night fighter. As the Ta 154 was a Focke-
 Wulf product the use of the designation "Fw 154" was quite pardonable,
 but the aircraft had no possible connection with the Fw 190 nor was it
 ever intended to install 18-cylinder radial engines. The numerical
 designation 152 was then unknown, but, as was discovered later, Focke-
 Wulf were engaged in developing the Ta 152 from the Fw 190.

41. Apart from their value in occasionally providing reasonably accurate
 information on specific items, agents' reports, when viewed in perspective,
 could give preliminary warning of new and important trends in aircraft
 or weapon development. In 1944 and early 1945 many reports were received
 of small German jet-propelled aircraft or missiles, both piloted and
 pilotless, capable of phenomenal performances. These reports were too
 vague, contradictory, and individually improbable to tell any coherent

story but collectively they could not be ignored. It was later discovered that the Germans were, during this period, engaged in great secrecy in the development of a series of weapons including the Natter, Schmetterling and Rheintochter for attacking bomber formations.

Prisoners of War Reports.

12. Prisoners of war displayed surprisingly little security sense, yet the amount of technical information which they divulged, either intentionally or unwittingly, was generally disappointing. From the standpoint of Technical Intelligence, prisoners could be divided broadly into two classes, namely aircrew and miscellaneous personnel. Useful knowledge was frequently gained from aircrew regarding organization and tactics, but these men were often ignorant of the technical characteristics of their own aircraft, quite apart from new types under development. However, P/W were often indiscreet enough to carry photographs of aircraft equipment etc. some of which proved of material value as a source of intelligence (see illustration "C").

13. Nevertheless some aircrew prisoners were interrogated late in 1943 on the subject of an unusual tailless aircraft which was then known to us as the "Peenemünde 30" and referred to by them as "Die Motte". This was later identified as the Me 163 and although the information supplied by the prisoners was by no means exhaustive it added considerably to our existing knowledge. They described, for example, the dual function of the "elevons"; the use of a jettisonable undercarriage for take-off; the absence of an intake opening; and the very rapid climb.

Thenceforth, prisoners' stories were of real assistance in augmenting our knowledge of the design and performance of the 163. In the spring of 1944, for example, one man stated that this aircraft could reach an altitude of 26,000 ft. in about 1.5 minutes. This was not quite accurate but it did indicate that, as an interceptor, the 163 was in a class by itself.

Captured documents and films.

14. Until the final stage of the war, when enemy territory was being rapidly over-run, the value of captured documents, although considerable, was not so great as might reasonably have been expected. Inevitably the bulk comprised handbooks on airframes, engines and equipment already operational, and although this information was not despised, it seldom did more than confirm or amplify existing knowledge. Interest was invariably

-14-

centred in performance rather than constructional details, and handbooks, although they might contain useful weight summaries and bomb load tables, seldom indicated speeds or ranges.

45 Apart from handbooks, which were useful principally for answering minor technical queries, certain categories of documents deserve special mention.

Aircraft data cards

(a) Every German operational aircraft carried a data card in a metal frame, the paper being protected by a sheet of talc. These cards often survived fire or explosion and were eagerly sought on the scene of a crash when a new type of aircraft or a known type with a new engine was involved. They were of a more or less standardised pattern and provided such data as type and sub-type of aircraft; works number; permissible indicated speeds at various altitudes; permissible oil and coolant temperatures; type of fuel; engine boost pressures and r.p.m. at various ratings; tankage; and fuel consumptions, endurance, climbing speeds and ranges at various altitudes.

Parts lists

(b) Parts lists relating to engines and other equipment, in themselves unpromising, often contained references to types of aircraft and not infrequently afforded the very first indication that a new design was in existence or projected.

Galland's lectures

(c) One of the most important documents captured was a set of notes prepared by General Galland to form the basis of lectures to German pilots. Two of these lectures concerned the technical development of German day fighters and the development of aircraft armament. The notes were dated January 1943 and were captured about a year later. Several of the projects which [were] foreshadowed developments of the Me 109 and Fw 190 never came to pass but the notes, although scanty, did afford a most valuable indication of future intentions.

Moreover a valuable insight into the potentialities of the Me 262 was afforded by a statement by Galland that during a test flight at Augsburg, a level speed of 527 m.p.h. and a rate of climb of 2,550 ft. per min. had been attained at 13,000 ft. The latest official German figures credit the operational Me 262 A-1 fighter with a speed of 518 m.p.h. and a rate of climb of 2,750 ft. per min. at this altitude.

Films

(d) Until the final stages of the war captured enemy cinematograph films of technical significance were limited to occasional newsreels. When aircraft were shown these films were viewed by Technical Intelligence officers and a useful item of information was sometimes forthcoming. One such film showed an Me 410 carrying a BK 5 (50 mm) gun and afforded the first indication of the fitting of such heavy
/armament

-15-

armament on this aircraft.

Interpretation of reconnaissance photographs.

46. The work of the photographic reconnaissance pilots from Benson and of the interpretation Staff at Medmenham were of the greatest assistance to Technical Intelligence throughout the war. Photographs were usually of high quality and the interpreters showed consistent skill in the identification of old and new aircraft types. They described accurately the salient features of the new designs and gave the main dimensions within remarkably close limits.

47. A policy was adopted of allocating a code designation to each unidentified aircraft appearing on a reconnaissance photograph; this comprised the name of the airfield where the type was first seen and a number representing the approximate span in feet. For example a large twin-engine aircraft was observed on a photograph of Rechlin. The interpretation report indicated that the span was between 103 and 105 ft. and the provisional designation "Rechlin 104" was allotted. Agents' reports had already indicated the existence of a new Arado transport, the Ar 232, and it was not long before the identity of this aircraft with the "Rechlin 104" was established. Thereafter the provisional designation was dropped. Later an aircraft closely resembling the Ar 232 but with four engines instead of two and a slightly increased span, was photographed at Brandenburg and was known provisionally as "Brandenburg 110". Later it became known that this 4-engine version was the Ar 232B.

Example :-

The following comparisons demonstrate the accuracy of measurement:

Span (Interpretation Report)	Span (Makers' Figures)
Ar 232 A 103-105 ft.	105 ft.
Ar 232 B 109-111 ft.	109 ft. 10½ ins.

48. In December 1944 an aircraft of unusually small span was photographed at Schwechat and was provisionally named "Schwechat 25". At this time it was known that the He 162 ("Volksjaeger") was under development and soon there was reason to associate it with the "Schwechat 25". A captured recognition description indicated that the jet unit was mounted above the fuselage but its exact position was uncertain. The problem was referred to P.R.U. and in April 1945 they were able to report that "When the 162 is seen at certain angles to the light,

/shadow

-1a-

shadow indicates that a long, fairly narrow, object is set above the fuselage. This object extends from a point between the tip of the nose and the leading-edge of the wing to just aft of the trailing-edge wing root. Light spread prevents a precise estimate of the dimensions of this object, but it is probably at least 12 ft. in length."

(The over-all length of the BMW 003 jet unit is about 11 ft. 6 in.)

Combat Films and Combat Reports.

19. Combat reports, although potentially a valuable source of intelligence information, were often misleading and much effort was wasted in trying to substantiate stories which appear to have had no basis in fact. Partly, no doubt, the trouble was due to inadequate recognition training but every allowance must also be made for the circumstances of excitement and mental stress.

20. The difficulties of recognizing hostile aircraft or interpreting phenomena observed at night were particularly great and it was not surprising that many of the strangest reports came from night bomber crews.

21. The most valuable statements were taken from P.R.U. pilots. In May, 1944 an enemy aircraft attempted to intercept a P.R.U. Spitfire from Benson. The type could not positively be identified but interrogation of the Spitfire pilot left little doubt that it was an Me 163 and details which he was able to supply afforded some insight into the performance and tactics of his assailant. This was one of the earliest occasions on which a suspected Me 163 was encountered operationally. Two months later a P.R.U. Mosquito was attacked near Munich by an Me 262 and although the pilot was able eventually to shake off his pursuer the engagement lasted for 17 minutes. The crew of the Mosquito were thus given ample opportunity to observe the appearance, performance and tactics of the Me 262, and were able to make an informative report.

22. Combat films, apart from refuting the claims of pilots to have encountered new or unusual aircraft (such as "long-nosed" Fw 190's ^{months} long before they actually appeared in service) were sometimes of technical significance. During the latter stages of the war the general quality showed

Illustration D

a marked improvement and some superb shots of the Me 163 and Me 262 were obtained at very close range. Stills from such films provided excellent recognition training material and assisted in the preparation of accurate silhouettes. (See *Illustration - En 'D'*)
53. A particularly valuable reward for assiduous study of combat films came in the form of a picture of a Ju 88 with a new aerial array. The true worth of this was not, however, apparent until it had been related to other information, as related subsequently under "FuG 220".

Air Attaches.

54. Although handicapped by lack of technical background and briefing, A/A's maintained a creditable flow of raw intelligence material. The Berne telegrams were especially helpful and A/A, Stockholm did some valuable work in connection with reprisal weapons and radar devices. The miscellaneous contacts of one Attache included the captain of a ship who had witnessed the testing of flying bombs over the Baltic. This man described and sketched the bomb and described the noise made by the impulse duct engine.

Press.

55. Despite the rigid German press censorship useful material was occasionally published, either due to a censorship lapse or because it was considered inocuous. Examples were the first clear photographs of a 50 mm. gun in a Ju 88 ground-attack aircraft, of the Bv 222 six-engined flying boat, and the Ju 290.

56. Photographs and articles almost invariably had a propaganda bias and did not approach in information value the material regularly published in the British Press. The first technical description of the Ju 88A was not published in Germany until long after the Battle of Britain; even then, it related to an obsolete version. It is, however, satisfying to record that the first pictures of the Fw.190 to appear in a German non-technical magazine proved to be an extremely valuable supplement to our meagre and uncertain knowledge of this fighter. They permitted a three-view drawing to be prepared to assist performance calculations. Obviously they had been carefully "vetted" by German Security and in one view the protruding barrel of a gun had been "touched out". *obliquely* the retoucher had *obliquely* overlooked the shadow of the aircraft on the ground, which showed the precise location of the gun in the airframe. (See *Illustration - En 'A'*)

Escapees.

57. During 1944 some vague references relating to a "pick-a-back" aircraft were made by agents. Some doubt attached to these until two months later when a composite aircraft was seen in flight by two escaped Ps/W and duly reported. For every useful escapee's report, however, there must have been a dozen which were useless. Thus in June, 1944, an Allied pilot described a "German jet-propelled aircraft" in the following terms:-

"Aircraft had twin tail booms and somewhat resembled the Black Widow apart from bulbous appearance of forward part of fuselage. The aircraft flew silently with nose low, tail high attitude; it never exceeded 500 ft. altitude and 90 - 100 m.p.h".

Patent Specifications.

58. It was sometimes possible to gain an insight into the ideas of a designer from a study of patents and this knowledge could occasionally be used in assessing reports.

59. A patent taken out by Dornier in 1937 and renewed in 1942 was reviewed in the German publication "Flugsport" in 1943. This related to an aircraft having one engine in the nose driving a tractor propeller and a second engine in the rear part of the fuselage driving a pusher through a long shaft. A drawing which accompanied the abstract gave a valuable clue to the layout of Do 335 which was eventually developed from this early design.

"Y" Service.

60. Only on rare occasions could any useful technical information be obtained from the monitoring of enemy signals traffic. One interesting example is, however, afforded by the interception of data transmitted by a pilot, presumably during a test flight. No direct indication was given of the type of aircraft or engine but boost pressures and oil pressures at various altitudes were recorded. It was stated for example "Our height is 7000 m. boost pressure 161". This obviously meant a boost pressure of 1.61 ata and the only German engine known to be in operation at that time which could maintain such boost pressure at the stated altitude was the Jumo 213. It was known, moreover, that the Jumo 213 had been installed in certain prototypes of the Fw 190. Thus it could be deduced with reasonable certainty that the aircraft was an Fw 190 with Jumo 213 engine and the fact that it

was being tested at this time (late 1944) provided further warning of its probable early operational appearance.

Radar plots of aircraft.

(1/ This source of Intelligence was not generally employed, but could on occasion be valuable. A case in point was the operation of stratospheric reconnaissance aircraft (Ju 86 P and R) over this country in 1942 when useful speed and height data were obtained. Again in February 1944, some high-speed reconnaissance aircraft flew over London and valuable comparative figures were provided by radar, the R.O.C. and A.A. for study by Technical Intelligence.

Postal Intercepts.

(2/ In general, postal censorship was not a productive source of Technical Intelligence data, but to illustrate the sort of material which was occasionally forthcoming the instance may be cited of some letters from an employee of Flohm and Voss, Hamburg, to a prisoner of war in Canada. These indicated the progress which was being made with the Bv 222 six-engined flying boat. An elementary code system was used and the following are typical extracts:

"Our new 22-year-old star Bertha Viola (Bv 222), whom we shall probably soon send out on the long lap promised to be a great success. You only know her from the time of her first development, but we are promising ourselves very good results from the Boote (boat) family".

Later:

"Our whole pride is the 22 year old swimmer about whom I wrote you in my last letter, and who has since achieved international successes. We ought to have many of her type, as we keep on saying. We are therefore making preparations to build up a whole group (gruppe) of capable girls like her and are receiving every support from official quarters".

Reports from Ground Forces and Civilians.

(3/ Reports from the Armed Forces of unusual aircraft and occurrences were occasionally useful, the witnesses having received some sort of recognition training, but statements from civilians were generally valueless. Trained

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Service spotters stood fast by their reports of strange visions (e.g. flying bombs with twin jet units, "internal rockets" and elliptical wings) and at one time joined ~~forces~~ with civilians in assailing Intelligence with statements indicating frequent intrusions by the Bv 141 - an asymmetrical reconnaissance aircraft, which never became operational.

64 Civilians could be helpful in reporting the circumstances under which enemy aircraft crashed, and in advising as to the easiest means of access to the incident. A surprising number took a delight in informing on neighbours alleged to possess loot from local incidents. They were, however, always liable to see Spitfires with German markings, an eight-engined bomber painted white, or a flying bomb launching a glider.

run on

APPLICATION OF INTELLIGENCE MATERIAL

65. Having now reviewed the merits and shortcomings of the various sources and illustrated the type of information they were capable of procuring, it is necessary to exemplify their inter-relationship in Technical Intelligence work.

Do 335 (See Illustration E)

E 66. A particularly good example of the collation of scraps of information is afforded by the story of the Do 335. The nucleus of our information was an agent's report referring to a "new Dornier light bomber, called Do 235, having a speed of 465 m.p.h." Although meagre and - as was later established - inaccurate in the type designation, it was considered important and a special watch on Dornier's activities was initiated. Other agents' reports soon gave the correct designating number. The high speed mentioned in the original report aroused a suspicion that the aircraft might be jet-propelled, particularly as the Germans were known to be actively developing this system of propulsion. It was some time before this suspicion was finally allayed, although agents and P.R.U. reports did nothing to foster it.

67. When, in May 1944, photographs of Lowenthal showed an unidentified aircraft of about 47 feet span, it was immediately suspected to be the Do 335. The next link in the chain of evidence came some months later in the form of a sketch by a deported French workman which gave the first clue to the unconventional engine disposition. This called to mind an old Dornier patent specification and research at the Patent Office showed that in 1937 Dornier had patented a tandem-engined aircraft. A P/W soon obliged with a sketch resembling both the patent drawing and the rendering by the Frenchman.

K 68. Interrogation of later P/W gave sufficient confirmation to enable an interim report to be issued. A draughtsman was shown the C.I.U. photographs, the two rough sketches and the patent specification, and from this material prepared the highly creditable wash drawing reproduced herewith. (See fig. 4)

69. Meanwhile aircraft specialists, had drawn up a provisional estimate of weights, loadings and performances. Thus, all operational Staffs and Units were informed of the existence and probable appearance of an aircraft which might be encountered in future operations.

Ju 287

70. The "discovery" of the Ju 287 illustrates perfectly how P.R.U. interpretation was correlated with reports from other sources. In July 1944 a Medmenham report was issued headed "Aircraft of Unusual Design at Rechlin". The subject aircraft was provisionally designated as "Rechlin 66".

The report read:

"The most unusual features of this aircraft are its sharply swept-forward wing and very long thick nose. No engine nacelles are fitted which suggests that the aircraft may possibly be either jet-propelled or a glider".

71 At the time there was a strong suspicion that the "Rechlin 66" might be a tail-first design, although a projection, which subsequently proved to be a fin, was visible at the "tail" end. This theory was not endorsed by a P/W report early in 1945 which ran:

"Whilst P/W had been at Brandis he had glimpses of an unusual type of aircraft.....He had never seen it in flight, but from the fact that he had once seen what he took to be a test of the effect of the jet engine discharge on the empennage, he concluded that the aircraft flew nose first."

72 As late as February, 1945, however, a second C.I.U. report on the "Rechlin 66" which had then been seen at Brandis read:

"The Rechlin 66" was seen in one of the dispersal bases at the edge of the woods to the east of the airfield and other aircraft of various types were seen to the east of the airfield and other aircraft had been parked facing outwards from the trees, and this is the usual practice at most German airfields. The "Rechlin 66", however, is seen with its tail unit outwards from the trees which suggests the possibility that it may be of "tail-first" design."

73 Subsequent reports from sources caused a complete reversal of opinion and eventually it was established that the wing was swept forward and that the aircraft was the Ju 287 jet-propelled bomber.

Me 163 (See illustration F)

74 The story of the Me 163 may be quoted as a final illustration of how intelligence concerning a new aircraft was processed.

75 In April, 1943, a small tailless aircraft was photographed at the German experimental establishment at Peenemünde and was provisionally named "Peenemünde (See Fig 1) 30". Later covers were of exceptionally fine quality and prints issued by C.I.U., Medmenham yielded some useful information on this interesting and unconventional aircraft. The dimensions and plan form were established with certainty and the fact that one aircraft was seen with a wing tip on the ground immediately suggested an unconventional undercarriage, possibly of the skid type. Single fan-shaped marks on the same airfield indicated that the power plant might be a jet or rocket unit. Here was an example of really valuable intelligence yielded by the successful interpretation of a series of photographs. But in

September, 1943, one of those instances occurred where intelligence was almost too successful. A "Peenemünde 30" was photographed on a rail about 1000 yards long ^(See fig. 2) and from this evidence it was reasonable to assume that the aircraft was normally intended to take off from some form of trolley guided on rails. It will later be seen that this assumption was false.

76. Subsequently it was possible to fill in more details as further scraps of technical information were supplied by sources and Ps/W. Great interest attached to the aircraft because it was clear that a turbo-jet or rocket-propelled interceptor of these dimensions would have an exceptional performance.

77. Some mechanics who had been at Peenemünde were captured and made some useful comments on the aircraft, which they called the "Motte" (Moth). The method of propulsion, the approximate performance, controls, armour protection and the fitting of "heavy armament" in the future were all described with considerable accuracy by one fitter. In January, 1944, another pertinent and even more valuable report arrived from a French source. This concerned Messerschmitt aircraft and gave some useful information on the Me 282 and a type designated Me 163. Quite obviously the latter was the "Peenemünde 30". As the author of this report was a qualified engineer and draughtsman, his notes, a page of which are reproduced ^(See fig. 3) were unusually helpful.

78. Two Me 163s were photographed at Zwischenahn airfield in March 1944. This was the first occasion on which the type had been positively identified at any other place than Peenemünde and warning was thus given of its probable imminent appearance in operations. At the same time it was noticed that narrow extensions had been added to all the runways at Zwischenahn. The following extract is taken from a Technical Intelligence Report issued in April 1944:

".....the wing loading at take-off would be about 52 lb. This figure is not so high as to preclude unassisted take-off from a normal runway. On the other hand there is definite photographic evidence to show that, at Peenemünde, experiments have been carried out on a special runway in the form of a shallow furrow, about 1000 yards long, probably provided with rails. Such a runway may imply some form of assisted take-off, possibly utilizing a rocket-propelled trolley, in order to conserve fuel. If special runways of this type prove to be essential to the launching of the aircraft, their appearance on reconnaissance photographs should provide a ready means of identifying those airfields from which the Me 163 is to operate. It is very significant that narrow extensions have been made to all the runways at Zwischenahn". ⁷⁹ A month later combat reports referred to a railless "jet-propelled" interceptor, indicating that the Me 163 was being operated

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in small numbers. A P/W captured in June 1944 gave a very good account of the operation of the type and the following is an extract from a report based on his interrogation:

Insert
 "The aircraft took off under their own power and were airborne after a run of about 600 yards for the 'A' and twice that distance for the 'B'. (N.B. The P/W was referring to two sub-types). At Zwischenahn the aircraft always used the runways starting right at the end so as to give the longest possible run even though the full length was not required".

See 7, 10, 6
 It was thus established that rail launching of the Me 163 was not essential and was apparently not being employed anywhere but at Peenemünde.

§ 0. The capture in October, 1944 of an official handbook dealing with the dismantling of the Me 163 for road and rail transport gave the first close-up photograph ^(see fr. 5) and confirmed previous Intelligence.

§ 1. Not until after the collapse of Germany was the full story of the launching rails elucidated. It had been planned to launch the Me 163 from standard-gauge railway lines. To this end a small train was to be made up with special trucks to carry the aircraft, fuel and equipment and provide accommodation for pilot and ground crew. At selected points the track was to be prepared by the provision of a central braking rail. To launch the aircraft it was to be mounted on a rocket-propelled trolley. When the necessary speed had been attained the aircraft would rise from the trolley which would then be arrested by hydraulic brakes bearing on the central rail. This idea was never put into practice for various reasons but an experimental installation was laid down at Peenemünde and launching tests were carried out using wooden mock-ups of the Me 163 for the purpose.

§ 2. This question of rail launching for the Me 163 although, as it proved, unimportant, has been stressed because it illustrated how authentic information might be misleading.

DB 603

§ 3. The instance of the DB 603 engine exemplifies the tantalizing inconsistencies inherent in agents' reports and P/W statements and the satisfying finality of physical inspection.

§ 4. At the beginning of 1942 the DB 601 and DB 605 were established in service and it was reasonable to expect that a more powerful unit was under development. In April of that year a source mentioned a DB 603 with a reputed power of 2,000 h.p. Thereupon followed several conflicting references to an engine with this designation. These described it as:

- (1) A 16-cylinder inverted-vee engine.
- (2) A 24-cylinder engine.
- (3) Two coupled DB 601 engines.
- (4) "Exactly the same as the DB 601" (12-cylinder inverted-vee).
- (5) A large-bore DB 605.

§5 Figures for the swept volume ranged from 41 to 52 litres (the swept volume of the DB 605 was 55.7 litres) and in view of the persistent reports of 52 litres and the high output of the engine, it seemed possible that the DB 603 was a 16-cylinder design. This theory was not seriously assailed until a Me 410 fitted with DB 603 engines was shot down in Sicily. The pilot maintained that the engines had 16 cylinders, but Technical Intelligence officers signalled their count as 12. Undaunted, supporters of the 16-cylinder theory signalled back asking for a recount.

The capacity of the engines in the Sicily 410 could not immediately be established, but soon afterwards aircraft of the same type were shot down in this country and the capacity was found to be 44.7 litres.

§6 It must in fairness be recorded that Daimler-Benz did develop a 16-cylinder inverted engine - the DB 609 - but this never became operational.

Investigation Controlled Missiles (Hs 293 and FX Bombs)

§7 ^{General:} The following review of the investigation by Technical Intelligence into Hs 293 and FX radio-controlled bombs has the merit that its wide ramifications covered most aspects of procedure and liaison.

§8 The Hs 293 and FX may be considered as the first of a series of unorthodox German weapons, although strictly speaking, the first "secret weapon" was the magnetic mine. Long before the two new weapons were introduced Ps/W and agents had referred in vague and general terms to experiments with radio-controlled bombs; this was not surprising since similar experiments had been ⁱⁿ progress for some years in America. The first indication that German research had progressed beyond the experimental stage was provided by Ps/W from a Do 217 shot down over the Mediterranean early in August, 1943. These men claimed that they had been using a new type of radio-controlled bomb in attacks on ships and that these attacks represented the first "service test" of the new weapon. Several attacks had subsequently been made but since no success had been obtained and some attacks were carried out at night with the aid of target-illumination aircraft, the crews of the ships attacked had not realized that any unusual weapon was being used against them. True, in one case it was reported that a bomb had been seen "emit-

bomb without radio-control and this fact in itself did not arouse suspicion.

89 The prisoners' information fortunately coincided with the first recognized attacks with Hs 293s, on a group of British light Naval craft in the Bay of Biscay in late August. When the vessels docked in England, Technical Intelligence officers assisted in a thorough interrogation of the crews. It was at once evident that the new weapon had a serious significance and the Admiralty afforded full facilities for investigation and appreciation of its capabilities. The arrangement was that any fragments recovered were to be sent to Technical Intelligence for preliminary examination and to be redirected to the Royal Aircraft Establishment. Later a Committee under the First Lord of the Admiralty, working through three Technical Sub-Committees, was formed to further the investigation.

90 The decision to channel all Technical information through Technical Intelligence might well have given rise to some friction, but thanks to the excellent co-operation of the Director of the Gunnery Division, Admiralty, all fragments from British and American warships, as well as a great deal of miscellaneous data, were satisfactorily relayed. The fact that one agency - in this case Technical Intelligence - had at its disposal all available information contributed greatly to the success of the investigation. This is stressed because later in the war there was no effective central body in a position to collate discoveries relating to enemy armament made by investigation teams on the Continent; thus, at any given time it was difficult to know exactly what had been learned so that further investigation could be planned.

91 From this point the stories of the Hs 293 and FX bombs may be conveniently divided.

Hs 293 (See Illustration J)

92 When the August attacks were investigated only the vaguest information on the Hs 293 was available. The first substantial piece of evidence was provided by a Naval Officer who, with great presence of mind, had photographed the approach of the bomb with his cine-camera. His picture ^(see fig. 1) (reproduced herewith) established the general appearance of the missile but did not permit accurate determination of its size. Since a series of frames had been exposed, however, it was possible to calculate its speed. This was done in consultation with Kodak Ltd., the makers of the camera, who gave their estimate as 375 m.p.h. Eye-witnesses (generally unreliable in such ^{circumstances} ~~conditions~~) had estimated the speed at anything from 200 to 700 knots. An official German publication, obtained after the war, gave the speed of the 293 at the target as 340 to 450 m.p.h., depending on height of release and range from the parent aircraft.

/Other...

93 Other evidence was provided by fragments of an Hs 293 thrown aboard a vessel which suffered a near miss. One small piece of light-alloy casting bore the reference "293" followed by other figures which established unquestionably the identity of the weapon. The fragments were still not sufficient to give an idea of the size of the complete bomb, but part of the rocket propulsion unit was recovered, from which it was clear that liquid fuels were being employed. The fullest investigation into the characteristics and potentialities of the Hs 293 rocket was desirable since this was the first example of a German jet-propulsion unit to be recovered and it was evident that the enemy was far in advance of the Allies in rocket propulsion with liquid fuels.

94 Because the Hs 293 and the FX were both used initially as anti-shipping weapons the chances of recovering useful fragments were greatly reduced, and it was purely fortuitous that so much valuable material was collected from ships after the early attacks. Parts which fell in the sea were generally lost, although some were recovered by diving in shallow water near the Corsican coast. In another instance, off Anzio, diving in deep water was unsuccessfully attempted at the spot where an FX was reported to have fallen into the sea without exploding.

X 95 Gradually the Intelligence picture of the ^{Hs.} 293 was blocked in, ^{and} ~~one~~ of the accompanying photographs ^(17.2) shows a partial reconstruction using standard SC 500 bomb which was rightly believed to be of the same capacity as the Hs 293 warhead.

96 From time to time reports were issued for the information of the Air Staff, Operational Departments at the Admiralty and members of the Technical Sub-Committee which had the ultimate responsibility of advising on counter-measures to the Main Committee of the First Lord of the Admiralty. At almost every Meeting evidence provided by Technical Intelligence was tabled.

97 Attacks with the 293 spread in the Aegean and Mediterranean, the Bay of Biscay and further out into the Atlantic. A few of the bombs were used on the Anzio beachhead against landing craft, and provided more fragments, permitting Technical Intelligence officers to become familiar with their components and to filter them before despatch to the U.K. Moreover, these officers were easily able to identify fragments when the Admiralty was in some doubt, from observations made during the attack, as to whether Hs 293 or FX bombs were involved.

98 By November, 1943 it was possible to issue a recognition silhouette of the Hs 293, and subsequent investigations and reconstructions at R.A.E. did not seriously conflict with this drawing, but it was not until Allied troops were overrunning France that a complete specimen was secured. A photograph ^(17.4) shows how accurate the silhouette and reconstruction had been.

99. Investigation of the radio control of the Hs 293 ran parallel with that of the FX since basically similar systems were employed. From components recovered from exploded Hs 293s and from examination of abandoned German aircraft at Foggia in Italy it was soon possible to determine the frequency used and to initiate countermeasures. The investigation proved of value later in the war when similar radio components from early models of the A4 long-range rocket were examined.

100. In assessing the performance of the Hs 293 it was necessary to determine the thrust of the rocket motor, but this could not be calculated until the fuels had been identified. In the U.S.A. some work had been done using concentrated nitric acid as an oxidant and a little research had been undertaken in this country with liquid oxygen. Examination of Hs 293 components, however, soon established that the materials used were unsuitable for these oxidants, and it was eventually established that one of the two fuels was, in fact, calcium permanganate. This was deduced from analysis of manganese dioxide residue found on pieces of wreckage. On this basis the Sub-Committee dealing with fuels concluded that the oxidant in the Hs 293 was likely to be a nitro-compound and numerous possible materials were tested in a small-scale apparatus made up to duplicate, as far as possible, the Hs 293 rocket unit.

101. Little progress was made towards determining the composition of the oxidant, and a rather too vigorous reaction of test fuels sometimes caused the apparatus to blow up with resultant delay while another was built. It was, however, possible to establish the burning time of the motor unit as about 10 seconds; this was based on the capacities of the fuel tanks, diameters of inlet pipes feeding the combustion chamber, and the known pressure in the compressed air system used for feeding the fuels. A fortunate discovery in this connection was the battered remains of a small pressure gauge marked with a red line indicating the filling pressure.

102. Basing calculations on the burning time, the estimated speed at the target and other observed factors, it was possible to work out the approximate specific thrust given by the fuels. Simultaneously, Ps/W. were closely questioned concerning the

The latter was readily identified as the calcium permanganate component, so that future work was directed towards determining the composition of "T-Stoff".

of handling it, the colour, smell, etc. Taking all this into consideration, chemists came to the conclusion that the oxidant might not be a nitro-compound, as at first assumed, but concentrated hydrogen peroxide. Once this idea had been put forward plentiful evidence was forthcoming to support it, particularly from some constructional details of the motor unit which had previously been puzzling but were thus explained.

/As...

As an example, the tank containing the oxidant was made of very pure aluminium, whereas normally aluminium tanks for other purposes would be made of an alloy containing a little copper. This copper content would not be permissible in a container for concentrated hydrogen peroxide.

103 Practical experiments were commenced, using the concentrated hydrogen peroxide as a fuel. Here another difficulty was encountered in that no commercial stores of highly concentrated hydrogen peroxide were available in this country. Intelligence came to the fore again in trying to determine whether the Germans had shown interest in the manufacture of concentrated hydrogen peroxide, or indeed in manufacturing larger quantities of the weaker commercial grades than could be used for normal industrial purposes. At this stage, particularly close liaison with the Ministry of Economic Warfare was maintained.

104 Eventually experiments made it practically certain that T-Stoff was concentrated hydrogen peroxide. Many attempts were made by agents to recover samples from German storage points on the Continent, but this was never possible and the first sample, which confirmed experimental deduction, was secured when the invasion of France overran a large underground store.

105 Results of the Hs 293 rocket motor investigation subsequently proved of value in studying the Me 163 rocket-propelled interceptor and the A4 long-range rocket, both of which use concentrated hydrogen peroxide.

The FX Bomb. (See Illustration "K")

106 Although the Germans claimed to have launched some FX high-altitude armour-piercing radio-corrected bombs as an operational experiment in July, 1943, no damage was done to our shipping and the effective use of the bombs did not begin until September of the same year when units of the Italian Fleet were attacked. The Italian battleship Roma was sunk and the Italia damaged. Soon afterwards an attack was made on heavy units of the British and American Fleets in the Mediterranean and hits were obtained on the Warspite and some U.S. vessels.

107 The prisoners from the Do 217, mentioned in the discussion on the Hs 293, had made a rough sketch of the FX bomb, but from this it was impossible to form any idea of the amount of control possible. The bomb which hit the Warspite penetrated many inches of armour before exploding, but it was possible to collect a few fragments of casing and tail unit. These were examined at Malta by Technical Intelligence Field Team representatives and were despatched to Headquarters, together with fragments from the Italia.

108 The position was confused by two factors; Firstly Naval personnel in the ships attacked tended to confuse the Hs 293 and the FX; secondly, Italian survivors

maintained that the attacking aircraft were Ju 88s and that the bombs were of the rocket-propelled armour-piercing variety already known to us. When samples arrived at Technical Intelligence Headquarters, it was possible to contradict the Italian story and to confirm that FX bombs had been used. Confirmation was later forthcoming from German sources which, moreover, bore out the assumption that Do 217 and not Ju 88 aircraft made the attack.

109 There was no loss of time in attempting some sort of reconstruction of the FX and for this purpose experienced personnel from the Ministry of Home Security (Research and Experimental Branch) were brought in, as they had been closely concerned with examining fragments of exploded German bombs in Gt. Britain and pronouncing on their calibres and types. One of the accompanying illustrations (Fig. 2) depicts a reconstruction in a sand tray. It will be seen that there are two slots in the light-alloy tail unit; through these, it was rightly assumed, control plates or "spoilers" were made to project to alter the course of the bomb. At the end of September, 1943, the reconstruction was complete and a provisional drawing was issued by Technical Intelligence (See Fig. 3).

110 The next important discovery concerning the FX was made by a Field Team in Italy. It was known that at one time the Germans had operated from the Foggia District with Do 217's equipped to handle FX bombs and a determined search was made of the Foggia fields when they were overrun. In a corner of one field the remains of a small fire on which the Germans had endeavoured to burn FX tail units, with their control apparatus. The magnesium alloy parts had burnt fiercely in the manner of an incendiary bomb, but by sifting the ashes of the fire some of the small control solenoids and spoiler plates, which had remained unburnt, were recovered. (See Fig. 4).

111 The Foggia fragments were flown immediately to the U.K. and made it possible to calculate approximately the amount of control which could be applied to the bomb and to make some recommendations for countermeasures and avoiding action.

112 As more Ps/W were interrogated, it became apparent that the aircraft dropping the FX bomb had to reduce speed rapidly after the release and had to continue in its line of flight while the bomb was guided to the target. Thus, it was comparatively vulnerable to A.A. fire.

113 An ingenious apparatus was constructed at the National Physical Laboratory to simulate the fall of the bomb as it appeared to the bomb aimer. The FX had a flare in the tail to enable the bomb aimer to keep it in view and the N.P.L. apparatus was used, for instance, to determine the effects of firing a large number of flares of the same colour from the ship being attacked and to see how far the

bomb aimer might be confused.

114 As a result of the discoveries at Foggia, the original Technical Intelligence drawing of the FX was elaborated ^(See pg 5) and it was neither possible nor necessary to revise this until a complete bomb was ^{recovered} secured during the invasion of France ^(See pg 6)

Signals Equipment
FuG 25 A

115 The first indication of the existence of a radio apparatus designated FuG 25 A was provided by labels on mounting frames found in a crashed aircraft. This set was not known and inspecting officers in this country and in N. Africa were warned to keep a special watch. Crash examination continued to show that the enemy proposed to fit the new apparatus to nearly all operational aircraft, but though the mounting frames frequently appeared, no apparatus was discovered until 1942 when a unit was recovered from a crashed Fw 190 at Lulworth Cove. It was now established that the apparatus was an I.F.F. (Identification) set.

116 Continued search in subsequent crashes and liaison with the Y Service indicated no large-scale employment of the equipment, but by 1944 it had become apparent from crash inspections on the Continent that the enemy was beginning to use the equipment on all night fighters. The Y Service confirmed this finding.

117 Evidently the moment was opportune for a counter-measure. This took the form of an apparatus fitted in Bomber-Support aircraft which triggered off the FuG 25 A and enabled Bomber-Support Mosquitos to home accurately on German night fighters.

FuG 200

118 Agents' reports had indicated that an apparatus known as FuG 200 was being installed in German anti-shipping aircraft. The nature and purpose of the equipment was not stated. In September, 1943, during the British offensive in Sicily, several wrecked aircraft were discovered with peculiar radar aerial arrays, labelled "FuG 200", in the nose. All were badly damaged but a reconstruction was made on the spot and it was calculated that the radio frequency was approximately 550 Mc/s. ^(see AMH XI 117) Moreover, from the location and construction of the arrays it seemed certain that the apparatus was A.S.V. At about the same time a Ju 188 crashed into the sea off Spurn Head. After the wreckage had been immersed for several days some fragments of radio or radar were recovered from which it was obvious that the aircraft had been carrying some novel equipment. Due to corrosion and damage it was difficult to establish the purpose of the apparatus, but after several days of cleaning and detailed examination, it was proved that the fragments were indeed part of the A.S.V. equipment FuG 200. ^(See pg 7)

A sample circuit was reconstructed and tested and was found to work on a radio frequency of 560 Mc/s. This confirmed the findings in Sicily.

119 In December, 1943, an Fw 200 aircraft ~~from KG 100~~ crashed in ~~Southern France~~ ^{Ireland}. At this time the Hs 293 glider bomb was causing some concern and an officer from Technical Intelligence was despatched to ~~France~~ ^{Ireland} in the hope of finding some evidence of the radio control unit for the new weapon. As it happened the aircraft was not fitted for launching the Hs 293, but it was equipped with FuG 200. The crew made a good job of destroying the aircraft except that an internal explosion threw parts of the FuG 200 into a nearby bog. These were salvaged and proved of great value in supplementing previous discoveries and enabling a clear picture of the equipment to be formed. (See pg.)

120 Many agents' reports stated that the enemy were carrying out trials with a view to using the FuG 200 for the bombing of convoys in conditions of darkness or low cloud. There was now sufficient evidence to assess this possibility and it was considered that such bombing would be inefficient and wasteful and that it would never be put into practice. Eventually captured documents established that the enemy had, in fact, tried out the scheme in the Baltic but had come to the same conclusion, and had abandoned the project.

121 One counter-measure, based on the findings of Technical Intelligence, was the construction of a "spoof" apparatus, to be installed in trawlers, which would simulate a whole convoy of ships on the screen of the FuG 200.

FuG 220

122 In 1943 a German night fighter, landed at Wick. It was fitted with FuG 220 - an A.I. apparatus working on 490 Mc/s. ^(See illustration "M") The aircraft was in perfect flying order and immediate flying trials were begun. The effectiveness of the apparatus was assessed and counter-measures initiated. More effective protection could now be given to our bombers over Germany; nevertheless, early in 1944 losses began to increase and it became painfully obvious that Germany had introduced a new A.I. apparatus.

M

123 Agents reported new equipment by code names such as 'Neptune', 'SN2' and by type numbers like FuG 216 and FuG 220. It was impossible to deduce anything from their conflicting statements and the Y Service listened in vain for unfamiliar signals. Then one agent supplied a sketch of an He 219 equipped with a new aerial array in the nose which was obviously associated with new A.I. equipment. Unfortunately the drawing was free-hand but estimates indicated a wide-angle search A.I. on a frequency of 150 Mc/s. Still no signals on this frequency could be heard

by the 'Y' Service and all the time the enemy was gaining more and more victories over our night bombers. At this time Technical Intelligence officers were paying regular visits to showings of Combat films taken by fighters of the U.S. 8th Fighter Command. One of these showed a Ju 88 fitted with a new aerial array similar to that depicted in the agent's sketch. Stills and enlargements were immediately procured and comparative measurements taken. The new equipment undoubtedly worked on a radio frequency somewhat lower than 100 Mc/s. The Y Service were informed immediately and a search on a band lower than 100 Mc/s. was begun. Signals were very soon picked up and identified as being from an apparatus with aerials such as those shown in the films. In this way the new German A.I. was positively identified and counter-measures developed.

*Illustration
"M"*

Ny!

124 Shortly afterwards a German night fighter aircraft landed at Woodbridge, having flown in on a reciprocal. It was fitted with the new FuG 220 and with

*Illustration
G.I. 1*

*Illustration - En G. 17 (iv)
L*

FuG 227, an apparatus for homing on to the British "Monica" tail-warning set (See Flight trials with this aircraft resulted in very positive and precise counter-measures against both equipments.

125 Agents' reports, confirmed by examination of physical specimens, enabled all subsequent modifications to the FuG 220 to be jammed immediately until the enemy was obliged to introduce an entirely new A.I. equipment, the FuG 218.

"Benito"

126. Frequently it was possible to determine the functions and value of new radio equipment from a close study of the old. For example, after two years' development work on navigational bombing beams the Germans produced the "Benito" which was intended to avoid interception by the Allies. Beam signals and the associated communication channels were quickly reported by the Y Service. It was not until a badly damaged specimen of the mechanical signal analyser used on "Benito"-equipped aircraft had been recovered and reconstructed that the form of signal necessary for jamming was obtained. "Benito" was later adapted by the enemy for the control of single-seat fighters and here intercepted signals and agents' reports of French production gave warning of the enemy's intentions. Thus, when the fighter/bomber raids commenced in the summer of 1943, depending on Benito for their navigation, the number of aircraft forced down due to "navigational errors" became too costly for the continuance of the raids.

(Benito was used in the raid)

(They could have used the old model in the raid)

M.A.P. and Associated Establishments

127 The efficient dissemination and utilisation of data concerning the development of enemy aircraft, engines, jet units and associated equipment postulated a close liaison with other Ministries, Departments and Commands. The M.A.P. body principally concerned with the enemy's aeronautical progress was the Enemy Aircraft Section of the Royal Aircraft Establishment, Farnborough, to which specimens were consigned for test or analysis by specialists. The E/A section received all Technical Intelligence reports and itself reported in detail on captured aircraft, concentrating on structural and aerodynamic features. This section also despatched specialist investigators to crashes involving new aircraft or important items of equipment. Occasionally they found that a new enemy device had a direct bearing on our own development. A case in point was the GM 1 power boosting system, which resembled an installation under development for the Mosquito night fighter.

128 With the advent of jet propulsion a valuable association was formed with Power Jets (Research and Development) Ltd. and it was to this concern that the first components of the Jumo 004 turbo-jet, recovered from a Me 262 in November, 1944, were despatched. Within a few weeks the Company had prepared a sectional drawing showing the general lay-out of the complete unit and had forecast the performance with remarkable precision. Technical Intelligence officers frequently visited the Power Jets Establishment near R.A.E. to present and discuss new evidence. This liaison was a particularly profitable and happy one.

129 Performance testing and handling trials of enemy aircraft were primarily the responsibility of R.A.E., but tactical trials against our own aircraft were the concern of the Air Fighting Development Unit. Certain squadrons overseas acquired examples of enemy fighters for their own enlightenment and amusement.

130 Serviceable engines could be test-run by arrangement with R.A.E. or when the Farnborough test beds were fully occupied on urgent development work, the Thornton Aero-engine Research Laboratory or an engine manufacturer could be authorised to conduct the tests. The first Jumo 213 was delivered to Alvis Ltd. under such an arrangement. Rolls Royce Ltd. tested various types of liquid-cooled engine, and were loaned a Me 109 F for flight trials with particular reference to the power plant.

-35- 388

Petroleum Board

131 / The Enemy Oils and Fuels Committee of the Petroleum Board did valuable work and a representative of Technical Intelligence regularly attended their meetings. Samples of oils, fuels, greases and other liquids removed from crashed aircraft were analysed by the Board. The usefulness of its work is illustrated by the analysis of the fuel used in the Jumo 004. For some time prisoners had referred to this as a diesel oil, a description which covered a wide variety of fuels. The Board's analysis and determination of specific gravity permitted the probable location of producing plants to be established and assisted in calculating the range of the Me 262.

Within Air Ministry

132 / Within the Air Ministry there was free consultation with other Air Intelligence Sections. This is illustrated by an instance where the Section responsible for assessing enemy aircraft production had learned that a certain number of pumps, designated KRP 20, were manufactured monthly for the Me 262 programme. In consultation with Technical Intelligence it was established that the pumps were of the immersion type, and as the number of fuel tanks was known, it was possible to form an estimate of the monthly production of the Me 262.

133 / Periodically a meeting was arranged by Technical Intelligence with members of Sections dealing with agents' reports, P/W interrogation, and photographic interpretation. New enemy air equipment was discussed and priorities allocated for special investigations.

Armament Establishment

134 / On receipt of a new item of equipment by the Armament Staff it was customary after the issue of a preliminary report to pass it to a research or development establishment for detailed inspection and appraisal. Thus new guns were sent to the Gun Test Unit for examination after the Directorate of Armament development had been advised. A branch of the Unit organised firing trials in conjunction with the Ordnance Board, which were followed by penetration trials. Ballistic tests were often made at the Experimental Establishment, Pendine. New bombs or bomb fuzes were generally dealt with by Air Ministry, O.10 in conjunction with the Directorate of Bomb Disposal and other Service bomb disposal organisations. Preliminary reports were issued by Technical Intelligence and more detailed appreciations, dealing more specifically with disposal, by O.10 and D.B.D. Final examinations were undertaken by C.S.A.R. who reported on static detonation trials, analyses of materials and fillings. Bombsights and bomb-carrying gear were solely an R.A.E. responsibility. The

Instrument Division of the Establishment examined bombsights while carriers were handled by the Enemy Aircraft Section. Rocket projectiles were normally turned over to the Projectile Development Establishment at Aberporth. After preliminary reports had been issued from Aberporth, static firing trials, analyses of materials and fillings, and ballistic trials were initiated.

135 First specimens of guided missiles were allocated to the Chief Engineer Armament Design, Fort Halstead, who was responsible for our own developments in this field. Other interested bodies were the Royal Aircraft Establishment and the Telecommunication Research Establishment, the latter being particularly concerned with the radio control aspect.

Radio and Radar Establishment

136 The laboratory facilities at R.A.E. were utilised for detailed investigation of radio and radar specimens from crashed aircraft and when M.A.P. was formed this function was continued in co-operation with the Director of Communications Development. Later some of the investigations were transferred to T.R.E. (Telecommunications Research Establishment).

137 Details of German Army communications equipment were supplied by the War Office, while the Admiralty communicated as much information as they received on radio devices of general interest. Two important recipients of Technical Intelligence radio and radar reports were the Ministry of Home Security and Ministry of Supply. Contact was maintained with the Royal Observatory, Kew, which assisted in the investigation of German meteorological devices used to control automatic transmitters.

138 Towards the end of the war when German night fighter radar became a paramount consideration, most of the technical details of captured equipment were evaluated within the Air Ministry. It was found that details of operational significance could be established without special laboratory

Access by T.I. Officers to Research & Development Establishments

139. Despite the carefully fostered liaisons enumerated above the swift advance in technical development during the war rendered evaluation of enemy air equipment a formidable problem and officers sometimes found themselves in the position of having to evaluate a new development for which they had no criterion. This was so in the case of rocket-propelled aircraft. The obvious solution for the future will be to permit Technical Intelligence officers free access to our own research and development establishments and free interchange of information with design staffs of aircraft firms. These facilities will enable them to approach the evaluation of foreign technical equipment with added confidence and a proper sense of proportion.

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aircraft
Admiralty

Take in at (B) page 36

141. It was rarely ^{possible} ~~conceivable~~, due to ^{the urgency of other matters} ~~procedural matters~~, to prepare detailed appreciations of specific aspects of German development, but when it was possible to issue such papers they were well received. Examples were "German Aircraft Sub-Types" and "Development of German Fighter Armament".

142. Appreciations of a rather different type were occasionally written with the object of forecasting trends in the light of miscellaneous reports which could not be individually interpreted in detail. One such appreciation was "Specialised German Aircraft and Weapons for Attacking Bomber Formations"; this examined the evidence that new anti-bomber weapons were in preparation.

143. It is admittedly a prerequisite that a good Intelligence Section shall not only collect and collate with speed and precision, but disseminate its information without delay; but speed of dissemination down to lower formations was not always an unalloyed virtue and could easily recoil on the originators. As an illustration, a report was issued describing an experimental version of the He 219 having an auxiliary turbo-jet beneath the fuselage. Before long, night bomber crews began reporting encounters with He 219's thus equipped. These persisted, despite protestations from Technical Intelligence, imaginations no doubt having been over-stimulated by the original report. The truth is that only one jet-assisted He 219 was built and this was not used on operations. It is doubtful whether the majority of aircrew reports did, in fact, concern He 219's - with or without jet.

Publications on Performance Data etc

144. The need for a handbook for the information of I.O's and aircrew, setting out the characteristics and performance data of foreign operational aircraft was felt early in the war and a publication known as C.D.151 "Performance Tables of Foreign Service Aircraft", was compiled by M.A.P. This was graded "Secret" but as the war progressed it was seen that the circulation was unduly restricted and that the subject matter was not always reaching formations and persons who might benefit from its perusal. It was then decided to down-grade the security classification and to make the book (re-designated as A.P.1976) a joint M.A.P. and Air Ministry responsibility. Data were supplied by Technical Intelligence and an M.A.P. section was responsible for estimating performances where necessary.

145. In A.P. 1976 each type of aircraft was covered in some detail. Airframe construction was concisely described, variants listed, and armament and loading data tabulated. Inevitably the publication quickly became out of date /and

and an effort was made to offset this by the frequent issue of amendments. It was soon found, however, that as the compilation, type setting and proof correction of the amendment supplements took some weeks the time lag was unduly great and it was eventually decided to displace A.P.1976 by simplified charts covering the aircraft of each country. These charts did not aim at giving details of the many sub-types of aircraft in service, but rather at providing a concise guide to the capabilities of representative types. They were reproduced by stencil which meant that the time lag between compilation and distribution was short.

Miscellaneous Publications

146. Miscellaneous publications prepared and distributed by Technical Intelligence included large sectional drawings of representative enemy aircraft types, reproduced in colour; wash drawings; and outline drawings to accompany reports; and "Armament and Vulnerability" diagrams indicating in colour distribution of armour plate, tanks, guns and crew on enemy aircraft. See Illustrations 'B', 'H' and 'I')

Technical Intelligence Library and Captured Documents.

General

147. The Germans were well aware of the necessity for keeping their documents secure; that they were successful is borne out by the fact that by November 1943 the Technical Intelligence Library consisted only of some 560 documents, very few of which were graded higher than ^{"Official Use Only"} ~~"C.I.C."~~. As it happened these were of real value; many concerned operational aircraft and equipment then under test at C.A.E.

the Allied Landings in Normandy

148 It was obvious that after ~~the~~ ^{the} trickle of documents would increase and to control the ensuing flood S.H.A.E.F. issued a directive governing their handling. Technical Intelligence assisted in collecting documents, but the P/W Interrogation Section was the official channel through which they passed, ^{and latter} this section was made responsible for listing and distributing them in the U.K. On paper the plan was promising, but in practice it was found that

the many independent investigating teams which established themselves ^{for the} ~~in~~ Normandy, landing onwards

Air Documents Research Centre

149. ^{By} June 1945 the situation was serious, and it was decided that the only method of controlling it was to set up an inter-Allied Centre. This was designed as the Air Documents Research Centre, and was staffed largely by American personnel. Real efforts were now made to induce independent agencies to forward their documents to A.D.R.C.; there was liaison with Army Document Centres on the Continent and "scavenging" parties were organized to comb Germany for

for hidden documents. Even during the last weeks of the war, the enemy did his best to hide or destroy his more valuable papers, but largely due to the persistence of officers of the Air Prisoner-of-War Interrogation Unit many tons of valuable material were unearthed.

150. It was found impracticable to evaluate this in the original German and arrangements had to be made for its speedy forwarding to U.K. Special aircraft regularly flew documents from British and American zones of occupation; officers and airmen coming on leave escorted consignments; and tank-landing craft disembarked lorry loads, all destined for the A.D.R.C. Here the immense task of cataloguing the material was begun. As the documents arrived they were sorted into technical and non-technical subjects. The P/W Interrogation Section took over all non-technical material and dealt with it themselves; technical papers were sorted for inclusion in "Unit Libraries" and all documents were read and indexed on cards which circulated to interested agencies.

151 The preparation of these cards demanded fluent German and a high degree of knowledge in the particular subject covered. To find sufficient personnel with both qualifications proved almost impossible. Even when the cards had been produced there remained the difficulty of translating the appropriate documents.

152 Some examples of the type of intelligence derived from documents during the war have been given elsewhere. ^{From the Normandy landing onwards} ~~After the~~ priority was transferred to those which might assist Research Establishments. The Ministry of Aircraft Production had realised their potential value and supplied senior members of its staff having the necessary qualifications. In this way the bulk of the material was read in German.

Comp

The Enemy Aircraft "Circus Flight" and Mobile Exhibition Vans →

153. The interest displayed in German aircraft and equipment by aircrew and, for that matter, by personnel of all branches, was such that, late in 1941, it was decided by V.C.A.S. that a number of German aircraft should be made available for demonstration and affiliation trials at R.A.F. Stations. It was further directed that a ground exhibition should tour simultaneously. Technical Intelligence was entrusted with the work of organizing the travelling exhibition. whilst the administration of the aircraft "Circus" (1426 flight) was done by Fighter Command.

154 The Flight was initially provided with one Ju 88 A, one Me 110 C, one He 111 H, and one Me 109 E. After pilots had been passed out on the aircraft they set out /on

on a demonstration tour of airfields in the eastern counties, selected by Fighter and Bomber Commands. So successful was this first tour that requests were received for the Flight to visit practically every airfield in the country.

155 Operations continued until late 1944 when the aircraft were handed over to the Central Fighter Establishment, Tangmere. By this time they had visited more than 110 stations; in many cases two or more visits had been paid.

156 The ground exhibition comprised two large vehicles with van bodies specially adapted for the display of enemy air equipment - guns, ammunition, engine components, air/sea rescue gear, flying clothing, bomb carriers, bombsights, cameras etc. The largest exhibit was a complete working installation of a German airborne radio set. Most of the electrical equipment was arranged so that practical demonstrations were possible.

157 Such interest was aroused by these vans that the officers accompanying them were physically exhausted after about three days, due to the strain of continuous lecturing and answering questions. The problem was solved by a set of gramophone records.



(j) DEFINITION AND PURPOSE OF SECURITY

DEFINITION

1. Before describing the development and functions of the Directorate of Intelligence (Security) during the European War; it is necessary to define exactly what Security and Counter Intelligence are, and what they seek to do. The widespread ignorance on these two points was the greatest single stumbling block which the Directorate encountered during the War, for it was obvious that so long as the R.A.F. as a whole, and Senior Officers in particular, failed to appreciate the value and purpose of Security - or which was worse, had merely a vague conception of some of its comparatively minor functions - they would attach little importance to it. Thus they sometimes ignored it, frequently underestimated it, and generally failed to ensure that suitable officers were selected for Security posts. Therefore no reasoned discussion on the subject of Security can be attempted in this record until Security itself has first been defined.

2. Security is the defence against indirect attack. Indirect attack differs from direct attack (i.e. the attack by guns, bombs etc.) in many obvious ways, and also in two that are vitally important but are less obvious -

(i) The indirect attack is usually carried on without the attacker being aware of it, whereas he is seldom in any doubt about the existence of direct attack, which is usually violent, noisy and unmistakable. (Indirect attack seeks always to be the reverse).

(ii) Direct attack ends the moment a War ends, because the vanquished are promptly deprived of all their weapons by the victors. Indirect attack does not. It is pursued as industriously in peace as in War. It is widely used in preparation for war; and, after a war is lost, it remains the only method whereby a defeated nation can continue the assault.

3. Therefore Security must have a long-term outlook and policy both to War and Peace. It can never relax. In War its problems multiply and become more acute, but they do not necessarily become more complex. This is because the many Security precautions and regulations which are promptly enforced the moment War is declared are usually held to be unwarranted in peace-time, and are therefore as promptly abolished once a war has ended.

4. The outbreak of a War does admittedly succeed in arousing a vague, though urgent sense of awareness of the needs of Security, but the experiences of 1939 unfortunately proved that not only was this sense vague - it was also generally misinformed. The immediate (and very laudable) publicity campaign waged by the Ministry of Information against loose talk, with the slogan "Careless Talk Costs Lives", undoubtedly did much to suppress mischievous gossip about service matters among the rank and file of the services and the general public; but it also had the unfortunate effect of establishing in the minds of many people, including Senior Officers, that the be-all and end-all of Security was the suppression of loose talk, and that once this had been accomplished - by lectures and the salutary chastisement of offenders - Security had achieved its end.

5. A mature and balanced outlook on Security was therefore slow in developing, because its full significance was probably never even really appreciated until the planning stage for the Normandy invasion was reached, when it at last became obvious to one and all that the enemy would spare no effort to discover our plans and thus rob us of surprise.

PURPOSE

6. In order to fulfil its function of providing a defence against indirect attack Security has three fields to cover -

/(a)



- (a) The Defence of Information against Enemy Intelligence.
- (b) The Defence of Material against Sabotage.
- (c) The Defence of Personnel against Propaganda.

These three fields must be discussed in greater detail.

7. Defence of Information. It is the function of an Intelligence organization to obtain information about the strength, disposition and intentions of the enemy. It is the function of a Security organization to reverse the process and to deny all such information to the intelligence organization of the Enemy. It is for this reason that Security is frequently referred to as "Counter-Intelligence", for that exactly defines its function in respect to information. From this it will become apparent that Security, in order to be successful, must make a careful study of enemy intelligence methods (and also, incidentally, of its own country's methods,) since all intelligence services work on similar lines. Thus it will be seen that Security is by no means limited to the purely negative activities of closing mouths and locking doors, but must also fulfil an active - and in the field an aggressively active - function of prying into the enemy's intelligence organization, and of capturing papers and records which may reveal the identity of his agents, and his plans for attack by underground methods.

8. It is therefore necessary at this stage to list certain of the sources through which an intelligence organization obtains information in war, since it is these sources which Security must seek to block. They include:-

- (i) Interrogation and search of prisoners of War. A prolific source of information, especially if skilled interrogators with a wide knowledge of psychology are used, and if they are examining and evaluating the articles and papers found in the pockets of prisoners, or in their aircraft. The security defence is the constant education of personnel on enemy interrogation methods and how to combat them.
- (ii) Interception of Signals. The interception, monitoring and evaluation of enemy signals, whether by wireless or by landline, but primarily by wireless. The security defence is the observation of strict signals discipline at all times. (Note: Signals Security, being a highly specialized subject, was the concern of D.G. of Signals at Air Ministry, and not of the D. of I.(S).
- (iii) Examination of the Press. Careful scrutiny of the enemy's newspapers, obtained through neutral sources - particularly of citations and other such publicity stories. (Information obtained in this way can be of great value in interrogation - see (i) above). The security defence is Press Censorship, and a carefully controlled release of information to the press.
- (iv) Examination of Mail received either directly from the enemy (P/W Mail etc.) or from neutral countries which are themselves in contact with the enemy. The security defence is censorship, both civil and service, and security education on dangers of careless writing after capture.
- (v) Espionage. The use of agents who, for the purpose of this history, can be divided into two main classes (a) the high-grade, long-term agent, experienced, capable, fully briefed and using wireless, secret ink or other such methods for communications and (b) the short-term, "line-crosser" agent, usually low grade. Type (a) used for difficult missions where Security defences are effective. Type (b) for day-to-day espionage in the field, where effective Security defences are hard to maintain, especially where native peoples exist (e.g. Middle and Far East). The security defence (and security regulations and restrictions; control of entry; a pass system; study of enemy espionage methods; suppression of loose talk.
- (vi) Examination of Captured Equipment and Documents. Evaluation of captured material, even if only in fragments. The security defence is the destruction of equipment before it can fall into enemy hands.



(viii) Neutral Sources including diplomatic channels. The security defence is observation and control, so far as possible, of resident neutrals. Under exceptional circumstances, even censorship of diplomatic mail may be enforced.

9. Each of these sources of information must be blocked as far as possible by Security, and special machinery must be set up on the outbreak of War to effect this. However, certain information cannot always be hidden from the enemy, no matter what Security precautions are taken (e.g. preparations in U.K. in 1943/4 for invasion of Continent). It is then that Security is called upon to fulfil its most highly specialised function, which is the deception of enemy intelligence by persuading it to draw false conclusions from what it learns. This deception may even include contrived leakages of inaccurate or misleading information. Thus operational planning at high level must include the provision of a cover plan for deception purposes. All such high-grade deception must obviously be engineered by an inter-service body; and must be carried out in the greatest secrecy.

10. Defence of Material. Sabotage, as a weapon of indirect attack, has certain limitations. Unless it is skilfully planned and complies with the main requirement of indirect attack - namely that as far as possible it shall not be apparent to those who are being attacked - it may only defeat its own ends, by achieving a temporary success at the expense of putting the enemy on the alert and encouraging him to strengthen his defences.

11. It was perhaps for this reason that sabotage by enemy agents did not play a very important part in the European War; and although Security had always to assume that sabotage was possible, and to take all precautions against it, in point of fact it was comparatively rare. Overseas, in the field, or in areas where the R.A.F. were dependent on native labour, it was sometimes encountered but was usually connected with theft, and the motive behind the removal of equipment was therefore more often found to be personal gain rather than any desire to cripple the Allied War effort.

12. Thus the chief responsibility of Security in regard to sabotage was similar to that of espionage - rigid control of exit and entry to all stations and airfields, the maintenance of an efficient pass system, the mounting of guards where necessary, and the development of a sense of individual responsibility amongst personnel.

13. Defence of Personnel. Enemy propaganda, when used as a weapon of indirect attack (as opposed to its purely internal usage by the enemy for the maintenance of morale on his own home front), seeks (a) to undermine the morale of its opponent's home front and fighting forces, by deceiving or intimidating them, and (b) to drive a wedge between allies, on the principle that a house divided against itself cannot stand.

14. The chief onus for exposing and countering German propaganda between 1939-1945 fell on the press and the B.B.C., and the function of the service Security organisations in this direction was limited for the most part to local lectures at units on the dangers of listening to enemy lies and to disquieting rumours. In certain special instances, however, as when a Unit was isolated and living (and fighting) under trying conditions, cut off from news, depressed, overwrought and hence in a mood receptive to rumour, the need for a level-headed security officer who could quash such rumours and maintain morale was very great. But such circumstances were the exception rather than the rule, apart from the jungle fighting in the Far Eastern theatre. Propaganda, it must be remembered, is never so dangerous as when things are going badly.

15. On the whole, German propaganda during the war was not inspired and was not very effective, and Security was never gravely concerned about it. Efforts to drive a wedge between the Allies provided the greatest danger, and this danger increased with the advent of peace, when the common danger which had served to unite the Allies in war ceased to exist. The post-war period, as regards propaganda, was further complicated by the efforts - (both calculated and unwitting) of the German people to arouse sympathy for their plight amongst the occupying forces - a sympathy which would not only assist them in recovery but also help to estrange the British from the Russians, of whom dreadful tales were told. Since



the plight of the German people was undeniably very real and very apparent to all who found themselves in Germany; and since the British are by nature and tradition both kind-hearted and magnanimous in victory, the problem of countering this insidious form of German propaganda was often by no means easy.

SUMMARY

16. From all foregoing paragraphs it will be seen that the primary function of Security is to deny information to enemy Intelligence, and that to achieve this it adopts three main methods -

- (i) Defensive Measures such as censorship, control of travel, entry and exit, regulations, restrictions and security education of personnel, correct handling of documents e.g. personal security.
- (ii) Countermeasures, including a close study of enemy Intelligence methods and the prosecution of active counter-intelligence in the field. Hence the frequent reference to Security as Counter-Intelligence.
- (iii) Deceptive Measures, aimed at persuading the Enemy to draw false conclusions from information already in their possession.

The secondary functions of Security include the defence against sabotage and Propaganda, but these functions are more indefinite, and, generally speaking, less important.

So much for the functions of Security. Once these are clearly understood it at once becomes apparent why certain machinery had to be set up in 1939, and developed throughout the War, in order to fulfil these functions. This chapter is therefore devoted to a study of this machinery, and its gradual expansion throughout six years of war.

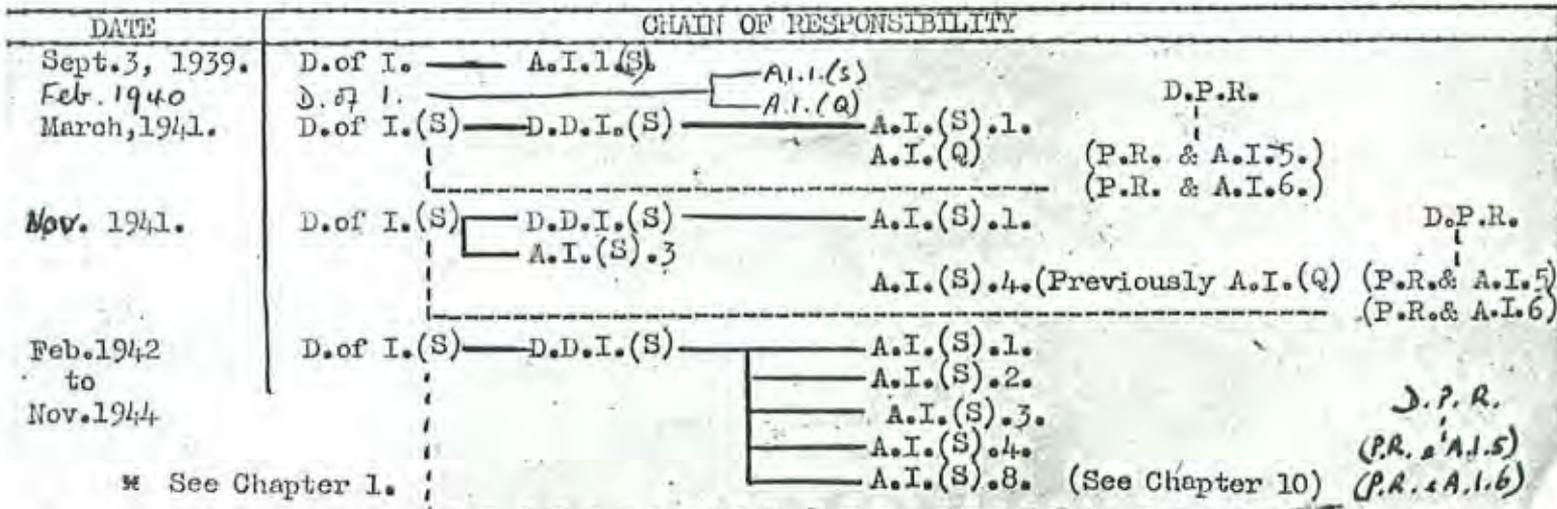
(ii) DEVELOPMENT AND FUNCTIONS OF SECURITY ORGANISATION

DEVELOPMENT OF SECURITY ORGANISATION

17. From immediately before the war until the formation of the Directorate of Intelligence (Security) in the spring of 1941 security was the responsibility of the Director of Intelligence. A section known as A.I.1(S), headed by a Squadron Leader, dealt during that time with the many problems constantly referred to it by other branches and departments if there was even a remote security aspect. In general, the section was responsible for -

- (a) Security of personnel
- (b) Security of information
- (c) Security of material

When, early in 1941, the first appointment of an A.C.A.S.(I) was made, the first D.of I.(S) and D.D.I.(S), with their responsible sections, came into being. During the course of the war the number of these Intelligence (Security) sections underwent changes necessitated by the volume of work, which reached its peak shortly before the invasion of the Continent in 1944. Subsequently, the sections were contracted as the volume of work decreased. The growth and contraction of the Directorate is shown in the attached chart.



* See Chapter I.

NA

SECRET

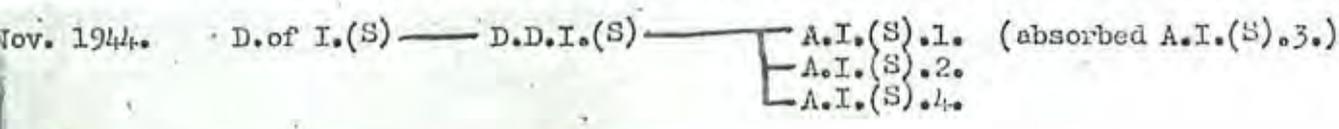
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DATE	CHAIN OF RESPONSIBILITY
Sept. 3, 1939.	D. of I. — A.I.1.(S). P.P.O. ----- A.I.5. ----- A.I.6.
Feb., 1940.	D. of I. — A.I.1.(S). D.P.R. ----- A.I.(Q) ----- P.R. & A.I.5. ----- P.R. & A.I.6.
March, 1941	D. of I.(S) — D.D.I.(S) — A.I.(S).1. D.P.R. | ----- A.I.(Q) | ----- P.R. & A.I.5. | ----- P.R. & A.I.6.
Nov., 1941	D. of I.(S) — D.D.I.(S) — A.I.(S).1. D.P.R. | ----- A.I.(S).3. — A.I.(S).4. † | ----- P.R. & A.I.5. | ----- P.R. & A.I.6.
Feb., 1942 to Nov., 1944	D. of I.(S) — D.D.I.(S) — A.I.(S).1. D.P.R. | ----- A.I.(S).2. | ----- A.I.(S).3. — P.R. & A.I.5. | ----- A.I.(S).4. — P.R. & A.I.6. | ----- A.I.(S).8.*

† Previously A.I.(Q)
 * See Chapter 10.



DATE CHAIN OF RESPONSIBILITY



A.I.(S).1.

18. Development. With the formation of the Director of Intelligence (Security) the greatly increased work and responsibilities of A.I.1.(S) caused the creation of four sub-sections. These, under a Wing Commander with five officers and three civilian clerks, were known as A.I.(S).1.(a), (b), (c) and (d). Later, during the war, when security precautions reached a peak before the invasion of the Continent, the number of officers in the section rose to:-

- 1 Wing Commander
- 2 Squadron Leaders
- 3 Flight Lieutenants
- 1 Section Officer, and
- 5 civilian clerks.

Towards the end of 1944 it was considered unnecessary to continue A.I.(S).3. as a separate section - accordingly this was absorbed into A.I.(S).1.(b) who continued its work. At the end of hostilities the volume of work involved in removing security measures remained at a high level until 1945, when this section was once again reduced to:-

- 1 Wing Commander
- 1 Squadron Leader
- 4 Flight Lieutenants
- 1 Section Officer, and
- 4 civilian clerks.

19. The formation of the Ministry of Aircraft Production for a time greatly increased the work of A.I.(S).1. until the security work involved could properly be undertaken by that Ministry's own security staff. There was, however, always a close liaison between P.S.5.(b), the M.A.P. security branch ~~and~~ A.I.(S).1. the Directorate of Intelligence (Security) being their adviser on all problems which had an Air Staff aspect. This was particularly necessary for security trials of new weapons and their first introduction to the Service.

Security and Personnel.

and AI(S)3

20. This embraces the examination of individuals' records for such purposes as:-

- (i) Visits by the individuals or other people to R.A.F. Stations.
- (ii) The suitability of individuals for employment on special secret equipment, either on R.A.F. Stations or at manufacturers' works.
- (iii) Employment of foreigners with the various civil air line companies operating during the war.
- (iv) Vetting of officers for duties in Intelligence and "Y" Service.

In addition to the foregoing, there were many other cases where vetting was required, such as the members of the Civilian Technical Corps at the beginning of the war, consideration for the visits of foreigners to this country where these visits would cause contact with Air Staff arrangements. The method of dealing with this vetting was to refer to the Security Service and the Provost Marshal's branch; A.I.S.1. being the official Air Ministry channel for communication with the former and the latter being the link between A.I.S.1. and the Criminal Record Office.

φ See paragraphs 34-53.

* See under "Security in M.A.P." at the end of this chapter.



Security of Information and Material.

21. This was safeguarded so far as possible by:-

- (i) Press censorship.
- (ii) Postal and telegraphic censorship.
- (iii) Scrutiny of visits to R.A.F. establishments and issue of directives for such visits.
- (iv) Investigation of the loss of official papers and Confidential or Secret documents.
- (v) Special arrangements for the transmission, storage and use of new types of aircraft and equipment.

22. The method of censorship control of the press was through P.R. and A.I.5. acting as Air Advisers to the Censorship, and in the case of the postal and telegraphic censorship through A.I.(S).8. * (formerly A.I.1.S.) who also acted as an Air Adviser. In the case of the former, safeguards were of necessity often laid on after there had been an indication of leakage, though in the case of the latter, control was more complete.

Routine Work Undertaken by the Section.

23. So much variety of work was undertaken by the section that a brief note may be of interest regarding its routine duties.

- (i) Vetting of individuals.
- (ii) Inquiries into losses of Secret and Confidential documents.
- (iii) Security of official papers in transit.
- (iv) Security problems with Civil Aviation Companies, e.g. their use of R.A.F. Stations.
- (v) Security questions in connection with the issue of official documents outside the R.A.F.
- (vi) Preparation or scrutiny of A.M.C.O's and A.M.O's from the security aspect.
- (vii) Approval for showing R.A.F. airfields on maps.
- (viii) Action to be taken on censorship intercepts.
- (ix) Closing of roads or questions relating to protected places and prohibited areas.
- (x) Allocation of scrambler telephones during the greatest shortage.
- (xi) Perusal of Defence Regulations and Statutory Rules and Orders affecting the R.A.F.

/(xii)

* See Chapter 10.



- (xii) Control of Photography Order and dispensations under this.
- (xiii) Entry and exit facilities for individuals whose presence might affect Air Staff projects.
- (xiv) Issue of D.R. forms 5 and 7.
- (xv) Restrictions on aliens connected with Air Ministry work.
- (xvi) Approval of technical or other documents requested by Allies.
- (xvii) Security of contracts with the Air Ministry.
- (xviii) Evasion of censorship by R.A.F. personnel.
- (xix) Questions relating to security problems affecting enemy Prisoners of War.
- (xx) R.A.F. personnel and possible subversive activities as P.o.W.

In general any matter which could possibly have a security aspect was constantly being referred to this section, not only by Air Ministry departments, but also by the other two Service Ministries with whom there was a very close liaison.

Special Work Undertaken by the Section.

24. In 1940 Lord Swinton's Committee was set up to co-ordinate security in Government departments. This committee later became the Security Executive and at the end of hostilities the Standing Inter-Departmental Committee on Security. It fell to the head of A.I.(S).1. to attend these meetings and those of the working committee, known as the Liaison Officers' Conference, while the section itself was responsible for putting into force the recommendations of these two Committees as affecting the R.A.F.

when

25. The Panel on Security in Government Departments was set up by the Prime Minister and numerous recommendations were considered and forwarded by the section whose head was the Air Ministry service representative. A.I.(S).1. were solely responsible for security arrangements in connection with the Prime Minister's flights, or other V.I.P's, making their own arrangements for any cover plan as might be desirable.

Conclusions and Recommendations.

26. Security suffers from being by its nature, a negative function, and proof of its efficiency is therefore difficult to adduce. However, from German documents captured at the end of the war, there have been several references to the security-mindedness of individuals, as well as information on aircraft and equipment, which make it clear that the enemy had little knowledge of it until it fell into their hands.

The main leakages would appear to have been indiscretions by:-

- (i) R.A.F. aircrew under interrogation as Prisoners of War.
- (ii) Leakages in the press.

27. As regards the press leakages, there is evidence from captured documents to show that the Germans paid great attention to our technical journals and derived considerable benefit from these. It would seem, therefore, that the possibility of leakages from this source needs more careful consideration. The absence of press censorship in the United States at times adversely affected our own control of the press in the U.K.

28. A closer liaison between A.I.(S).1. and Public Relations and A.I.5. would, it is considered, have been of value. In addition, records of disclosures maintained by A.I.(S).3. (later absorbed into A.I.(S).1.(b)) could have been greatly supplemented by access to those held by Air Affairs operating under P.R.2., though using the offices of Public Relations and A.I.5. It is considered that proper use of these records would have ensured a more harmonious relationship with the press on subjects which had already been disclosed and so might have lessened the tendency to use censorship as a goal-keeper to be got past.



A.I.S.2. SECURITY EDUCATION

Origin.

29. By the beginning of 1942 it had become apparent that it was of little use developing at Air Ministry a machinery for formulating and interpreting Security policy if a corresponding machinery were not set up to educate all ranks of the R.A.F. on its meaning and purpose, and to awaken in every individual a sense of personal responsibility. Rules, regulations and restrictions are of the greatest importance; but they can never be wholly effective until the individual develops this sense of personal responsibility and can be relied upon to obey the spirit of them even on occasions - such as after capture - when the disciplinary arm of the law can no longer reach him. Therefore in the Spring of 1942 a new Section, A.I.(S).2., was brought into being. Its function was the education of the R.A.F. by all means and through all channels possible; and the greatest lesson learnt between 1942/1945 was that Security Education must start at the top, as well as the bottom. Until Senior Officers are persuaded to appreciate the value of Security, its purpose and full significance (that is to say until they cease to dismiss it as of little importance) there can be little hope of educating the R.A.F. as a whole. The amateurish outlook, which was so frequently encountered in the earlier years of the War and which viewed Security as a tedious campaign to impress on airmen the dangers of loose-talk, had to be gradually eliminated. Security had instead to be presented as an active defence against indirect attack, which included among its many ramifications that of high-grade inter-service operational planning, and of operational counter-intelligence in the field.

Methods.

30. A number of different methods of carrying through the programme of Security Education were gradually developed by A.I.(S).2. during the war. Chief among them were:-

- (a) Films. The cinema is the finest method of education because the appeal is visual and arresting; because the producing body controls what is being said and how it is being said, and is not dependent on the abilities of a local interpreter, as is the case with unit lecturers; and because even an indifferent unit lecturer can usually contrive an adequate talk if he has a film to help him out. It was found to be essential for the sponsoring body - in this case the D.of I.(S) - while accepting the general principle that the technique of film-making is the work of specialists, to make the final and overriding decision as to the subject matter and manner of presentation. The problems which were encountered in producing Security films included (i) the high cost of making a film which could at least bear comparison with the commercial product; (ii) the shortage of celluloid; (iii) bad projection at units; and (iv) breakdowns in distribution. Any suggestions that an educational film is an official film and therefore a dull film was vigorously resisted. The pill, it was rightly felt, had to be coated as far as possible with sugar. For example, the R.A.F. Prisoner-of-War Interrogation film "Information Please" contained several well-known stars and the chorus from a London theatre. In all, 5 films * (excluding a large number of "shorts", or "trick-trailers") were made by A.I.(S).2. (the fifth, "Design for Murder", being made in collaboration with the Admiralty) and some dozen others were borrowed from the other Services or from the Americans. In conclusion, it cannot be too strongly emphasised that the problems of cost can best be overcome by inter-service production, seeing that the general problems of Security apply similarly to all three services.
- (b) Lecture Courses. In order to carry out the policy of educating from the top, as well as from the bottom, a security course of three days duration was run at the R.A.F. Intelligence School, Highgate, from November 1943, until the end of the Japanese war. It was limited

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* See Appendix.



to three days because senior officers found it inconvenient to spend longer. The course was for Senior Admin. Officers, Station Commanders and Security officers generally, and was attended by officers of the rank of Air Commodore downwards. The best possible lecturers were obtained from a variety of sources, both service and civilian, including one from the Security Service. Films were used to illustrate the talks and to provide a diversion from the spoken word. The course "lived in" - a most desirable ruling as it encouraged discussion and the exchange of problems. In addition to the special security course at Highgate, Security lectures were also included as a standard part of the various intelligence courses held at the School. The D.of I.(S) himself lectured on Security for a period at the Staff College at Bracknall. This unfortunately did not become a permanent item in the syllabus, the Security was subsequently dealt with only in passing as part of the A.C.A.S.(I)'s lecture on Intelligence. Finally, arrangements were made in November 1945, for a few hand-picked I.(S).Officers to attend a course run specially for them by the Security Service.

- (c) Delivery of Lectures. It was not until the autumn of 1944 that the Air Ministry adopted a scheme (which had been in use by the Admiralty since the beginning of the War) of establishing a team of experienced and carefully briefed full-time Security lecturers [¶] who visited units throughout the U.K. Such a scheme had much to recommend it; for bitter experience had proved that a bad Security lecture, given by a disinterested officer of a unit, did infinitely more harm than good. However, even after the formation of this team of Air Ministry Security lecturers it was never found possible to relieve the individual unit of all its educational responsibilities, and throughout the War the part-time station or unit I.(S).O. had inevitably to bear the chief burden. In order to help these part-time lecturers, A.I.(S).2. widely distributed a large amount of written material (see (d) below), including some very necessary notes on "How to Lecture". Even so, the results were only occasionally good, often mediocre, and sometimes truly terrible. The A.I.(S).2. lecture team was created in November, 1944, to talk on Far Eastern Security problems in general, and Japanese P/W Interrogation in particular. It consisted of 3 F/Lts. This was increased to 2 S/Ldrs. and 4 F/Lts. in June 1945.

- (d) Written Lecture Material. * In order to provide unit Security officers with ideas, and to brief them on the latest aspects of Air Ministry Security policy, distribution was made of:-

- (i) D.of I.(S) Liaison Letter, a monthly publication surveying topical Security problems and giving up-to-date guidance on policy, was sent to each Command I.(S).O. and reproduced by him as his own Bulletin, with special additions of matters peculiar to his own Command.
- (ii) Printed lecture notes, a series of nine - which were issued at regular intervals on subjects ranging from "P/W Interrogation" to "Security Overseas".
- (iii) Air Ministry Pamphlet 147, a specially prepared course of 10 graded lectures for use at the training schools only.
- (iv) A.M.Pamphlet 150, similar to above but in modified form and for use only in the A.T.C.
- (v) Miscellaneous notes, many of which were the skeleton outlines of talks given on the Security Course at Highgate.

/(vi)

¶ An exception was the A.D.I.(K) lectures on the specialised subject of P/W security (See Chapter 7, Appendix A).

* See appendix.



- 1/a -
- (vi) A collection of Security stories, slogans, rhymes, etc. issued from time to time to meet the constant demand from unit Security lecturers for anecdotes to enliven their talks. (The majority of unit lecturers, even when competent speakers, proved singularly barren of ideas.)
- (e) C.D.275 - the R.A.F. Security Manual. This was the "bible" of the I.(S).O. at all levels. It contained, in itself, ample material for a number of lectures, and summarised all the essential points made in the Lecture Outlines, A.M.Pamphlets and Security Forms. It also contained a digest of all Security A.M.C.O's and A.M.O's., which was brought up-to-date by periodic amendments; and gave a comprehensive picture of the organisation of Security. It was produced by A.I.(S).2. in July 1943.
- (f) Posters. * A series of three fully-coloured Security posters was produced for the R.A.F. by A.I.(S).2. (25,000 copies of each, crown size), together with numerous less ambitious black-and-white designs giving straightforward instructions or warnings on essential matters. Close liaison, and a system of mutual exchange, were also maintained with the Ministry of Information, the other services and the Americans. In all more than 250,000 posters of all descriptions were distributed to the R.A.F. at home and overseas. Poster designing is a specialist's work, and it was found that only the best artists should be employed. Amateurish designs (of which examples were submitted in their hundreds to A.I.(S).2. are of no value-whatever, except to the unit which produced them.
- (g) Security Plays. Several of these were written, distributed, and produced on stations. One was broadcast by the B.B.C.

Essential Lessons.

32. The essential lessons learnt in six years of war, and the subjects of outstanding importance on which Security Education had to concentrate, in addition to routine instruction on general problems, are summarised briefly in the following paragraphs.

- (a) Briefing against Enemy Interrogation Methods. The need for the fullest instruction on this subject was at once realised, and its importance cannot be over-emphasised. It was, and always will be, the No.1 priority of Security Education in war time, for more information can be given away by prisoners who talk, than can be obtained by an army of spies working day and night. That is why the Intelligence Staffs of both sides reduced P/W Interrogation to a fine art, and adopted the most advanced psychological methods of approach to the prisoner. Constant advice on behaviour after capture, constant warnings on the tricks liable to be encountered, and even threats as to the disciplinary action that would be taken against offenders after the war, had therefore to be given to all personnel, but particularly to aircrew. The problem was greatly complicated by the refusal of the Japanese to adhere to the terms of the Geneva Convention; but with regard to the Germans, and in any Theatre where the Enemy observes the Convention, the Golden Rule is "Name, Rank and Number Only", given politely but firmly. Experience proved again and again that the prisoner who kept this one simple rule fixed firmly in his head, and gave this information and nothing else, resolutely and with polite singleness of purpose, alone could be relied upon to defeat the most indefatigable interrogator. Special P/W Publications and Instructions issued by A.I.(S).2. included:-
- (i) A.P.1548. A booklet on the Responsibilities of a Prisoner of War, issued to all aircrew, whether operational or under training. The 3rd edition, issued in April 1944, was marked "For European Theatre Only". The possibility (and advisability) of issuing a special edition for the Far Eastern Theatre was under consideration when the Japanese War ended.

(ii)



- (ii) Form 1920. A poster displayed on all Units, at home or overseas, instructing personnel in behaviour after capture.
- (iii) Form 1920A. A replica of Form 1920, which all aircrew had to sign as having read and understood.

Finally it had at all times to be clearly and repeatedly impressed on personnel that the search of a prisoner's pockets and evaluation of the articles found in them comprise an essential and vital preliminary to enemy interrogation. Even a tram ticket or purely personal letter could give away information on which a skilful evaluator could build a case. The slogan used to bring home this all-important point was "A silent and resolute prisoner with empty pockets is an interrogator's nightmare". * Evidence subsequently obtained from the records of Dulag Luft, the German interrogation centre outside Frankfurt, showed that their interrogators were greatly hampered by our P/W Security education, which may therefore be said to have met with considerable success, yet without ever having achieved a 100% suppression of this source of leakage, owing to the fallibility of aircrew, who so often failed to adhere unswervingly to their one simple rule.

- (b) Limitation of Briefing. "Only those are told who must be told". The secret is to limit the number of people who know it to an absolute minimum. The question of trust does not arise. It is immaterial. In the case of aircrew who may be subjected to violence, and even torture, to extort information, limitation of briefing is of particular importance.
- (c) Selection of Security Officers. C.Os. had gradually to be educated (i.e. persuaded) to appreciate that the choice of a part-time "Security officer" was in their own interests and required careful consideration. If they believed it to be a 'stooge' job in the first place, a vicious circle developed, for they appointed an officer without any aptitude for the work, and so it became a farce.
- (d) Security is Discipline. In the final analysis, Security-mindedness was proved to be nothing more than discipline. It should become second-nature to personnel not to discuss secret or confidential matters in public, or unnecessarily amongst themselves. Once this discipline is achieved it will no longer be necessary for the Air Ministry to have to explain why certain steps are being taken and why certain seeming inconsistencies (e.g. in official releases to the press) are being permitted. Secrecy will often be compromised if explanations of the policy have to be given.
- (e) Inter-Service Responsibility. Security is a common responsibility shared by all three services and thus each must seek to protect the Security of the others as well as of itself. The Security Organisations of the three services, of the civil police (and of the Central Security Service itself, which is the backbone of all our Security defences) must always stand together and be mutually self-supporting. The closest co-operation is essential.
- (f) Security Overseas. Security Education must constantly seek to impress on personnel under training in the U.K. that the Security problems to be encountered overseas are far more complex - and infinitely harder to solve - than those met with in this country.

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* Note: Compare A.D.I.(C) methods and Experience, e.g. Chapter 7.



The U.K. is a bad training ground for Security, because its Security defences are so effective (thanks largely to its being an island). As a result, personnel who have always lived in the U.K., and have no knowledge of the conditions likely to prevail overseas, either in the field or amongst the people of other nations, are liable to grow complacent, because they see so little evidence of the enemy's indirect attack. Therefore before they are sent overseas, they must be forewarned.

- (g) Balance. Security is a means to an end, and not an end in itself. It is therefore a good servant, but a bad master. When the needs of Security are in conflict with other considerations, such as speed or operational efficiency, the advantages to be gained must be carefully weighed against each other. If the balance is in favour of expediency, then Security must be sacrificed; but what is lost on the Security swings must always be made up for on the expediency roundabouts.

Conclusion.

31. The widespread ignorance of what Security meant and what it could achieve was the greatest handicap under which Security Education laboured during the earlier years of the War. The name was thought to imply nothing more than the prevention of careless talk by airmen in public houses. Had Security Education been content to accept this definition, and therefore concentrated solely on lecturing airmen on this failing, the R.A.F. would never have achieved the professional and adult outlook to the problem which it latterly developed. Thus the education of those at the top in the full significance of Security is the secret of success.

A.I.(S).3. SECURITY OF R.A.F. EQUIPMENT

Formation and Duties.

32. A.I.(S).3. was formed in November 1941 to act as:-

- (a) the section responsible to D.of I.(S) for technical aspects of Security, particularly as affecting R.A.F. equipment; and
- (b) Secretariat to the Release of Technical Information Committee.*

It must be emphasised that in all cases, the problem involving the Security of equipment had to be closely integrated with the question of adequate publicity. Security is fundamentally a matter of balance, and in the interests of democracy and incidentally, morale, it is necessary to tell the general public something of what is going on.

Press Releases.

34. In all cases, the main object was to deny information to the enemy regarding any type of new equipment until he might reasonably be expected to have knowledge of it. Even then, the degree of release of information to the press depended upon a number of factors, such as the number of aircraft of a specified type captured or shot down over enemy territory; whether they might be assumed to be total wrecks or only partially damaged; and how long it would take the enemy to find out how any piece of apparatus worked. If, however, it was positively known that an aircraft of a certain type had been captured intact, full release was immediately made as to its performance etc.

35. A new type of bomb, for example, would almost certainly be apparent to the enemy as soon as it had been dropped and its effects observed. Improved fusing devices, however, might not become known until he had obtained an unexploded bomb and dismantled it. So, although the effects of the new weapon would be observed by the enemy, what produced the effects would not. Also, in the case of an unexploded bomb, it was to be hoped that the anti-handling device had operated before it could be dismantled.

* See paras. 37-43

Release of Technical Information Committee.

36. Shortly after the beginning of the War "The Release of Technical Information Committee" was formed under the chairmanship of the then D. of I. to keep under constant review the policy to be adopted and to initiate action for the release to the press of information about aircraft and equipment on the Secret and other lists, ^{by the Air Ministry} ~~by the Air Ministry~~. Later it was found necessary to delegate the duties of the Committee to A.I.G. who had, in practice, found the machinery of the Committee too cumbersome for dealing with ordinary day-to-day problems of censorship arising in connection with operational types of aircraft and other matters of a secret or confidential nature.

P.R. and
37. It soon became apparent that information about new types of aircraft and equipment likely to be of most value to the press (and equally, of most value to the enemy) related to items which were, for the most part, still under the control of the Ministry of Aircraft Production, as being still in the design or development stage. These items could not be released to the press at such an early stage. Even at a later stage when they had been in operational use, and Security considerations might allow their disclosure, there would still be a considerable interest from the point of view of M.A.P. Public Relations, concerning their development and manufacture.

38. About the middle of 1941 it was found that there was a strong tendency for the Director of Public Relations at M.A.P. to release information to the press without adequate consideration by Air Ministry. The R.T.I. Committee was therefore re-established, but on a more comprehensive basis than formerly, including representatives of interested departments in M.A.P., War Office, Admiralty, Ministry of Supply, the Dominion Air Forces and representatives of the U.S. Navy and Army Air Forces.

39. The normal procedure was for the Directorates of Public Relations to put before the Committee proposed items for release to the press, and for the Committee to give them due consideration, bearing in mind not only the question of the value of the information to the enemy in itself, but its bearing on future developments, and any question of common interest in its development or use by ourselves and the Americans.

40. It should be noted that the Committee was concerned only with agreeing the release of information to the press, and was not concerned - except indirectly in the case of certain items involving common interest with the Americans or with patent questions, - with the date of release. This is specially noted because there were, during the war, certain items agreed for release by the Committee, which were held up for various reasons concerned with the policy of the Directorates of Public Relations; Air Ministry, and M.A.P. 'Security' was often blamed unjustly for these delays.

41. The work of the Committee was by no means plain sailing. One of the difficulties encountered which caused much worry, was premature release of information in the U.S.A. Such premature release was, in the main, the result of official visits by Americans to this country in connection with the common Anglo-American interest in the aircraft industry. These visitors had, inevitably, to be given access to information which had not been released to the press. On their return to the U.S. they unguardedly gave away such information to the American press, either in interviews or in speeches to technical institutes and similar bodies.

R.T.I.
42. To obviate these difficulties the U.S.A.A.F. Release of Technical Information Committee was formed in Washington, with a specially appointed R.A.F. liaison officer, which operated in a manner similar to that of the British set up. Through this American (R.T.I.) Committee, visitors newly returned from the U.K., were warned that they must not make public statements about British equipment, and parallel action was taken to safeguard items of mutual interest.

Press Security.

43. From the very start of the North African Campaign the need was felt for the creation of a special department in London, whose function it would be to keep in constant touch with press censors overseas; to supply them with current



censorship guidance; to co-ordinate censorship between the various theatres, and to secure personnel for press censorship duties in future operations. As a result of the above, and of recommendations based on practical experience by a member of A.I.6. who was Field Press Censor, North Africa, a post was created in November 1943, on the strength of A.I.(S).3., to carry out the following:-

R.R.R

- (a) Co-ordination of R.A.F. press censorship at home and overseas.
- (b) Transmission of information and guidance to R.A.F. press censors overseas, and distribution of information received from them.
- (c) Advice on selection, training and posting of personnel for press censorship duties.
- (d) Advice on press censorship establishments of new Commands overseas.

After three months had elapsed it was found that many additional duties had to be undertaken.

44. In view of the very close liaison existing between the Americans and ourselves on press censorship matters, it was usually necessary to secure agreement between the British R.T.I. Committee and the American R.T.I. Committee before any technical release was made. In addition it was found necessary to compile a comprehensive document containing all types of R.A.F. aircraft showing what data was publishable and what was not. This document, when completed, was distributed to all overseas Commands, as well as to the interested sections here and in America. This document was kept up to date by means of amendment-lists.

45. A monthly guidance on all current Censorship problems was distributed, and signals were sent immediately when urgent Censorship problems arose. Censorship rulings from the various theatres, and from America, were received and distributed to interested parties here and abroad, so that co-ordination could be achieved.

46. A considerable amount of work was put in by the section on the safeguarding of types of aircraft and equipment prior to their introduction into the R.A.F. Examples are the introduction of various forms of radar, the particular form of mine used in the attack on the Mohne dam, the 40 mm. cannon used in the Hurricane fighter, and special anti-submarine weapons. Not only were precautions laid on before introduction to the Service, but in the early stages of use careful check was kept on the losses of aircraft and the consequent liability for compromise of the equipment, coupled with careful scrutiny of any indications that the enemy had knowledge of these. An important example was the loss of an aircraft fitted with A.I. Mark X, shortly before the invasion of the Continent, it being vital to keep this information from the enemy.

Security staffs to relax the very necessary Security precautions. The argument was that these restrictions involved special storage arrangements, armed guards, sealing of containers, and similar arrangements which made handling difficult. Because of these urgent demands to relax, the position was reviewed continuously. Assessment of the degree of compromise of any item of equipment became one of the more important duties of A.I.(S).3. Such assessment was based primarily on -

- (a) Information from intelligence sources indicating the extent of enemy knowledge.
- (b) Capture or knowledge of enemy equipment involving the same principles as our own, thereby showing that the enemy would learn nothing further from detailed knowledge of our equipment.
- (c) An assumption (based on our own experience), that after a given number of any particular item of equipment was lost on operations, the enemy might be assumed to have sufficient examples to have obtained full information.

Security Grading.

49. The full course of Security classification of any item of equipment would be from "Top Secret" through "Secret", and "Confidential" to "Restricted". By no means all items of new equipment, however, merited the classification of

/ "Top Secret"



"Top Secret", even in the development stage, and much equipment was only "Secret" when first used operationally. In the early days of the War there was, somewhat naturally, a tendency to give equipment a security classification higher than was strictly warranted. It was difficult also, at times, to persuade directorates concerned to take the necessary down-grading action even when it was considered that evidence warranted it. This difficulty, in fact, still exists. Conversely, it was often difficult to persuade those concerned, that the security classification ought to be maintained for lack of evidence of enemy knowledge, or because widespread knowledge of a particular item might jeopardise the security of a later development.

50. The position was not eased, in the earlier days just after the United States entered the war, by the fact that the American and British Security classifications were different. This resulted in a complicated situation, where classifications had to be stated as, for example "British Top Secret equals United States Secret". Such anomalies were abolished when a common system of security classifications were adopted by the two nations.

Date

51. In the course of building up records of the security classifications of equipment, and the degree of compromise, an extensive card index system had to be evolved, covering every type of aircraft in use by the R.A.F., many American aircraft, all major items of equipment (knowledge of which would be of value to the enemy) and much miscellaneous information relating to the subject. The question of the Classification of Signals equipment presented a major problem, for Signals Security was not a branch under D.of I.(S), but was the concern of Signals 5 under the Directorate of Signals. The problem was solved in 1943 by the setting up of Signals Technical Secrecy Grading Committee under D.G.of S., on which D.of I.(S) was represented by A.I.(S).3.

Foreign Nationals and Political Considerations.

52. Closely related with the foregoing problems there had always been the one of knowledge of certain types of equipment being made available to other allies co-operating with the R.A.F., such as the French, Poles, Czechoslovaks and others. It was obvious that the enemy could bring additional pressure to bear on these foreign nationals, should they be captured, by holding out threats of ill treatment against any of their relatives still in German-occupied territory, and serious consideration had to be given to balancing up operational demands against the dictates of Security in its efforts to avoid compromise.

53. Political considerations also entered into the question. From time to time it was policy to offer certain facilities for training in Great Britain of nationals of foreign neutral countries, as, for example, those of Portugal and Turkey. The problem had to be faced that on the return of these foreign nationals to their own countries, it would be possible for any of them, if they so desired, to pass on any information acquired to German diplomatic sources: Special precautions had therefore to be taken in this direction. This problem was accentuated after the victory in Europe, when there was the inevitable series of requests, both from the governments of our allies now returned to their own countries, and from neutrals anxious to learn R.A.F. methods and to purchase British aircraft and equipment. The requests had a strong backing from the point of view of opening up again our export trade, and new security problems arose. The latter were mainly concerned with implementing policies laid down by higher authority regarding the disclosure of technical information to foreign countries, and endeavouring to assure that foreign nationals had access only to such information as they were entitled to receive.

A.I.(S).4. INTER-SERVICE SECURITY BOARD

Origin.

54. In February 1940, when the Chiefs of Staff were considering an Allied landing in Norway, it was decided that an Inter-Service Security Board should be formed, to protect the Security of the plans for the landing. It was at this time that A.I.(S).4. (at first known as A.I.Q.) came into being, the head of the section becoming the R.A.F. representative on the Board. Although the proposed operation did not materialise, it was decided that the I.S.S.B. should become a permanent body.



Security of Major Operations.

55. The I.S.S.B. was responsible to the Joint Intelligence Committee for the security of major operations throughout the planning stage up to the assault. It gave advice on all questions affecting service security, following the policy laid down for the R.A.F. by D.of I.(S). The co-ordinated security recommendations of the Board were then submitted to the Chiefs of Staff, the Joint Intelligence Committee and the Joint Planning Staffs, or to force commanders according to circumstances.

56. A.I.(S).4. under the authority of the I.S.S.B. took action to implement, in Air Ministry and R.A.F. Command Headquarters, operational security measures in force within the R.A.F. with any special requirements of combined major operations, and advised and issued directives to Command I.S.O's or to R.A.F. Force I.S.O's involved in them.

As a result of recommendations made by I.S.S.B. A.I.(S).4:-

- D.
- (a) Advised D.of I.(S) on the implementation within the R.A.F. of such security measures as were recommended by the I.S.S.B. and approved by the Joint Intelligence Committee or Chiefs of Staff.
 - (b) Maintained liaison with Air Ministry departments and Commands, in matters affecting operational security.
 - (c) Issued and controlled the use of I.S.S.B., (and certain other), operational code words throughout the Air Ministry and Commands, and maintained inter-service code names indices in liaison with the Air Ministry War Room. (It was through A.I.(S).4. also, that special code names used by M.A.P. were approved).
 - (d) Attended conferences held by Air Ministry departments on organisation matters affecting forthcoming operations, and advised on the security implications.
 - (e) Advised Command I.S.O's on all questions affecting operational security.

57. In addition to the particular R.A.F. aspects of the problems submitted to the I.S.S.B., the R.A.F. representative had to consider all aspects, irrespective of which service was primarily concerned. The Board worked as one body, and the chair was taken by the service members in rotation. One member of the Board was always present at any planning meeting, such as those convened by the Executive Planning Section; the 'Q' Planning Committee, etc., and so was able to pass on to the Board any relevant matter concerning them.

Deception.

58. A.I.(S).4. was responsible for keeping the D.of I.(S). advised as to all measures of 'deception', or 'cover', which affected R.A.F. policy and security, in liaison with the London Controlling Section, who were themselves represented at the meetings of the I.S.S.B. and the greater part of the work of A.I.(S).4. was devoted to this subject.

PRESS RELATIONS

The Work of P.R. & A.I.5.

59. Before the beginning of the war in 1939, it had been decided that for the better co-ordination of policy and security with the press it would be necessary to detach a section from the Air Ministry to act in an advisory and liaison capacity between the Air Ministry and the Ministry of Information, and to deal with air matters in that connection. The detachment was to be composed of one uniformed officer - of the rank of Squadron Leader - for advisory duties, and one press officer and four civil servants from the Press Branch of Air Ministry for direct liaison work between the Press Branch and the Ministry of Information News Division. The selected personnel were accommodated in the London University Building, Malet Street, W.C.1., and upon the declaration of war were ready to take



up their duties which required a continuous duty watch over the full twenty-four hours of each day.

60. In addition to the air security work for the Censorship Division, the Air Adviser's time was taken up to a great extent in answering the many questions upon air strategical, tactical and technical matters brought to him by press representatives and other writers requiring immediate information. These personal interviews were encouraged by the Air Adviser, since it was realised that these questions and talks undoubtedly tended to ease the risk of dangerous material being submitted to censors who might, with insufficient knowledge (especially in the early days) unwittingly approve and pass for publication a dangerous statement or inference.

61. The duties of the air advisory staff were varied, and as time went on, developed considerably. They included the checking and passage of material submitted as a result of visits to R.A.F. establishments and interviews granted by the Air Ministry to the press and other writers. These submissions were dealt with both from security and policy points of view, and proved a very considerable load to add to the general security work required of the section.

62. In addition, many other personal correspondence and enquirer's questions were directly dealt with by the section, as, since a large percentage of the general public considered that the Ministry of Information should be able to answer any of their questions, a fully equipped Air Enquiry Bureau must be included in its organisation. These enquiries were generally accepted, and directly dealt with, as it was realised that by so doing a vast amount of correspondence through the Under Secretary's Office and other Air Ministry departments and offices was avoided and time saved.

PRESS SECURITY

The Work of P.R. & A.I.6.

63. In September 1939 there was no organisation at Air Ministry or elsewhere, which would ensure that the public demand for news about Royal Air Force operations should be balanced with security requirements. All such news was issued by the Press Section, a civil branch which was provided with full details of all operations and had access to all secret reports, but as a civil branch was not controlled by the Air Staff. Nominally the Director of Intelligence was supposed to be consulted before information was published, but as he had no staff allocated for the purpose it was in practice impossible for such consultation to be made, particularly in view of the fact that to meet the needs of the press and B.B.C. quick advice at any time of the day or night had to be given. The result of this was that there was really no effective security control at all. To provide this control A.I.6. was created. P.R. & A.I.6. were responsible to the Director of Intelligence (Security) for security but for policy under the control, and responsible to, the Director of Public Relations. This in many ways was unsatisfactory as communiques were often involved with A.M. policy, which is the function of the P.U.S.

64. It would have been more satisfactory if the department had been on the strength of D.of I.(S). under A.C.A.S.(I), but responsible to the P.U.S. for communiques. Also, it is suggested that Field Press Censors abroad should come under D.of I.(S) and not as at present under D.P.R.

65. Additional duties, notably that of responsibility for writing the official Air Ministry communiques, accrued to the department during the course of time. The functions of A.I.6. were therefore primarily to examine from the point of view of security and policy all material issued by Air Ministry and all material written by serving R.A.F. personnel intended for publication. As can be imagined, a very large range of subjects had to be considered, much of which was of a highly technical nature. Such matters were referred to the department qualified to deal with them, and A.I.6. was guided by their views. Similarly the closest liaison was necessary with the War Office, the Admiralty and other Government departments, as well as with our allies, so that maximum security could be jointly achieved.

66. It should perhaps be made quite clear that A.I.6. had nothing to do with ordinary press censorship. That is to say, it was not concerned with any material

/originated



originated by the press or emanating from any source outside the Air Ministry and the R.A.F. Nor was A.I.6. concerned with Air Ministry material of a classified nature which was not intended for general publication.

SECURITY IN MINISTRY OF AIRCRAFT PRODUCTION

Development of Security.

67. Before the formation of the Ministry of Aircraft Production, the security of Air Staff operational requirements in research, development and production was a matter which came directly under the control of Air Ministry security authorities. With the creation of the new Ministry it soon became clear to the Director of Intelligence (Security) that it was no longer practicable to control from Air Ministry the security of R.A.F. operational requirements once the whole organisation of aircraft production had been placed under a separate body. Moreover there existed no security branch established in the Ministry of Aircraft Production with the necessary terms of reference to co-ordinate the larger issues of security involved in the whole chain of production.

68. Early in 1942 a panel was set up by the Cabinet to deal with security arrangements in Government departments: this panel in due course recommended the appointment of an M.A.P. Security Board, whose terms of reference were to establish in co-operation with Air Ministry (and advised as necessary by the Security Service), the general security policy to be followed at headquarters establishments and factories within the Ministry. Among other things the report recommended the establishment of a security section whose personnel should include a full-time R.A.F. officer with the rank of Wing Commander and the necessary security experience to act as Liaison Officer between the Department, the Security Service and Air Ministry.

Functions of the Security Section.

69. The main divisions into which the work of the section fell are as follows:-

- (a) Security of Air Staff requirements during research and development.
- (b) Security of Air Staff requirements in quantity production.
- (c) Security education, including security of personnel.
- (d) Security in connection with all storage of aircraft and flying undertaken under M.A.P. Control.
- (e) Investigations of leakage of information, and breaches of the security regulations current in M.A.P.
- (f) Security in connection with publicity.
- (g) Control of all visits to factories.
- (h) Employment of aliens in factories, etc.

Relations with D.of I.(S).

70. The M.A.P. Security Board was the Air Ministry security link with M.A.P. A close liaison was maintained between M.A.P. and Air Ministry Security branches in all matters affecting Air Staff requirements. The Director of Intelligence (Security), being consulted where doubt existed in carrying out policy which affected service interests.

(iii) THE I.(S).O. ORGANISATION

Early History.

71. When the Directorate of Intelligence (Security) was created in 1940 for the purpose of formulating Security Policy at Air Ministry, the Provost Marshal branch already existed to enforce routine day-to-day security outside Stations, - such as the keeping of observation in public houses where loose talk was suspected - and to initiate disciplinary action against security offenders. It became apparent in 1940,

/however



however, that it would be necessary to create an organisation of full and part time security officers who would operate within Commands, formations, stations and units as the agents of the D.of I.(S). To these officers he could feed information on the latest policy rulings with guidance on their implementation, while they in turn kept their Commanding Officers fully briefed on these matters, acting in a purely advisory capacity and without administrative or disciplinary powers.

72. The first scheme to be tried out, in 1940, was the formation of a team of full-time Intelligence (Security) Officers, established on the Directorate of Intelligence (Security) Air Ministry, but attached to Command Headquarters in the same way as were Public Relations Officers throughout the War. The scheme was not a success. The weakness lay in the fact that the officers were not Command bodies. Security was vaguely suspect at the time, being connected in the minds of many with "snooping" and officious interference, and the feeling developed that Air Ministry was attempting to introduce security spies into Command Headquarters - officers who would tell tales of any weaknesses they discovered to Air Ministry, and who, by virtue of being established on Air Ministry, could not easily be controlled. Whether this outlook could have been overcome, had the officers selected displayed attributes of diplomacy and tact beyond the ordinary, is perhaps irrelevant; they did not, and the scheme died.

73. In 1942 another attempt was made, and the I.(S).O. Organisation, which gave such admirable service for the remainder of the War, was brought into being by A.M.C.O. A.9/1942, issued on the 30th January. Briefly this Order created an I.(S). network, with the D.of I.(S) as apex, throughout the R.A.F., at home and overseas, on the general principle that every unit was to appoint either a full-time or part-time Intelligence (Security) officer, * whose primary function was to keep his commanding officer fully informed as to the state of security within the Command, formation, station or unit which he commanded, and to advise him as to how it might best be improved. Once again the emphasis was on the advisory capacity of the officer. He had no administrative or disciplinary powers. In other words, every effort was made to divorce him, both in fact and in the minds of his C.O. and the personnel of his unit, from any suggestion that he might be a security policeman whose aim was to apprehend and to punish. Above all, therefore, he was required to foresee and to prevent security breaches rather than to initiate disciplinary action after they had occurred, and in this he followed the example of the Army's Field Security Personnel, who were wholly divorced from all police functions. Thus the I.(S).O. at all levels had no executive powers.

Selection of Officers.

74. The fundamental point of issue in the creation of this I.(S).Organisation was that a Commanding Officer was responsible, among many other things, for the maintenance of security within the formation which he commanded. In view of the development and ramifications of security in war time, it was felt that he could not be expected to fulfil this duty adequately himself and was therefore to appoint an officer to watch security on his behalf. It was thus in his own interests to appoint a suitable officer, but this point was not always appreciated.

75. The whole history of the I.(S).O. network throughout the war bore eloquent testimony to the adage that an organisation is only as good as the men chosen to run it. The most carefully formulated policy, the most inspired directives and the most detailed instructions will always be set at naught if those responsible for implementing them are found wanting. This is particularly so in the case of a security officer. If he is to fulfil his duties successfully he must possess certain qualities, of which the chief are:-

- (a) Commonsense, which in the long run, will provide him with a suitable answer to almost every security problem which may confront him.

/(b)

* Note: Although the term Intelligence (Security) Officer is used throughout this section, it should be realised that it was not held to be essential for the officer appointed for part-time security duties to be an Intelligence officer, although this was desirable wherever possible.



- (b) Tact. Without tact he will, by the very nature of his work, tend to antagonise many of those with whom he comes in contact, and will thus bring security into disrepute.
- (c) A balanced outlook, which will enable him to see his own duties in their true relationship to those of other officers, and will thus enable him to judge when security should, for reasons of expediency, be sacrificed to other interests, and when, alternatively, its requirements are such that no sacrifice can be made.
- (d) An unassumed outlook to his duties, which will prevent him from using his work for gratifying any exaggerated sense of self-importance.
- (e) Discretion. Not of the type which shrouds every act in a cloak of ostentatious secrecy (for this, in reality, is not discreet for it merely draws attention to something which should remain unnoticed), but rather the quiet, unruffled discretion which will enable him to continue to behave normally in times of abnormality.

These are the essential qualities of his trade. A thick skin is an asset, for it will make his life easier, but it is not essential; and a sense of humour is also of great help, for it will prevent him from ever allowing himself to become melodramatic.

76. Unfortunately the care needed in selecting I.(S).Os. at all levels was not appreciated, and mistakes were made, and officers were too frequently chosen at random and often without thought. Security suffered immeasurably - and perhaps irremediably - as a result. Certain appointments revealed a complete lack of appreciation of what was required of, or could be achieved by the right man. When the security authorities themselves were responsible for such appointments, as opposed to misguided C.O's., they may be said virtually to have committed security suicide in the Command or area to which the unsuitable officer was sent.

77. A security officer has to sell an essential but an unpopular commodity; he must expect to encounter a certain amount of sales resistance, particularly from those in high places. Therefore it is essential that he should have something of the salesman's powers of tactful persuasion. If he is aggressive, he is lost, and not only does he fail in his duty - he also brings Security itself into disrepute.

Development and Growth of the Organisation.

78. In 1942, when the I.(S).O. Organisation was created, offensive operations overseas, and hence the organisation of Security overseas with its corresponding problems of security in the field, had scarcely begun to develop. Thus the first concern of the D.of I.(S). was to build up an effective organisation in the U.K. on the long-term policy that a substantial proportion of the R.A.F. must ultimately go overseas into operational theatres before the War ended, and so their security defences had to be perfected while they were still in the U.K.

79. At first, full-time security officers (of the rank of S/Ldr.) were appointed only at Command Headquarters, at home and overseas, and at a few special units, such as the Parachute Training School at Ringway and the Photographic Interpretation Unit at Medmenham. At all other formations the I.(S).O. was a part time officer only.

80. The Command I.(S).O. was the apex of the I.(S). network in his Command. He had two main sources of information:-

- (a) The flow of information and guidance on security policy, which he received from the Directorate of Intelligence (Security), including a large volume of security educational material from A.I.(S).2.
- (b) The flow of information concerning the security of his Command, which he received from Stations and Unit I.(S).Os. through the group I.(S).O., or as a result of his tours of inspection throughout the Command.

/Thus



Thus he was in a position to advise both his A.O.C-in-C., (either directly or through his S.A.S.O. or C.I.O.) and the D.of I.(S). on all aspects of security concerning his Command.

81. In order to maintain a close contact with the Command I.(S).O's., the D.of I.(S). summoned a quarterly conference at Air Ministry, at which outstanding problems were discussed, views were exchanged and plans for the future were made. In this way he obtained a clear picture of the overall state of security in the R.A.F. (It was not generally the policy to recall C.I.(S).O's, from overseas for these conferences, but this was done in special circumstances).

82. 1943 was the year of general advance throughout the Mediterranean of growing activity in India, and of feverish preparation in the U.K. for the European invasion. The I.(S).O. Organisation was developed and enlarged accordingly to face its new commitments. The C.I.(S).O. posts were upgraded to W/Cdr. first at A.E.A.F; then in India and at M.A.A.F.; and finally at Transport and Coastal Commands. (All operational Commands, should, in theory, have been upgraded in this way, but were not, for reasons that need not be discussed here). Next, the establishment of full-time I.(S).Os. at Commands was extended to Groups already overseas, or to those preparing for operational duties overseas. Thus by the beginning of 1944 all Groups in 2nd T.A.F. had a full time I.(S).O. of the rank of F/Lt. During the final stages of planning and preparation for the Normandy invasion, the C.I.(S).Os. most intimately concerned held frequent conferences at Air Ministry to decide what special steps needed to be taken to safeguard the security of the operation.

83. By 1945 the I.(S).O. network had reached extensive proportions and virtually covered the R.A.F. throughout the World. The A.C.S.E.A. a replica of the Directorate of Intelligence (Security) was built up, with an Inter-Service Security Board, an Educational Section and an Inter-Service Publicity Section (an innovation never attempted in the U.K.) all under the aegis of a Deputy Chief of Intelligence (Security). In M.A.A.F. (subsequently Med/Me), full time I.(S).O's were established in the Balkans, Greece, Austria and Italy; and in B.A.F.O. (Germany) G.I.(S).O's were provided with assistance, and finally were upgraded to S/Ldr.

Security Training Pool.

84. As a result of the rapid expansion through 1944 and 1945, the D.of I.(S) was faced with the problem of furnishing a steady flow of fully-trained I.(S).O's to meet the demands for them which were being urgently received from all over the World. To this end a Security Training Pool was created in February, 1945, with an establishment of 2 S/Ldrs., 2 F/Lts., and 8 F/Os. The value of such a Training Pool cannot be overemphasised. It enabled the D.of I.(S) to give a period of intensive security training (including lecture courses at the R.A.F. Intelligence School, Highgate, and periods spent at Air Ministry and Commands) to the members of the Pool; and, more important still, it enabled him to make his own selection of officers after interview and due consideration of their qualifications. In this way only hand-picked officers were chosen, and the former system whereby officers had been chosen at random and in haste, as was the case before the Pool was created, was finally abolished - though not before its elimination was overdue. Moreover an officer who was found, during training, to be unsuitable could be rejected; while one who revealed any particular qualifications could be earmarked for special posts which it was known would be required to be filled in the future. The Security Education Section, A.I.(S).2., was responsible for this training, and also kept detailed records of all full-time I.(S).O's throughout the world, so that officers could be moved from one post to another when vacancies occurred, or as the necessity arose.

85. By the end of 1945 the period of reduction and contraction had set in, particularly in the U.K. Full-time Command I.(S).O's. at home were abolished, save for Transport Command, though the overseas organisation, with its problems of occupying enemy territory, did not greatly change. The peacetime policy for the pool was then to select officers of wide experience who had applied for permanent and short-term commissions, so that a long-term policy could be formulated, and so that organisations such as the Security Service and Security Intelligence Middle East should be encouraged to accept R.A.F. representation and R.A.F. security liaison, knowing that those with whom they had to deal were officers of experience, integrity and some degree, at least, of permanency. (They were

/naturally



naturally reluctant to impart much information about their organisations to those whom they knew would shortly leave the Service).

Security in the Field-Relationship with P.M. Branch.

86. As already stated, the policy in the Army had always been to have a body of Field Security Personnel responsible, as their name implies, for Security in the field which included active operational Counter-Intelligence duties such as the capture of enemy intelligence records and material (often by operating with advance units), the countering of enemy subversive and espionage movements, both during battle and during the occupational phase that follows victory, and the vetting of all questionable characters, enemy or otherwise. This necessitated a close liaison with the Security Service, whose numerous records could furnish much invaluable information.

87. The R.A.F. had no parallel organisation for counter-intelligence in the field. An attempt was made in 1943 by the D.C.I.O.(S.), India, to create a similar organisation for the Far Eastern theatre and a corps of security N.C.O's was formed but the Provost Marshal subsequently stated that his Provost officers could carry out these duties in addition to their provost function, and that the I.(S). Field Security Organisation was therefore superfluous. So they were disbanded. Apart from this, the only other attempt to form an F.S. organisation was when a small body of security N.C.O's operated for a short time (and quite unofficially) under the G.I.(S).O. of 83 Group in 1943; but their span of life was brief.

88. From 1939-1945, therefore, while the question was being argued out in theory as to whether or not the provost security officers should or should not be responsible for field security in an operational area, they were in practice fulfilling this function. The question also arose as to whether, since they were neither Staff nor Intelligence officers, they could have any direct contact or liaison with the Security Service with Air Staff Headquarters at Group or Command, or with the Army Ib Staff. The matter was brought to a head with the production of A.M.C.O. A.95/1944 amending A.M.C.O. A.9/1942 and which was notable, in particular for the following paragraphs; these sought to clarify the issue, and did so in theory, but not altogether in practice:-

"4. On behalf of the Air Staff, the Director of Intelligence (Security) is responsible for the co-ordination and promulgation of Security policy throughout the Royal Air Force at home and overseas, and for directing the Provost Marshal's Branch to take such action as may be appropriate for its implementation. This direction will be exercised at every level through normal Air Staff Intelligence (Security) channels, but will not preclude independent action by the Provost Staff for the routine maintenance of Security, as laid down in C.D.275, Chapter II, paras.107 to 114.

7. Overseas, wherever the Army assumes the major responsibility for Security, the normal link with the Army or counter-Intelligence matters will be the Intelligence (Security) Staff, but local liaison between the appropriate Army Authority and Provost Staff will be made as necessary."

89. The whole crux of the matter lay in the fact that the Provost Marshal's Branch had a large number of N.C.O's who could be readily made available for security as well as police duties in the field, whereas the I.(S).O. Organisation had none. Even many of its officers only performed part-time security duties. Therefore the I.(S).O. organisation was never in a position to undertake the active counter-intelligence in the field, which, in theory should have come solely within its province; as a result, the Provost Marshal Branch had to be relied upon in practice to carry out this work. Thus the R.A.F. fell into the error which the Army F.S.P. had always been at such pains to avoid, and married security work to provost work. No criticism is made of the way in which the P.M.Branch carried out these duties - on the contrary, it is readily admitted that they did much excellent work.

90. Clearly, however, the future of security and of counter-intelligence in the field cannot be based on any such makeshift arrangement. The answer would seem to lie either in the creation of (a) an R.A.F. F.S.P. under the control of the I.(S).O.



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Organisation; or (b) in the formation of an inter-service F.S. body comprised both of Army and R.A.F. officers and men (and, when circumstances demanded of Royal Naval Personnel). In either case it should be unnecessary to rely on the Provost Marshal Branch, whose security function should be limited to initiating disciplinary action for security offences outside the boundaries of station or airfield.

AIR MINISTRY INTELLIGENCE IN WAR

PART IV: CHAPTER 16

A.I.3.(d):

JAPANESE AIR FORCE INTELLIGENCE

Organisation

1. From about the middle of 1941 until the end of 1943 Japanese Order of Battle Intelligence was included in a section (A.I.3.(d)) which covered the whole of the Far East and the Middle East as well as Russia and Sweden. Due to the growing importance of operations, current and pending, in the Far East, the decision was made at the end of 1943 to form an entirely separate Japanese Section with an establishment commensurate with its new terms of reference. About this time there was a marked increase in the volume of intelligence material such as captured documents, prisoner of war reports, technical reports, etc., which became available as enemy occupied territory was recaptured.
2. The question had arisen as to whether Japanese Intelligence should be dealt with by two sections on the same lines as A.I.3(b) and A.I.3(e) where, on German Intelligence, Research and Order of Battle were separated. It was decided that, as the Japanese Section would not have the heavy Operational Intelligence commitments of the German Section, the work could be covered more economically by one section, and A.I.3(d) was therefore organised on this basis, being divided into two subsections, one for Research and the other for Order of Battle. The result, in practice, proved satisfactory; both sub-sections worked in the closest co-operation and were frequently able to throw useful light on one another's problems. The same document circulated throughout the whole of the section and a common Records System made reference by either sub-section an easy matter and obviated a great deal of duplication of records.

Integration with Washington

3. During 1944, by agreement between the United States Army War Department and A.C.A.S.(I), Air Ministry, intelligence on the Japanese Air Forces was to be integrated and to be centred in Washington. So far as the Order of Battle section was concerned complete integration was not, however, fully achieved. In the American organisation the Navy Department was responsible for intelligence on the Japanese Naval Air Force and the Army

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Department for that on the Japanese Army Air Force. While the Army Department G.2. section was well staffed and organized, the section responsible in the Navy Department, F.22, was extremely small, have heavy operational intelligence commitments, and was therefore unable to do more than maintain a current estimate of strength in Japanese Navy Air Flying Units. Such intelligence material as was issued by the Navy Department was produced mainly by the Intelligence Section at the Headquarters of the Pacific Fleet.

4. Generally it may be said the Americans were not greatly interested in research work on the organisation of the Japanese Air Forces and were apt to consider this as interesting only from an historical point of view and to be of limited use for current operational requirements. In the light of experience gained in the German War, a rather different view was taken by London. The organisational background which enabled the Japanese Air Forces to function was regarded as a useful and necessary study; some investigation was made into their supply and maintenance system; and this aspect of the work enabled Air Ministry to form opinions on the strengths and locations both of Japanese Commands and of the ground air units of both Air Forces as well as those of the purely tactical flying units and occasionally to forecast their future movements. The study of the training organisation in particular proved of considerable use when the Japanese committed their training system to suicide operations. At the same time a certain amount of historical research into campaigns was pursued, and the results published in various papers. A comprehensive study of the organisation of both the Japanese Army and Naval Air Services was carried out and the results embodied in the Handbook S.D.554 "Organisation of the Japanese Army and Navy Air Forces" which was issued as a "Secret" publication. As further intelligence material became available on which the Handbook could be supplemented or amended special papers were issued. It would not be unreasonable to say that on questions of organisation London was generally ahead of Washington, particularly on the Japanese Naval Air Force, and recognition of this fact is implied in the request made by Washington for the supply of a number of copies of S.D.554.

Relationship with Operational Commands

5. Weekly estimates of aircraft strengths have been issued independently both by Washington and London and also by the Commands in operational theatres. It was obvious from the early stages of the war that local Commands would have to make their own estimates of strength and disposition of the forces by which they were immediately opposed.
6. They were able to keep an up-to-date general picture of these mainly from a study of W.T. traffic patterns which combined with photographic reconnaissance kept them abreast with the very latest developments and not infrequently enabled them to forecast an enemy raid and the base from which it was to be mounted. Information was also received from captured documents and from P.O.Ws., who, owing to the theoretical impossibility (from the Japanese point of view) of being taken alive, had apparently received no security training. Such information as was received from these sources, however, was generally too old to be of operational value, but was useful in checking previous estimates and in broadening the general background of our information.
7. All this material reached Washington and London after it had been "processed" at the H.Qs. of the Commands, who therefore generally made and used their estimates before the information reached G.2. and F.22 in Washington, or A.I.3(d) Air Ministry in London. In the earlier stages of the war the official Ministry estimates were therefore based mainly on those already issued by the Commands.
8. From 1943 onwards, as the flow of information increased, Air Ministry and Washington were able not only to check on information received from operational areas and amend it when possible, but also in turn to signal new information of importance to operational Commands. Furthermore, they were able to cover a wider field than any individual Command and to build up an accurate general picture of the Japanese Air Forces and their potentialities, which provided a basis for long-term planning.

Accuracy of Intelligence

9. Generally speaking the estimates of London, Washington and local Commands were in reasonably close agreement. Where differences arose there

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was a wholesale exchange of views by signal, and all centres acted as a valuable check on each other. Information received from the Japanese after the termination of hostilities provides a gratifying indication that both Air Ministry's and Washington's overall estimates of strength showed a very small margin of error, while on the organisational side their knowledge of the disposition of the Japanese forces was in some respects more up-to-date than that shown in the various documents produced by the Japanese themselves at the Manila Surrender Conference.

Definition and Scope

During the war of 1939-45, the term "Evasion and Escape" covered the following activities:-

- (a) Facilitating the escape of British, Dominion and Allied prisoners of war, thereby getting back service personnel and containing enemy manpower on guard duties.
- (b) Facilitating the return, to our own lines, of those who succeeded in evading capture in enemy occupied territory.
- (c) Assisting in the denial of information to the enemy.
- (d) Collecting and distributing intelligence.
- (e) Maintaining morale of British, Dominion and Allied prisoners of war in enemy prison camps.

Methods2. (a) Methods of facilitating evasion and escapes

- (i) Preliminary training before proceeding on operations.
- (ii) Preparation and issue of M.I.9 Bulletin.
- (iii) Technical research and production of "Escape" Aids (including special maps).
- (iv) The issue of "Escape" Aids, either before proceeding on operations or by means of special parcels to Prisoners of War Camps.
- (v) The issue of "Blood Chits".
- (vi) The preparation of plans for evasion and escape.
(It should be noted that rescue work in connection with aircraft flying over friendly territory or sea is the responsibility of the Air Sea Rescue Service. M.I.9 is responsible for escapes from or evasion in enemy territory.)

(b) Denial of information to the enemy

The denial of information to the enemy can only be effected through a strict security training of British, Dominion and Allied Service personnel who may be liable to capture by the enemy.

(c) Methods of obtaining and distributing information

Information was obtained by interrogating evaders and escapers (British, Dominion and Allied personnel), certain infiltrators (Allied) and civilians (British). Information so obtained was embodied in reports which were distributed to all three services and other Government departments.

(d) Maintenance of morale

Maintenance of the morale of British, Dominion and Allied P.W's. is an important factor as has been proved from many captured documents (e.g. S.S. Report on Questions of Internal Security - 12th August, 1943). This can be effected by prior M.I.9 training and by the maintenance of Secret Communications between U.K. and P.W. camps.

Historical Background

3. (a) Before the outbreak of war, conferences of escapers of the 1914-18 war were held under the auspices of the War Office; the Air Ministry was represented. In November - December 1939, G.H.Q. British Expeditionary Force recommended to the War Office that an organisation should be set up to facilitate escapes of British prisoners of war from enemy prison camps. The War Office raised the question with the Admiralty and the Air Ministry and, as a result, M.I.9 was established as an Inter-Service section consisting, in the first instance, of three Army officers and officers attached from the Admiralty and the Air Ministry.
- (b) Resulting from further consultations with selected escapers of the 1914-18 war, it was decided to carry out a programme of lectures by the latter in order to teach service personnel how to behave in the event of capture, emphasis being laid on the duty to avoid capture, if possible, but if this was not possible to try to escape after capture. It was decided that the best way to get escape material into prison camps in the early stages of the war was on the man, and these lectures were also designed to give instruction on the use of escape gadgets.
- (c) At the same time a secret M.I.9 fund was authorised and a technical officer brought in to experiment and advise upon "escape" equipment.

- (d) In April 1940, M.I.9 took over responsibility for "Intelligence" work connected with enemy prisoners of war and internees. The side which dealt with enemy prisoners of war and internees in the U.K. was incorporated in M.I.9 as M.I.9(a), the side which dealt with British prisoners of war and internees in enemy and neutral countries being named M.I.9(b). The latter was also responsible for "intelligence" aspects of persons arriving in the U.K. on repatriation from enemy countries.
- (e) During 1940 and 1941, work on both the enemy and British sides expanded to an extent which resulted in the establishment, at the end of 1941, of a Deputy Directorate of Military Intelligence (Prisoners of War), M.I.9(b) becoming M.I.9 (British Prisoners of War Intelligence) and M.I.9(a) becoming M.I.19 (Enemy Prisoners of War Intelligence). A new unit, Intelligence School 9, was created to take over the executive work of M.I.9. The "intelligence" aspects of aliens, repatriated persons and internees came under M.I.19.
- (f) On 1st January, 1942, M.I.9 was re-organised into two sub-sections, M.I.9(b) and M.I.9(d), the former dealing with general questions, co-ordination, distribution of information and liaison with other services and Government departments and overseas commands. The latter was responsible for organising preventive training (instruction in evasion and escape) to combatant personnel of the three services in the United Kingdom, and for the issue of "escape" aids and information to Units at home and M.I.9 organisations overseas.
- (g) In order to centralise the collection and distribution of "Intelligence" available from M.I.9 sources, a sub-section was formed in April 1944.
- (h) A chart showing the organisation of P/W. Intelligence (British) is at Appendix "A".

A.I.1(a)E/W.

4. (a) The section of A.C.A.S.(I)'s staff attached to M.I.9 was A.I.1(a)P/W. The head of the section was named Air Liaison Officer, M.I.9 (post established 28th December, 1942) and he was subordinate to the Deputy Director of Intelligence (Organisation). In January 1943, A.I.1(a)P/W consisted of thirteen R.A.F. and W.A.A.F. officers and in March 1946 reached a peak of sixty five officers.

Selection of Officer Personnel

5. Different types of officers are required for the varied tasks for which M.I.9 were responsible, and the requirements are:

(a) At Air Ministry level (equivalent to War Office, D.D.M.I. P/W, M.I.9).

The first requisite is good staff officers, linguistic and similar qualifications not being necessary. Owing to the specialist nature of the work continuity is highly desirable; so, the Director and as many of his staff as possible should for choice be re-employed ex-Regular Intelligence (R.A.F.O.), R.A.F.V.R. and Supplementary List Officers as they are less liable to be moved on elsewhere. In any case, it may be taken that the manpower position of this country will never admit of a free choice of officer personnel for duty in U.K. and that what will, therefore, be available will be oldish or unfit male officers and personnel drawn from the W.A.A.F. Many of the latter made first-class junior staff officers during the 1939/45 war.

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In the case of M.I.9 (M.I.9(d)), two or three young escapers or evaders should be selected as soon as possible for use as lecturers (escapers of the 1939/45 war will be listened to in the early stages of a war, but later on youth demands instruction from those with up-to-date experience). As one of the M.I.9 sections (M.I.9(b)) dealt with matters relating to the Geneva Convention and Press publicity regarding secret matters, one of the officers of this section should, if possible, be a barrister. One of the officers for the Finance Section (Purses, purchase of escape and evasion stores, etc.) should, if possible, be a Chartered Accountant. It is essential that the services of officers with the right qualifications for handling cash and accounts should be found.

(b) In the U.K. executive units (equivalent to War Office, I.S.9), the choice will again be limited to the same officer categories (except finance and legal). The heads of Units should be good Commanders and their immediate assistants sound unit staff officers. A good administrative officer is essential. A proportion of the officers in the I.S.9(X) escape and evasion planning section, I.S.9(Y) and I.S.9(W) interrogation section should be evaders or escapers. The head of I.S.9(Z) technical section should, if possible, be an officer with commercial experience in civil life as he has to deal

with many commercial firms. The Commanding Officer or second i/c command of Awards Bureau/Allied Screening Commissions should, if possible, be an evader. Experience has shown that an evader is the most suitable type of person for Awards Bureau work but all personnel on this work should have a good knowledge of the language of the country concerned.

- (c) In Theatres (equivalent to War Office, G.2(P/W) A.F.H.Q. I.S.9(WEA) and "E" Group) the same requirements are needed for the staffs, but younger and more active personnel is essential.
- (d) In the Executive Units of Theatres personnel must be prepared to undergo great risks.
- (e) In all cases, as far as it is humanly possible, officers should have had an R.A.F. training and background. Knowledge of a language alone, for instance, does not make an interrogator.

D.D.M.I.(P/W) - British P/W Intelligence

6. The following paragraphs set out the organisation and working methods of D.D.M.I.(P/W) (British P/W Intelligence) and its units M.I.9 and I.S.9(U.K.) during the 1939/45 war.

7. The British P/W Intelligence of the Directorate was entirely inter-service and was staffed by personnel of all three Services, who not only concentrated upon the work of their own service, but undertook whatever was allotted to them on behalf of all Services. In practice, however, it was desirable, so far as was possible, to use an officer of one Service to lecture or interrogate personnel of that Service.

8. War Office, Directorate of Prisoners of War (equivalent to D.P.S.) must be kept fully in the picture, so that he understands the vital role Intelligence plays, from his point of view, in providing him with valuable intelligence, in acting as a secret channel of communication between him and British P/W, and in helping to maintain the latter's morale.

Finance Section

9. For the successful prosecution of M.I.9 work considerable sums^S of money are required. As far as the greater part of this cash is used to finance operations of a top secret nature, it is essential for D.D.M.I.(P/W)'s fund to be secret and non-accountable. This was agreed by the Finance Section of the War Office and by the Treasury. In the 1939/45 war, there were three main requirements:-

- (a) Sterling and foreign currency for ordinary secret expenditure on M.I.9, I.S.9 and Theatre operations, on compensation to helpers of escapers and evaders and on other miscellaneous projects.
- (b) Funds to purchase evasion and escape stores and equipments and experiments thereon by I.S.9(Z).
- (c) Foreign currency for purses.

10. Staff and Units in Theatres of War dependent upon D.D.M.I.(P/W) for general policy directives. The following Staffs and Units in Theatres of War depended upon D.D.M.I.(P/W) for general policy directives, the supply of funds and technical equipment (for evasion and escape) and arrangements for the interchange of information of value to all P/W Intelligence organisations:-

- (a) G.2(P/W) A.F.H.Q. which controlled the following units:-
 - (i) I.S.9(C.M.F.) - operations for the rescue of evaders and escapers in Central Mediterranean area.
 - (ii) Allied Screening Commission, Italy - settlement of claims, recommendations for awards (Italy).
 - (iii) Allied Screening Commission, Greece - settlement of claims, recommendations for awards (Greece).
 - (iv) A.I.S.(I.S.9) - Interrogation of evaders and escapers.
 - (v) I.S.9(M.E.) - operations for rescue of evaders and escapers in Middle East Areas.
- (b) I.S.9(W.E.A.) working with Shaef. - Operations for the rescue of evaders and escapers in Western European Area.
- (c) "E" Group working with South East Asia and India Commands.

Note: All the above units' personnel included R.A.F. and W.A.A.F. officers and other ranks of A.I.1(a)P/W.

11. Relations with Attaches. As a result of lessons learnt the responsibilities of Naval, Military and Air Attaches in neutral countries in regard to evaders and escapers were to:

- (a) Notify the arrival of evaders and escapers of his own Service to his own Ministry, repeating to M.I.9, War Office.
- (b) Interrogate and report to his own Ministry on technical matters solely of interest to his Ministry.
- (c) Look after the welfare and discipline of personnel of his own Service.

12. Responsibility of Military Attache. It was the responsibility of the Military Attache (who received policy guidance from M.I.9) to:-

- (a) Interrogate all evaders and escapers on evasion and escape methods, routes, helpers, etc., and conditions and other matters of interest in P/W camps and to report results to M.I.9, War Office.
- (b) Arrange onward transmission of personnel to U.K. by clandestine means, where these exist.
- (c) Deal with general questions affecting Camps where evaders may be interned by a neutral state.

13. Security of P/W Intelligence. One of the major difficulties to be encountered is the maintenance of a correct balance between the need for secrecy and the necessity for giving adequate training to those who may benefit from it. To go to one extreme or the other must mean that either M.I.9 would be making no contribution to the war effort or that their activities would be badly jeopardised. In the 1939/45 war considerable emphasis was placed upon security and this was responsible, in part, for the slow development of M.I.9 work. By and large it is considered that it is better to err on the side of secrecy than the reverse, but the following points should be borne in mind:-

- (a) It is essential for M.I.9 to know of impending operations.
 - (b) It is necessary for instructors on M.I.9 subjects to be given background knowledge of M.I.9. It is difficult for an instructor to teach his subject intelligently unless he possesses a greater knowledge of it than merely that portion which he intends to impart to his pupils.
 - (c) It was always considered inadvisable to divulge details of evasion and escape organisations. Such things as names of helpers, safe houses and rendezvous should normally be kept strictly secret and not be imparted to personnel. If secrecy is not maintained, the helpers' lives may be endangered through notes being taken at lectures, and "safe houses" etc. may become known to the enemy.
 - (d) The major security "headache" which will always have to be faced is Press publicity. It is vital that before the outbreak of war, some arrangement should be made with Censorship regarding the imposition of the necessary "Stops". It is particularly important to prevent leakages in Allied and Dominion countries, and censors in such countries require as thorough a briefing as those at home, otherwise stories, once published abroad, may be reproduced in the U.K. Through Censorship the voluntary assistance and co-operation
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of the Press should also be sought.

- (e) In the 1939/45 war, evaders and escapers were made to sign a security certificate to the effect that they would not divulge their experiences to unauthorised persons.
- (f) Except to obtain immediate tactical information (e.g. R.A.F. Commands and O.R.'s), interrogation of evaders and escapers must be carried out by M.I.9 personnel or persons deputed by them for the work (e.g. M.A's., A.A's. in neutral countries, etc.). Unless this is done, the security of escape organisations may be compromised. Once the M.I.9 interrogation is completed, evaders and escapers with special knowledge may be passed to other Branches or Ministries for detailed questioning on these special subjects only.

M.I.9 - Organisation

14. M.I.9, the organisation of which is shown at Appendix "B", was composed of a G.S.O.I and three sub-sections fulfilling the following roles:-

- (a) Co-ordination and general correspondence. War Establishments and provisions of personnel for Army - liaised with A.L.O., M.I.9 regarding M.I.9 requirements for R.A.F. personnel.
- (b) Training of all Services. Obtaining indents for "escape" aids and providing equipment.
- (c) Obtaining "questionnaires" from all Services and outside Ministries and distributing intelligence obtained from P/W Evaders and Escapers.

15. M.I.9(b), M.I.9(d) and M.I.9(f) comprised the sub-sections of M.I.9 and the details of the work of the two most important sub-sections are given below:-

- (a) M.I.9(b). This sub-section was formed in January 1942 and consisted of two Army officers and two W.R.N.S. Head of sub-section was a Major. An R.A.F. officer was attached to the sub-section in an advisory legal capacity. Its duties consisted of general correspondence, co-ordination and secretariat and the sub-section also dealt with the following subjects:-
 - (i) Liaison with Directorate of Prisoners of War on Policy, Geneva Convention, intelligence and security questions affecting British prisoners.
 - (ii) Liaison with Security Service on special cases arising in Camps.
 - (iii) Press and Publicity questions affecting evaders and escapers.

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- (iv) Liaison with Military Attaches abroad, M.I.9 organisations abroad and Casualty Branches of all three Services, Dominion, Colonial and India offices.
- (v) Liaison with Finance Sections on questions of expenses and allowances of evaders and escapers and with Admiralty, Air Ministry, M.I.5 and other departments in regard to arrival in U.K. of evaders and escapers.
- (vi) Annotation and distribution of information obtained from M.I.9 sources regarding camp locations in Germany.
- (b) M.I.9(d). This sub-section was formed in January 1942 and consisted of eight officers, the R.A.F. element being four officers. Head of sub-section was a Squadron Leader. The work of this sub-section is detailed below. During the period 1940-41, instruction in Escape had been organised by M.I.9(b), and was given chiefly by travelling lecturers who visited operational units of the three Services in the U.K. and certain Army formations of B.E.F. Owing to the large number of personnel (principally R.A.F.) who found themselves cut off behind the enemy lines, it was decided to expand the teaching to include evasion of capture as well as escape. On the formation of the Deputy Directorate of Military Intelligence (P/W) in January 1942, and the consequent re-organisation of M.I.9, M.I.9(d) was formed with the specific duties of organising and co-ordinating the training in Evasion and Escape of combatant personnel of the R.N., Army and R.A.F. in the United Kingdom, and for the issue of "Escape" aids to units at home and M.I.9 organisations overseas.

16. Training Lectures. These were given to all officers, warrant officers and sergeants. The object of the lectures was to emphasise the undesirability of being captured; to give instruction in evasion of capture; to give instruction on conduct in the event of capture; to demonstrate certain "aids to escape" with which units were equipped by M.I.9 prior to going overseas. Officers and N.C.O's. were expected to pass on the subject matter of these lectures to the troops (while making no mention of the "aids to escape", as they were available for issue only to limited numbers) but stressing the necessity for secrecy. As it was desirable that a uniform lecture should be given to units, a general outline of the lecture and a draft specimen lecture for the guidance of officers concerned was circulated amongst units. The lecture took

the form of an informal secret talk, and it was recommended that the audience at each lecture should not exceed 200 persons. As conditions were constantly changing, modifications to the lecture needed continually to be made. These modifications were published in the form of the "M.I.9 Bulletin" which gave up-to-date information on the subject and was distributed to Headquarters of all Commands (including R.A.F.) and armies. A supply of aids for demonstration purposes was given to R.A.F. Commands for distribution to Stations. Special Top Secret lectures were also given to selected personnel.

17. Early Difficulties. During the early months of 1942 preventive training was carried out under a considerable handicap. Lecturers at this time were not available to cover the vast number of operational units in Great Britain. Units visited were scattered all over the country, including Northern Ireland. These purely instructional lectures were augmented whenever possible by talks given by returned evaders and escapers. Endeavours were made to obtain the full-time services of officers who had recently escaped from enemy hands to supplement the instructional staff, but this proved difficult owing to the shortage of manpower, and it was not until October 1942 that an Army officer who had made an outstanding escape from German hands was made available. Subsequently two Naval Officers who had made brilliant escapes from a German Prisoner of War Camp in the present war were obtained, to be followed by one Army officer who had escaped from Japanese hands after the fall of Hong Kong and an R.A.F. officer who had made his escape from Singapore after its capitulation.

18. R.A.F. Intelligence Course 'B'. This initial difficulty in obtaining a sufficient quantity of trained lecturers was appreciated at an early stage and in January 1942, on the suggestion of the Air Ministry, a special intelligence course was opened at R.A.F. Station "X", Harrow, which was administered by the Air Ministry, the training policy being controlled by M.I.9. This course dealt exclusively with matters relating to Evasion and Escape, and was originally formed for the purpose of training R.A.F. Station Intelligence Officers who, in turn, would brief operational and O.T.U. personnel on these subjects. Not long after its inception, it became R.A.F. Intelligence Course 'B', by which name it was known throughout its further existence. Later it was expanded to include Intelligence Officers of the Royal Navy and Army and Eventually Intelligence officers of the American forces, and moved to more suitable premises at Highgate.

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With the increased instructional staff and the number of officers available as a result of this course within Army and R.A.F. commands and Naval Establishments and ships, it was possible in October 1944 to dispense with the civilian lecturers (ex-officer escapers of 1914/18 war).

19. Development and Expansion of Training - Royal Air Force. As has already been stated, preventive training had been carried out prior to 1942 almost entirely by visiting lecturers from M.I.9(d). This method was continued but, owing to the limited number of lecturers available, it soon became obvious that only a limited number of aircrew could be covered. It was at this stage that R.A.F. Intelligence Course 'B' was formed, and in due course every operational R.A.F. station and O.T.U. in the United Kingdom possessed at least one Intelligence Officer qualified to instruct in M.I.9 subjects. This instruction was supplemented by lectures from officers on the staff of M.I.9(d) who visited Groups etc. as required, and by visits from recent evaders and escapers. By this means all aircrew were thoroughly briefed on evasion and escape before taking part in operations. Two other innovations were the circulation of Evasion and Escape Reports to O.T.U's. which helped I.O. lecturers to illustrate their talks with practical examples, and visit of 'B' Course and sundry evaders and escapers to M.I.9. The latter definitely produced dividends as I.O's. as well as evaders and escapers were able to discuss difficulties and exchange ideas with M.I.9(d) and the technical section of I.S.9.

20. Statistics. Statistics show that 1,450 preventive training lectures were given to 290,000 R.A.F. personnel by the staff of M.I.9(d) during the period 1st January, 1942, to 25th August, 1945. These figures are conservative and are exclusive of lectures given under local arrangements by officers who qualified at R.A.F. Intelligence Course 'B'.

21. Evasion and Escape Equipment. Evasion and Escape Equipment is described below under the headings of "Control and Specifications", "Issue" and "Blood Chits".

(a) Control and Specification. Except in the case of P/W Camps, the control of issue of Evasion and Escape Equipment, which was devised and produced by I.S.9(Z), was vested in M.I.9(d) and issued by I.S.9(Z). This equipment consisted of:

- (i) Purses. Containing normally about £12 in notes of the country or countries in which the recipient might find himself cut off, appropriate silk maps, a small compass and ^{fly}jack-kaw.

- (ii) Aids Boxes. Containing compressed food, chewing gum, Halazone, Benzadrine, Matches, Safety Razor, and Soap, needle and thread, Surgical Tape, Fishing line and hook, Water bottle and small compass. These Aids Boxes were designed to give the evader sufficient nourishment for 48 hours and so enable him to lie up or move from his original location without the necessity of obtaining food.
 - (iii) Supplementary Aids Boxes. These were designed to meet the needs of flying personnel forced down in Germany where no help could be expected from the inhabitants and were carried in addition to the Aids Boxes and provided sufficient nourishment for seven days.
 - (iv) Far East Aids Boxes. These were specially designed for tropical climates.
 - (v) Special Aids Boxes - Far East.
 - (vi) Silk Maps. For enclosure in Purses or Wallets or for issue separately; these maps were specially prepared for evasion and escape purposes and covered territories in European and Far Eastern theatres.
 - (vii) Compasses. Of various small types suitable for concealment.
 - (viii) Pencil clips, Pencils, Studs and Evasion gadgets.
- (b) Issue. Evasion and Escape equipment was issued to all operational and O.T.U. Groups etc. of the R.A.F. in the United Kingdom, for distribution to flying personnel on 100% scale. A continuous supply of M.I.9 equipment was maintained to "E" Group, S.E.A. and I. Commands, and consignments were forwarded as required to I.S.9(M.E.) I.S.9(C.M.F.), I.S.9(W.E.A.) and the M.I.9 organisation in Australia. Supplies were also sent to War Dept., Washington, prior to their own technical section getting into production.

(c) Blood Chits. To serve the dual purpose of (a) overcoming the language difficulty, so that an airman forced down in enemy occupied territory could explain himself to the natives and (b) to act as a pledge (or promise to pay) redeemable when the enemy was ejected from the country, "Blood Chits" were prepared in a number of languages by M.I.9(d) and issued in conjunction with evasion and escape equipment. Blood chits were not issued for Europe because of the ease with which they could be forged but phrase books in many European and Asiatic languages were compiled and issued.

22. Publications. Various publications were issued by M.I.9(d), the principal being:-

(a) "The M.I.9 Bulletin". This document was the 'Bible' of Evasion and contained everything that could be of assistance to service personnel who might find themselves cut off in enemy occupied territory, or captured by the enemy. It was devised as a text book and guide to Intelligence officers who were called upon to give instruction in evasion and escape. Information on conditions in Europe, escape routes, etc. were mainly collected and supplied by I.S.9, who also provided maps and other material. It will be appreciated that for efficient and up-to-date training close relations with the executive body, I.S.9, were vital as teaching was frequently changed radically as the underground organisations changed. To overcome the delay often caused by the insertion of frequent amendments "Advice Memos" were instituted. These contained the latest long term information available for ultimate inclusion in the 'Bulletin'. Short term or transitory information was set out under the title of "Mercury" on the day of receipt (phoned to H.Q. Bomber Command for communication to aircrew for current 24 hours' operations). The "Mercury" series was issued only to recipients to whom the information would be of immediate value. This series proved of considerable value during the campaign in Western Europe, for which it was originated.

(b) "The M.I.9 Bulletin, Far East". A similar publication to the "M.I.9 Bulletin" but dealing only with the Far East and largely devoted to survival in jungle, etc. Owing to the difficulty of obtaining
/material

material for this document it was unfortunately not available for issue until June 1945 when it was most favourably received by the three Services.

- (c) Specimen Lectures. These, with stories of actual escapes, were issued for the guidance of Intelligence Officers.
- (d) Pamphlets. Various pamphlets directly or indirectly associated with evasion in the Far East were published by M.I.9(d), the principal being Far Eastern Survival, Land and Sea, for which there was a large demand, and the Malay language. These pamphlets were printed on silk.

23. Security. Although security instruction was not a part of the M.I.9 charter, P/W security was so closely linked up with the teaching of M.I.9 that the closest liaison had to be maintained with the Security Branches of the three Services. For instance, when it became apparent that a continuation of the rule of "Name, Rank and Number only" would probably have repercussions inimical to the interests and safety of British and Dominion prisoners in Japanese hands, it was largely through the efforts of M.I.9 that the rule was modified. After agreement had been reached the pamphlet "Precautions to be taken by British personnel in the event of capture 1942" was re-written for the Far East.

24. Statistics. A "break-down" of the total figures for Evaders and Escapers by area and nationality is held at Air Ministry. It will be seen that the total of British Commonwealth escapers is 21,533 and of British Commonwealth evaders is 4,657 making a grand total of 26,190. Of these 4,916 were interned in Switzerland, but the rest were available for further service. It can be fairly claimed that of these 90% of evaders and 33% of escapers were brought out as a result of M.I.9 organisation and activities.

I.S.9 Organisation

25. No. 9 Intelligence School, which was formed in January 1942, was added to as the work expanded and progressed. I.S.9(U.K.) was composed of an I.O.

Lieut.Col. and Sections fulfilling the following roles:-

- (a) Planning of Evasion and Escape and general co-ordination of I.S.9 work.
- (b) Clandestine work in enemy-occupied territory in Western Europe (in close collaboration with S.I.S.), training and dropping of agents in this area and maintenance of communication therewith.

- (c) Interrogation of Evaders and Escapers.
- (d) Obtaining intelligence, despatching escape equipment and maintaining morale.
- (e) Production of evasion and "escape" aids such as purses, aids boxes, maps, compasses, hacksaws, etc., and despatch to P/W Camps by secret means.
- (f) The establishment and control of Awards Bureaux in Western Europe (Paris, Brussels, The Hague and Copenhagen).

26. Below are set out the duties performed by each Section and Appendix "H" shows how the School finally became organised:-

- (a) I.S.9(W). Interrogation of evaders, escapers and repatriated service personnel; preparation of all reports and appendices; internal distribution of reports and correspondence.
- (b) I.S.9(X). Evasion and Escape planning; location of P/W Camps; collection of material for M.I.9 Bulletin; selection, recording and co-ordination of despatch of escape material to P/W Camps; preparation of evasion and escape maps.
- (c) I.S.9(Y). Liaison with outside secret departments with regard to special cases; correspondence with P/W Camps; passing to M.I.9 of intelligence received; maintenance of Camp records, names of attempted escapers, helpers, etc; dealing with Censorship slips; dealing with Special Questionnaires from Reception Camps; interviewing "Special" repatriated P/W's; preparation of Historical Record of each P/W Camp (except R.A.F. Camps which were compiled by senior R.A.F. Interrogation Officer, I.S.9(W)).
- (d) I.S.9(Z). Experimental work; production of escape and evasion equipment; preparation of P/W parcels. Distribution of gadgets and special clothing for I.S.9(D)/P15 agents, etc; weekly and monthly stock sheets. Despatch of supplies to all theatres on M.I.9 indents; records, indents, despatch notes, packing, etc.
- (e) I.S.9(D) - (P.15). Employment and training (under auspices of S.I.S.) of agents sent to enemy occupied countries of Western Europe to assist escapers and evaders to return to U.K; preparation of plans for evacuation of escapers and evaders from France, Belgium and Holland; communication with I.S.9 agents in these countries.

(f) I.S.9(A.B.). Interviewing helpers of British and American evaders and escapers in France, Belgium, Holland and Denmark; investigating and settling financial claims; making recommendations for awards to helpers. (This work was carried out in close conjunction with the Americans and the Intelligence Services of the countries concerned.)

I.S.9(W)

27. Formation. Like other sections of I.S.9, I.S.9(W) originated in M.I.9(b), but whilst the other Sections were separated from M.I.9 on the formation of I.S.9 in January 1942, the work of this Section continued in M.I.9(b) until March 1943 when, under a new War Establishment, it was brought into the School. The first interrogations of evaders and escapers were carried out, therefore, by M.I.9(b) and, on the changeover to I.S.9(W), no material change in the system of interrogation and of reports was involved.

An organisation chart is at Appendix "C".

28. Location. Although it was essential for the reports to be recorded and distributed from H.Q., it was found to be necessary for actual interrogations to take place in London. I.S.9 were extremely fortunate in obtaining the sympathy and interest of the London District Assembly Centre, who put rooms at their disposal for interrogation purposes. This purely unofficial arrangement continued to the winter of 1944. During the latter months of the war, with Army and Navy personnel being interrogated at Reception Camps outside London, and the R.A.F. at Finchley and 6 P.D.C. (ex P/W's. filled in questionnaires at latter place), it became an exceedingly difficult task for I.S.9(W) to cope with the work, but the necessary arrangements were made for all the returning escapers and evaders to be interviewed, wherever they happened to be sent; this entailed the employment of additional personnel (mainly R.A.F. and W.A.A.F.).

29. Interrogation. The aims of the interrogations carried out by I.S.9(W) were:-

- (a) To obtain information for M.I. lectures and the M.I.9 bulletin.
- (b) To obtain information which might be of use to I.S.9(X) in their planning of escapes.
- (c) To supply M.I.9 with information whereby they could make recommendations for awards to escapers and helpers, settle claims for expenses incurred and pay compensations, etc.
- (d) To help I.S.9(D)/P.15 to keep in touch with the progress of organisations (M.I.9) on the Continent.

- (e) To obtain and make available to the three services and other Government departments intelligence on conditions in enemy and enemy-occupied countries and on military and other specialist subjects.
- (f) To keep M.I.5 informed of matters of security interest affecting prisoners of war and evaders and to enable them to interrogate personnel whose cases were regarded as doubtful from the security point of view.

30. How intelligence is obtained. Intelligence for outside sections was obtained partly at I.S.9(W) interrogations, interrogators being briefed on subjects for which a watch had to be kept, and partly by arranging for the outside branch concerned to make its own interrogation. This latter system worked satisfactorily once escapers and evaders had become less of a rarity and there was less temptation for outside branches to pass them on to other departments, more in order to hear their stories than to obtain information from them. Such interviews were held at L.D.A.C., so as to lessen the strain on the man being interrogated. Close liaison was kept with M.I.5 during the whole of the war so that the security of escapers and evaders could be considered. Intelligence representatives from Bomber, Fighter and Transport Commands and O.R.'s. representatives from these Commands also attended at L.D.A.C. (and later at Finchley and No. 6 P.D.C.) in order to obtain air operations and technical information from all escapers and evaders.

31. Methods. At first interrogation was done largely by giving the evaders or escapers - other than those of obvious importance - a copy of questionnaire, a sheet of paper and a pencil and asking him to write his answers. This system worked tolerably well in the case of those who had escaped from the column of march or evaded capture in Belgium and France immediately after Dunkirk; indeed, considering that the original interrogation office had no regular trained help, it was probably the only possible system. But as soon as the need was felt for reports which would give a picture of an escape or evasion from which lessons for teaching could be drawn, the limitations of this method were evident. This system showed that personnel would not necessarily record those things they had done which others might with profit imitate or avoid. It was found from experience that to get a man to write his "own" story produced results of limited usefulness and, that to obtain satisfactory results there was no substitute for real interrogation. This method, which had the added advantage of making every

officer and man feel that the value of his performance in evasion or escape was fully appreciated, was therefore adopted and strictly adhered to. Where the numbers to be interrogated were large (e.g. influx of P/W at end of war) and time was short, it was sometimes found expedient to issue personnel with questionnaires and ask them to fill in their personal details and answer as many of the other questions that they could. This helped the interrogator to the extent of cutting out routine questions and of having the man already thinking along the lines of the subsequent interrogation; but it was never regarded as a substitute for interrogation.

32. Personnel

(a) Officers. Interrogation began in M.I.9(b) under one male officer (Army). This continued till January 1943, when a second male officer was employed. An A.T.S. officer had been taken on for secretarial work in 1942, but was not tried out as an interrogator until the spring of 1943. This A.T.S. officer proved, however, that the right type of woman makes a good interrogator. In 1944, a W.A.A.F. officer was attached to the Section who, besides being responsible for the whole of the office routine, carried out occasional interrogations very efficiently. In the same year a R.A.F. officer - an escaper from Germany - was added to the Section and later he became head of the newly formed R.A.F. Interrogation Section (mostly manned by W.A.A.F.) which proved of great value especially as some aircrew (especially senior officers) liked to be interrogated by their own service. This officer, after the war, compiled the histories of the R.A.F. P/W camps. From September 1944, when the full results of the invasion of France and Belgium became apparent, additional assistance was provided from I.S.9 Sections and from M.I.9 (including a number of R.A.F. and W.A.A.F. Officers). Canada was represented by the part-time employment of two R.C.A.F. officers, whilst from time to time various R.A.F. and Dominion officers were with the Section temporarily. At earlier stages, American officers and officers of I.S.9(W.E.A.) (including R.A.F. officers) attended I.S.9(W) interrogations, and their own reports subsequently became adaptations of the I.S.9(W) style.

(b) Other Ranks. Other ranks were not used as interrogators. Shortage of clerical staff was a great handicap when the work was under M.I.9(b), but the position improved greatly under I.S.9. In I.S.9

clerks were pooled and a number were trained to take escape and evasion reports to dictation.

33. Reports. Reports of interrogations of evaders and escapers were produced as M.I.9/S/PG (Secret, Prisoners, Germany) reports. Although, as time went on, interrogation of evaders and escapers from other countries besides Germany were carried out, the S/PG designation, which meant nothing to anyone outside the organisation, was kept for all reports of this nature. Later, when repatriated P/W's. returned and were interrogated, other designations were given. These were as follows:-

- I.S.9/W.E.A. - For ex-P/W liberated by the Allies.
- U.D.F./PW/Int./U.K. - For South African escapers.
- I.S.9/Rep. - For escapers from Germany via M.E. and Balkans.
- PW/Ex/Switz. - For Italy - Switzerland escapers.
- S/P.G./Lib. - For liberated P/W's. from Germany.
- C.S.D.I.C./CMP/SKP } - For escapers from Italy to the Allied lines.
- C.S.D.I.C./ME/SKP } -
- S/PG/MIS/Int. - Miscellaneous intelligence information
obtained from liberated P/W's. from Germany.

The above designations have little significance and are primarily a matter of internal convenience in keeping separate the various types of reports prepared.

The reports, where applicable, were divided into:

- (a) The main report (originally MOST and TOP SECRET and later SECRET). This contained information on an escape or evasion up to the point where the evader or escape came into the hands of an organisation. No names of persons were mentioned, or any descriptions given which might have identified helpers. The main reports had a fairly wide distribution (including Air Ministry, R.A.F. Commands and Bomber Groups).
- (b) Appendix "A" (Top Secret). This contained names and addresses of helpers, nature of help given, and relevant dates. This information was intended to help I.S.9(D) - (P/15) and, eventually, the Sections charged with tracing and rewarding of helpers (I.S.9(AB)). "Black List" foreigners were also included in this appendix. It had a very limited circulation.
- (c) Appendix "B" (Top Secret, later Secret). Military Information Distributed to Service Departments (including Air Ministry and R.A.F. Commands) and other interested.

- (d) Appendix "C" (Top Secret). This continued the narrative from the point where the evader or escaper came under an organisation. Names and addresses of helpers and their descriptions (where necessary) were included. This to a certain extent overlapped with Appendix "A". The distinction between the two appendices was so slight that they might have been merged into one.
- (e) Appendix "D" (Top Secret, later Secret). Details as to the use or otherwise of the aids box, purse and other escape aids. Distributed to R.A.F. Command concerned.
- (f) Questionnaires. Copies of questionnaires for interrogators and copies of questionnaires which repatriated P/W's. were asked to fill up are kept at M.I.9 records.
- (g) Distribution. This was carried out by M.I.9.

34. Welfare. If interrogation is to be carried out efficiently, a certain amount of welfare work is necessary, especially for those officers and men who have been out of touch with their homes for a long time. In the early days, it was seldom necessary to retain an evader or escaper at L.D.A.C. for more than one night, and no special provision was made for accommodation or welfare. Later, as the number of subsequent interviews became greater, it was necessary to retain them for several days, often for a week or even longer. The accommodation and welfare of officers presented no problem, but after a time an effort was made to improve the accommodation of other ranks. The Air Ministry furnished a dormitory and provided an R.A.F. orderly, who also left the interrogating rooms and rest room and conducted men to outside interviews. Wherever possible, officers and other ranks were allowed to live with relations and friends in London. 'Delousing' was carried out at Interrogation Centres. On the Continent, the policy of establishing clothing and medical stores with the interrogation teams for the influx of evaders and ex P/W's. proved a great success and was in fact in marked contrast to the lack of these facilities in the American Zone.

35. Administration. This presented no special problem till the autumn of 1944. R.N. personnel and R.A.F. personnel were sent for documentation to the Admiralty and Air Ministry (A.I.1(a)P/W) respectively. Army personnel were documented and sent on leave by the Commandant, L.D.A.C. who, in 1944, provided an officer for this work. In the autumn of 1944, with the arrival of large numbers of evaders and escapers from France, the problem of administering R.A.F.

personnel became acute. The Air Ministry finally provided an officer and two orderlies for administration at L.D.A.C. (until they moved to Finchley and thence to No. 6 P.D.C.).

36. Training of Interrogators. It was found that a satisfactory method of training interrogators was to have them work for a period on office routine before beginning interrogations. Reserve interrogators for use in rush periods were trained amongst officers of M.I.9 and I.S.9. It is essential to have such reserves.

37. Suggestions and Notes - Interrogations. The following are suggestions and notes which have been based on the working of I.S.9(W) during the 1939/45 war:-

- (a) Interrogators should be selected and trained before they are actually required. Part of their training should be their employment on other "M.I.9" work in order to get the background of what is required from interrogation. R.A.F. interrogators should be composed of Intelligence Officers and evaders and W.A.A.F. officers. R.A.F. personnel should, if possible, be interrogated by their own service. One of the interrogation staff should be earmarked to compile the histories of R.A.F. P/W Camps. Clerical staff should be S/T so that they can take evasion and escape reports to dictation.
- (b) The selected interrogators should study the questionnaires and the scope of their interrogations in advance.
- (c) Additional officers should be trained so as to form a reserve for emergencies.
- (d) It is preferable that the officer in charge of the Interrogation Section should himself be an experienced interrogator, to whom difficult cases can be referred. Once interrogation work becomes heavy, the officer in charge of the section should concentrate on the organising of the work, i.e. the allocation of interrogators, the arranging of outside interviews and the editing of reports.
- (e) To obtain maximum results, interrogation of all Services should be centralised and carried out under one roof (Army and Navy personnel will have information of value to R.A.F.). Air operations, technical and M.I.5 interrogation should be carried out in the same building as Evasion and Escape interrogation. Arrangements for accommodation and welfare should be made as complete as possible from the start, in consultation

with all the branches concerned in the three services. 'Delousing' should be carried out at Interrogation Centre. In Theatres of War, clothing and medical stores must be in close proximity to the interrogation teams for the influx of evaders and escapers. Evaders and escapers should be processed as quickly as possible in order to enable them to be sent on leave. Adequate transport is essential for interrogation staff.

(f) Suitable office accommodation is a pre-requisite to interrogation. A large and comfortable waiting room, hot drinks etc. (on the lines of Bomber interrogation rooms) is essential. Dormitory is required with orderlies for maintenance and conducting men to outside interviews.

(g) Escapers sometimes think they are under examination to elicit reasons for their capture; in fact M.I.9 is interested only in their escape and a friendly non-inquisitional approach must be insisted upon.

I.S.9(X)

38. Formation. I.S.9(X) was established in January 1942 as the Planning Section of I.S.9, which had just been formed.

39. Personnel. It was under an Army officer who had been working in M.I.9 almost since it was formed, with four officers (Naval, Army, R.A.F. and A.T.S.) under him. Owing to the smallness of the M.I.9 staff during the first two years of its existence, there had been little or no time or thought devoted to the planning of escapes from P/W camps or of collecting information likely to be useful to Allied personnel trying to evade capture in enemy occupied territory. I.S.9(X), therefore, started practically from scratch. An organisation chart is at Appendix "D".

40. Work. The Section began by collecting information of value to escapers and passing it on to I.S.9(Y) or I.S.9(Z), for transmission to Camps, and by selecting escape material for I.S.9(Z) to send out. As regards evasion, the work consisted in collecting information and passing it on to M.I.9(d) for inclusion in the M.I.9 Bulletin for issue to operational units. The first part of 1942 was mainly spent in preparatory work.

41. Collection of Material. Information of possible value to escapers soon started to come in. The most reliable source was from successful escapers themselves who were most carefully interrogated in detail on their arrival in this country by M.I.9(b) and later by I.S.9(W). Valuable information about the Swiss frontier was obtained in this way early in 1942. Maps of the frontier

crossed were made on a scale of 1:000,000. They included many landmarks which subsequently proved useful to other escapers. These maps and further detailed information were sent out to the Camps. In June 1942, information was received from a successful escapers of a route to Sweden via Danzig. Maps were again made and detailed information forwarded to contacts in the Camp by I.S.9(Y) and (Z). On the return of P/W's. after the liberation, Escape Committees of various R.A.F. camps made constructive criticisms which have been embodied in the R.A.F. Histories of P/W Camps. One Escape Committee was of the opinion that the scale of general maps of Germany was much too small. This committee felt that a great deal more escape intelligence should have been supplied by I.S.9 especially about contacts in occupied countries, routes, frontiers, ports and shipping. Detailed and up-to-date information about neutral shipping in Northern ports would have been invaluable and it would have been most useful to know how to recognise neutral ships, what their signals meant, which ships' masters were pro-British, where their haunts were on shore, which were the safest hiding places on ships, etc. Information about the ferry services between German ports and Denmark and Sweden and pass regulations of foreign helpers would have helped. Several camps felt that more direction in matters of policy and on escape intelligence should have been given by I.S.9. All R.A.F. Escape Committees visited by M.I.9 and discussed these points in detail. Maps, escape routes and plans prepared by I.S.9(X) are held at M.I.9 Records.

42. Combined Operations. During the summer and autumn of 1942 one of the duties of I.S.9(X) was special briefing for Combined operations. These operations concerned France and Norway. With regard to the latter country, it was soon evident that S.O.E. having a number of Norwegians and British officers who knew Norway well to draw upon, were in the best position to advise on evasion. It was, therefore, decided that it was much simpler for C.O.H.Q. to consult S.O.E. direct on all questions of topography and conditions in Norway, while I.S.9(X) gave advice upon wearing civilian clothes and the position of evaders arriving in a neutral country. I.S.9(X) also supplied cover stories. I.S.9(X) had a notable success at the end of the year. Plans were required for the evasion of a party detailed for an operation near Bordeaux. I.S.9(X) briefed the party before their departure with the result that some of them made contact with one of the organisations (M.I.9) in the area and were immediately conveyed by them over the Pyrenees to Spain and thence to Gibraltar.

43. New Developments. In the autumn of 1942 the Section started on new developments. It had become evident that, in two important respects, improvements could be made. The maps being issued in purses to aircrew for evasion purposes were on too small a scale and the periodical M.I.9 Bulletins were becoming unwieldy with numerous references back to previous issues. Unfortunately a very large sum of money had been expended on maps during the course of the year and there was need for retrenchment at this time, but the need for new and better maps was persisted in and gradually a series, which gained the approval of all those who used them, was produced. I.S.9(X) was responsible for the supply of a great deal of the data for the M.I.9 Bulletin. Practically all the 'country' chapters with the exception of the Far East, were supplied by I.S.9(X). These chapters were brought up to date by amendments issued by M.I.9 about once a month. With the assistance of S.O.E. a great variety of papers such as identity cards and travel permits, were forged and sent out to P/W Camps through I.S.9(Z) channels (a lot of material was also produced by P/W's. themselves). These were despatched in the autumn of 1942. Experience proved that papers of a temporary nature were of more use than the permanent type of pass with which all enemy officials would be familiar and which were apt to get out of date (samples are held at M.I.9 Records). During the course of 1942 the very large development in secret communications with Camps through I.S.9(Y) enabled escape messages to be distributed widely and escape equipment to be sent to an increasingly large number of Camps. At Christmas 1942 the first bulk parcel containing nothing but unconcealed escape material was successfully received in a P/W Camp (Oflag IVC). I.S.9(X) had been notified by a successful escaper from the Camp that, if I.S.9(X) sent a parcel with a specially marked label, described in advance in a code letter, contacts would be able to break into the storeroom and abstract it. Everything worked according to plan and I.S.9(X) immediately suggested to other Camps that they should adopt a similar method. Eventually 70% of the Camps were receiving escape material by this means.

44. Changes in Policy. In August 1943, it was decided that there should be a big speed up, especially in the amount of material despatched to Camps. By the end of the year very large quantities began to arrive, including a few cameras, typewriters, wireless sets, civilian clothes and German uniforms.

45. Lancashire Penny Fund. A scheme, by which money and maps, hidden in Christmas crackers and sent by an imaginary "Lancashire Penny Fund" direct to the German Camp Commandants, was successful in a large number of camps. A letter with the crackers requested the Camp Commandant in each case to pass them to the S.B.O. or Camp Leader to help brighten their Christmas Party. 50% of these got through.

46. Hogmanay Scheme. In the month of October 1943 sticks of shaving soap were sent in toilet parcels to eight P/W Camps, mostly working camps, with which I.S.9(X) had previously no contact. The soap contained maps, a compass, money and a message giving an address to which to write for further aids. This scheme achieved success in four out of the eight camps.

47. Further Changes. At the beginning of 1944, owing to the formation of I.S.9 (W.E.A.) under Shaef, there was a re-shuffle of personnel. The policy of sending large quantities of escape aids was now beginning to bear fruit; also, through the development by I.S.9(Y) of W/T communications with Camps, it was possible to supply them with up-to-date information about escape routes etc.

48. Mass Escape from Stalag Luft III. A mass escape from Stalag Luft III in March 1944 was a tragic climax to the history of escape in Germany. There had been mass escapes before, but since the spring of 1943 when the Germans adopted special measures for dealing with such outbreaks, most of the escapers had been recaptured. The Escape Committee at Stalag Luft III knew, therefore, that a mass break had less chance of success but, on the other hand, the tunnel had taken a year to build, which seemed a disproportionate effort if only seven or eight were to profit by it. The result of this mass escape is well known. Of the 74 who actually got out of the tunnel, only three reached England. The rest were caught by the Gestapo and S.S. Troops and 50 of them murdered. The rest were sent back to Stalag Luft III and reported to the Escape Committee exactly what had occurred. They stated that every-one had strictly complied with the Geneva Convention and had given themselves up immediately they had been challenged, thereby carrying out the instructions laid down for all escapers. After this example of German ruthlessness, P/W were discouraged from escaping in view of their ultimate certain liberation in the near future.

49. Escape Routes. But in spite of this tragedy there were several successful escapes during the Summer of 1944, mostly via Baltic ports and with the help of French workers. The main escape route during 1944 was via one of the Baltic /ports.

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ports. Stettin was the best, owing to the existence of a brothel, frequented by Swedish seamen, and of two or three camps of French dockers. On the whole the Swedes helped in spite of German threats, although there was one case in which a Swedish captain turned his ship round in order to hand over two R.A.F. stowaways to the Germans. In the Autumn of 1944 it was decided by J.I.C. that, in view of the approaching end of the war and adoption of severe measures by the enemy, such as at Stalag Luft III, escaping should cease. Instructions to this effect were, therefore, sent to all Camps.

50. The Last Phase. During the last few months of the war in Europe, the main attention of I.S.9(X) was turned to the safeguarding of our prisoners of war when the collapse came. I.S.9(X) kept in the closest touch with D.P.W. and Shaef with the result that the protection and rescue of our P/W's. were given a high priority in the operations. On the orders of D.P.W. all Camps were instructed by I.S.9 to "Stay Put", organise themselves and await orders. When the allied armies began their final sweep, the Germans began to move some of our prisoners of war away from the advancing armies, but in many cases they had managed to take their wireless sets with them and were able, therefore, to know where the Allies were. In one case, our P/W's. actually transmitted a message giving their exact location.

51. The Final Liberation. Owing to the rapidity of the advance of the Allied Armies and the complete disorganisation of the German military machine, our P/W's. were rescued far more easily than had been anticipated.

52. Conclusions. The following conclusions are recorded:-

(a) Although I.S.9(X) was not altogether unsuccessful, it took a long time to find its feet. This was mainly due to the lack of staff in the early days of M.I.9. As a consequence, contacts with other secret departments, such as S.O.E., which latterly proved so useful, were not made early enough.

(b) Owing to the time lag in the transmission of messages it was clear that plans for escapes had to be made in the camps themselves and the only useful contribution from I.S.9(X) was confined to the provision of maps, escape equipment and information concerning conditions in Germany, frontiers and ports. The information set out was obtained from returning evaders and escapers and, in a lesser degree, from other secret departments.

- (c) With the developments of W/T communications with Camps it might have been possible to plan rescues by aircraft. Several schemes were, in fact, prepared by Escape Committees in Camps and referred by I.S.9(X) (thro' A.L.O., M.I.9) to Air Ministry, but they were all turned down after very careful consideration because of undue risk to aircraft.
- (d) It was unfortunate that lack of staff prevented I.S.9(X) from interviewing more Allied evaders and escapers who passed through the Royal Victoria Patriotic School. Only about 50 were seen between the inauguration of I.S.9 in January 1942 and VE-day. Reports of possible interest were sent to I.S.9(X), but this was not the same as seeing the individuals personally. Under similar future circumstances it would be beneficial to have an M.I.9 interrogator permanently on the spot.
- (e) The policy adopted in the summer of 1943, of sending out escape material in large quantities paid handsome dividends. Although some was discovered and confiscated by the Germans a great amount got through undetected. It must, however, be stressed that such a policy should not be attempted unless there is a 99% chance of success.
- (f) It was never possible to obtain from S.I.S. contacts or addresses in Germany for the use of escapers. I.S.9(X) obtained one or two useful addresses from other sources but, in general, did not favour sending out actual names of possible helpers as it might endanger the safety of escapers. I.S.9(X) did, however, send out the address of the brothel at Stettin, which was particularly helpful. This, incidentally, came from one of the few Allied escapers interviewed at the Royal Victoria Patriotic School. It was used by quite a large number of escapers before it was literally blown up by the R.A.F. in the summer of 1944. It was a particularly favourite rendezvous because it was reserved for foreigners, Germans not being permitted to use it.
- (g) The later innovation of visits of escapers to I.S.9(X) was of value as they were able to give later information on Town Plans etc.
- (h) As a result of criticisms by Escape Committees of various R.A.F. P/W Camps regarding the question of more direction on matters of policy and on escape intelligence, the various R.A.F. Escape Committees visited I.S.9 and discussed all these points, so that the lessons learnt and experience gained during the 1939/45 war should not be lost sight of in the event of another war.

53. Results in Italy. I.S.9(X) section of this memorandum has been primarily confined to Germany because there was very little escaping in Italy. All possible was done to get in touch with Camps, and some success was obtained, but never to the same extent as in the case of Germany. This was due to three main causes:-

- (a) The inefficiency of the Italian administration handicapped our communications to such an extent that messages and escape equipment often took more than a year to reach the P/W Camps. In addition, much of the mail was destroyed or lost by the Italian censors, probably through laziness on their part.
- (b) P/W's. were guarded with much greater care than those in Germany.
- (c) The Italian collapse came just as I.S.9 was getting into its full stride. The best escape was made by British Senior Officers from their camp at Florence. They dug a tunnel under the direction of the S.B.O. and six officers (including an A.V.M.) made their escape. Two, who reached Switzerland safely, stated that the escape material, particularly the maps sent out by I.S.9(X) had been of great value.

54. Suggestions and Notes - Planning. The following are suggestions and notes which have been based on the working of I.S.9(X) during the 1939/45 war:-

- (a) That an adequate staff for planning escapes and obtaining information likely to help evaders and escapers is authorised at the outset. A proportion of the planning staff should be evaders and escapers. W.A.A.F. officers, if possible S/T, should form part of the staff.
- (b) That immediate and close co-operation be sought with other secret departments, so that information from such sources can be applied to the best advantage of evaders and escapers.
- (c) That it does not pay to be too timid. So long as lives of P/W's. are not jeopardised, a bold policy in conception and execution should be encouraged and adopted. It is essential, however, that, before adopting such a policy a 99% chance of success should exist and that those at the other end (P/W) should know what to expect and play their part.
- (d) That the control of all planning should be centralised.
- (e) That escapers should not be considered as the only sound authority on plans for evasion and escape.
- (f) That the sections on intelligence, especially in regard to more specific direction in matters of policy, and escape be carefully studied.

(g) Experience showed that Escape Committees in W.O's. and N.C.O's. camps had no official standing and had no means at their disposal for issuing orders, or enforcing their wishes. This inability to direct other P/W's. was the greatest difficulty with which the Committees had to contend. Despite difficulties some progress was made and details are given in Stalag Luft III History. If a future occasion should arise, it is suggested that the Escape Committees concerned should send a message to Air Ministry stating names of Escape Committee. Air Ministry could then give their approval of names with instructions that all escape activities be controlled by them (actually done in one instance during the war).

I.S.9(Y)

55. Formation. I.S.9(Y) was established in January 1942 as the Communications Section of I.S.9, which had just been formed. It was previously part of M.I.9(b) and had been responsible for the collection and dissemination of military and economic intelligence received by secret means from our prisoners of war and for supplying them with information likely to be of help in making escape plans. It had been firmly established as part of M.I.9(b) before being transferred to the School as I.S.9(Y). The collection of information from P/W Camps through secret means was the main "raison d'etre" of the original M.I.9(b). If this could not be accomplished, nothing could be achieved. With the agreement of the Admiralty and the Air Ministry, it was decided that the scheme should be run on Inter-Service lines under the direction and control of the War Office. The services of escapers and prisoners of war of the last war were enlisted and from them general ideas were obtained as to how to set about the job.

An organisation chart is at Appendix "E".

56. Situation when France Collapsed. An officer had been sent out to the British Expeditionary Force in France to contact I.O's. and explain what M.I.9 was trying to do, but the "phoney war" ended before very much could be done in that direction and, when France collapsed in June 1940 there were no specially trained Army personnel registered with M.I.9(b). Actually at this time, there were only three specially briefed prisoners of war - two R.A.F. and one R.N. - and no communication had been received from them. The British Army prisoners, taken by the Germans after France succumbed, numbered more than 50,000 and M.I.9(b) were in the unenviable position of having no secret means of communication arranged with any of them. Added to this was the fact that no prisoner of

war mail started to come through, except in very small quantities, for nearly six months.

57. First Contact. In December 1940, M.I.9(b) received their first special letter from an R.A.F. prisoner of war which established secret means of communication with Stalag Luft III.

58. Getting in Touch. After the collapse of France about 95% of our prisoners of war in German hands were Army personnel. It was essential, therefore, for M.I.9(b) to get in touch with them somehow. The means adopted to make contact were as follows:-

(a) Censorship were asked to send to M.I.9 for examination any letters received from P/W's. suspected of secondary meaning or of containing a private means of communication. They were asked also to send to M.I.9 other types of letters - those giving information about conditions in camps, about morale, treatment, location etc. so that M.I.9 could obtain a general picture. M.I.9(b) examined these letters carefully and got in touch with the addressees in likely cases. Whenever a prisoner of war's mail was utilised in this way, M.I.9(b) instructed Censorship to place his name on the M.I.9 Watch List, which was supplied to their sorters, whose duty it was to pick out all letters coming from those on the List and to send them to M.I.9 for examination. M.I.9(b) kept these letters for 24 hours only and then returned them to Censorship for forwarding to the addressees. In the case of letter from M.I.9(b) to prisoners of war, by arrangement with the G.P.O. M.I.9(b) had the correct place and date stamp franked on each envelope. The letters were then sent to Censorship who slit the envelopes in the same way as they slit all letters going to prisoners of war, stuck on the "passed by censor" labels and mixed them with the thousands of other letters being despatched. It was essential that these details should be strictly carried out, so that the letters, when reaching the German censors, were no different from the thousands of genuine ones. In this way M.I.9(b) managed to obtain contact with three Oflags in the early months of 1941.

(b) In February 1941, M.I.9(b) were notified that an officer who had received special training had arrived in the camp. Although M.I.9(b) had no registration of the officer, they obtained his back letters from his wife. Under General Fortune's orders this officer had taught other officers, the names of whom M.I.9(b) obtained from his back letters.

They covered all the Oflags and, when M.I.9(b) had been through the back letters of the officers taught, M.I.9(b) discovered that they in turn had taught others as well. The snowball was now assuming large proportions, and M.I.9(b) set about getting our contacts to organise Escape Committees in the Camps, which they did with alacrity and enthusiasm.

(c) The case of the Stalags was different. M.I.9(b) had failed to trace any specially trained Other Ranks P/W's. M.I.9(b) suggested, therefore, to the Oflags that they should approach suitable padres and doctors and specially train them with the idea that they should volunteer for service in the Stalags. This suggestion was carried out and both padres and doctors did excellent work in picking out the most reliable O.R's. in the Stalags, training them, notifying M.I.9 their names, etc. and getting Escape Committees organised.

(d) A New Establishment. During the summer of 1941, work grew to such an extent that it was obvious a special Section had to be found to deal with it. I.S.9 was, therefore, formed in January 1942, with I.S.9(Y) as one of its Sections. Head of Section was a Major and most of the personnel were female officers. An R.A.F. sub-section manned by two or three W.A.A.F's. dealing with R.A.F. Camps was later formed. This sub-section especially proved its value when liberated P/W's. visited I.S.9 and they were able to deal with many points of especial interest to the R.A.F.

(e) Progress. The work during 1942 steadily increased, I.S.9(Y) got in touch with all the main Oflags and Stalags and, in some cases, with working detachments separated from their base camps. Many camps (including R.A.F.) were splendidly organised with Escape Committees operating smoothly and efficiently. I.S.9(Y) were greatly encouraged by messages of appreciated of their efforts which they received from many of the camps, also by what escapers told them of the value of the work to those interned. Morale was kept on a very high level as a result. In the spring of 1942, I.S.9(Y) suffered a shock. Messages were being received from two of the Camps stating that they were receiving messages and parcels from Sweden which were so blatant that the whole of I.S.9(Y)'s Secret means of communication was being compromised. The previous year I.S.9(Y) had had a visit from the Military Attache, Stockholm, and had discussed with him the possibility of getting escape material sent out from Sweden, since

parcels seemed to arrive much more quickly from that country than from England. The M.A. in his enthusiasm had, unknown to I.S.9, endeavoured to get in touch with certain of his friends who were P/W's. and had tried to conceal, in fruit sent out in parcels, the method by which he proposed to communicate with them. Most unfortunately he had adopted a system similar to that used by I.S.9(Y). The messages were discovered by the Germans and, in consequence, the official method was in grave danger of being compromised. I.S.9(Y) were compelled to discontinue this particular method for a period of five months until they and their contacts were satisfied that the Germans had not discovered it.

(f) News Letters.

- (i) The writing of news letters to P/W's. was started by M.I.9(b) at the end of 1940, before they were in touch with Camps by secret means. These letters were written in an endeavour to counteract German propaganda which had, at that time, reduced morale to a very low level. They were written sometimes in secondary meaning, sometimes in clear, from fictitious people, in the hope that some would slip through the German Censors and be read in the Camps. I.S.9(Y) mentioned such things as the result of the Battle of Britain, the wonderful morale at home and our belief in ultimate victory. I.S.9(Y) felt that no letter was wasted; even those condemned had first to be read by a German. Many of these letters got through successfully and, in consequence, they continued them for a very long time.
- (ii) News letters from I.S.9(Y) were also made use of by other departments (e.g. Political Intelligence Department of Foreign Office) who gave I.S.9(Y) rumours and stories to include in them in order to deceive the enemy. I.S.9(Y) were able to get these letters to the authorities in Berlin when required by instructing our censors here to delete a few words or sentences before despatching them. I.S.9(Y) had been informed that any letters showing a deletion by our censors were not dealt with at the Camp, but were immediately forwarded to the authorities in Berlin.
- (iii) In 1941, M.I.9 discovered that the morale of Indian P/W's. was extremely low, mainly because the mails from India were not reaching Germany and the P/W's. felt that they were forgotten by

the Mother Country. I.S.9(Y) contacted a lady keenly interested in the welfare of Indian P/W's. who undertook to get a number of people to write regularly to these prisoners, provided I.S.9 organised the work and made themselves responsible for the letters written. I.S.9 consulted the Indian Office and from time to time received from them directives as to the line to be taken by these correspondents when writing about political matters concerning India. These directives were circulated by I.S.9(Y) to the 150 correspondents who had undertaken this work. Most of the letters (about 1,000 a month) seemed to have been received safely. I.S.9(Y) have no means of knowing how much these letters affected morale, but they do know that it improved enormously soon after these letters were started as a regular service and the Germans themselves remarked upon the change that had taken place. Many replies were received by our outside correspondents which showed only too clearly how greatly these letters were appreciated. Every Indian P/W was adopted in this way and the service continued until the latter months of 1944.

- (iv) Three Escape Committees have commented on the value of the News Letters in their Histories of P/W Camps. Stalag Luft III received them during the period April 1942 to January 1945 and they contained topical information, especially information on the war, which obviously was intended to bolster up morale. Handkerchiefs were also received with invisible messages written on them and the instructions and necessary chemicals (latter not always received but may have been found by Germans) for making the messages visible were also sent. Stalag Luft III felt that most of this literature consisted of out-of-date war news (the news sent was old by the time it was received and was superseded by news supplied by the Compound Radio Departments and by new P/W's.) and therefore was of little value. Stalag IIE also felt the morale value of these letters was not great. Stalag Luft VI considered some of the handkerchief messages were useful (believed they received no news letters) especially messages from Prime Minister and Chief of Staff.

(v) It must be realised that R.A.F. P/W Camps did not appreciate the varied distribution (e.g. Indians) of these News Letters. In the case of R.A.F. Camps, a fair summing up would be that they were of value in the early stage of the war but their value considerably lessened when P/W's. were able to obtain the news from their Compound Radio Departments. News letters, however, were also useful for propoganda purposes (e.g. deceiving the enemy).

(g) W/T Communication. The most important means of secret communication and the one which had the greatest effect on the morale of P/W's. was radio. I.S.9(Y) had foreseen the possibilities of this method very early on but, like many other innovations, it took a long time to develop and perfect.

(i) The first attempt was made by means of the Radio Padre, who spoke on the Forces Programme of the B.B.C. every Wednesday immediately after the 9 o'clock News. I.S.9(Y) approached him in October 1942 and obtained his co-operation. The necessary instructions took some time to reach our contacts but, in January 1943, the first special talk was delivered over the radio. The success depended so much on circumstances beyond the control of I.S.9(Y) - atmospherics, wavelengths, reception, the ability of those listening in, etc. - that this method did not prove to be a great success, although one or two messages were heard correctly. It was, however, a beginning. The weak point was, of course, that the reception of special messages was dependent so much on circumstances beyond the control of I.S.9(Y).

(ii) The next attempts by I.S.9(Y), this time by morse, were much more successful, particularly as the original morse system was initiated by one of the Camps. Eventually, with the co-operation of the Admiralty and S.O.E., I.S.9(Y) were having messages transmitted regularly, all of which were picked up and read correctly. R.A.F. P/W Histories of Stalag 357 and Stalag Luft 6 (N.C.O's. Camps) give, however, two instances where staffs of camps were unable to read correctly or where the messages were not picked up in full. In Stalag 357 they were unable to read a message and a chance meeting with an officer of

another camp enabled them to get full details. In Stalag Luft VI, they were also unable to read a message and in this case it is possible that complete messages were not picked up.

- (iii) Although several camps had transmitters as well as receivers, on grounds of security they were not allowed to send to I.S.9 messages until final liberation was in sight. P/W's. on their return confirmed that this policy was correct.
- (iv) The Escape Committee of Stalag Luft III had one criticism to make in their Camp History regarding the procedure of W/T transmission which did not come under I.S.9. They stated that occasionally unnecessary strain was put on members of the Radio department by an unpunctuality and disregard of the customary routine on the part of the operator transmitting the messages. A late start involved a waste of security and an early start involved the loss of the message. The Committee also stated that the transmission frequencies were not always suitable for the Camp. It was considered that a listening watch should have been kept in the United Kingdom to ensure that the transmission was free from interference.
- (h) Types of Information sent and received.
 - (i) I.S.9(Y)'s channels of secret communication between England and Germany were used not only by the three Services but also by other Government departments, such as the Foreign Office, Ministry of Economic Warfare, etc. as well as by other secret sections. I.S.9(Y)'s organisations were employed to send to them information of military and economic value, factory targets, conditions in Germany, morale of the people, details of how our aircraft were shot down, (supplied by survivors and most valuable to O.R's. Bomber Command), and to give I.S.9(Y) answers whenever possible to questionnaires prepared by various departments who desired periodical information on certain matters affecting their long term policy. They were also used to send I.S.9(Y) details of the requirements of the Escape Committees and I.S.9(Y), in their turn, notified them of what was being forwarded.

- (ii) In replying to Loyal Greetings from British and Dutch officers in Oflag IVC, H.M. The King and also H.M. The Queen of Holland used I.S.9(Y) means of communication. Messages were also sent to camps at various times from the Chiefs of Staff, Air Chief Marshal Sir Arthur Harris and the Prime Minister. These special messages were greatly appreciated by the recipients.
- (iii) Escape Committees of various R.A.F. Camps and certain criticisms regarding messages. Two Camps (not Stalag Lufts III and VI) said that certain personnel were specially trained and wrote to I.S.9 but messages were not received by latter. It is almost certain that non-receipt was due to the fact that these personnel had not been specially registered. It is most important that specially trained personnel should first of all be registered with I.S.9 so that they can be put on the Watch List. Certain Camps, including Stalag Luft III and VI stated that warnings of despatch of parcels should have been sent well in advance and in duplicate, because as I.S.9 were informed, the Germans purposely held back mail in order to delay reception of suspected code messages. All R.A.F. Escape Committees visited M.I.9 and discussed these points in detail.
- (j) Lady Ampthill Letters. The "Lady Ampthill" letters had no connection with I.S.9 work; P/W's. wrote to the address of Lady Ampthill (Red Cross) and their letters included information regarding casualties to our aircraft, i.e. details of action, etc. At one time, Air Ministry raised the question of security considerations about these messages but they were of value to O.R.S. Bomber Command who were desirous that they should not be stopped. Air Ministry agreed. Extract of these letters were sent to Cas P/W who forwarded them chiefly to Bomber Command.
- (k) Italy. Communications through the P/W mail operated in Italy on the same lines as in Germany, although on a smaller scale. The inefficiency of the Italian administration, however, made it more difficult and less effective, as the time lag was at times appalling, but I.S.9(Y) had a fairly regular communication with certain camps, particularly with the Generals' camp at Florence. Before the first

/paratroop

paratroop raid on Italy took place in January 1941, M.I.9(b) specially trained certain personnel taking party. When, therefore, some of them were taken prisoner, M.I.9(b) were at once in touch with them. They did their work well and taught other P/W's.

- (1) Statistics. The following figures give some idea of the volume of work performed by I.S.9(Y) during the war:-

Germany and Italy

YEAR	MESSAGES SENT		MESSAGES RECEIVED BY MAIL	TOTAL
	BY MAIL	BY RADIO		
1941	581	-	799	1,380
1942	1,115	-	2,228	3,343
1943	944	17	3,527	4,488
1944	546	204	2,630	3,380
1945 (4 months)	41	50	289	380
TOTAL:	3,227	271	9,473	12,971

It will be noted that the peak year was 1943. The development of radio communications in 1944 reduced the number of messages to be sent by mail very considerably and the defeat of Italy in 1943 reduced the number of messages despatched by I.S.9(Y) during 1944.

- (m) Suggestions and Notes - Despatch and Receipt of Messages. The following are suggestions and notes which have been based on the working of I.S.9(Y) during the 1939/45 war:-

- (i) Correspondence with British P/W by letter is slow, particularly where one's enemy is inefficient, as for example in the case of Italy. It is, therefore, essential that wireless communication from U.K. should be opened up as early as possible. It can be assumed that British P/W will always be able to manufacture home-made receiving sets, and this can be ensured if instructions that they are to do so are given to selected personnel in the earliest M.I.9 training. On the other hand it must be stressed that P/W should never transmit, as this can be easily located by the enemy and severe measures will undoubtedly be taken by him

to stop it.

- (ii) Speed in handling mails in U.K. is essential and this can only be ensured through the help of the Postal and Telegraph Censorship. An early contact with them must, therefore, be established, and the Heads of Censorship must be put into the picture to secure their co-operation.
- (iii) The success of special work was due to the great care with which every letter was written and to the good security prevailing in all P/W Camps. Extreme care must be taken in the writing of letters from U.K. especially at the early stages of the war when some personnel may be inexperienced. Information regarding despatch of parcels must be sent well in advance and in duplicate.
- (iv) This work proved that P/W's. can be utilised with advantage as suppliers of intelligence, even though because of the time lag the intelligence may be of background value only. It is most important that specially trained personnel in camps should be registered with U.K. before they undertake this special work, so that they can be placed on the Watch List.
- (v) With regard to W/T, punctuality and a set routine on the part of W/T operators is essential so that unnecessary strain is not put on the P/W Radio Departments. Listening watches should be kept in U.K. so that they can ensure that transmission is free from interference.
- (n) Communications with British P/W were designed for the following purposes:-
 - (i) To obtain from P/W intelligence about the enemy.
 - (ii) To obtain from P/W results of our own offensive operations.
 - (iii) To obtain from P/W their requirements of escape aids etc.
 - (iv) To notify P/W of means employed in sending out escape aids etc.
 - (v) To notify P/W of good escape routes.
 - (vi) To obtain from P/W information re camp conditions, treatment etc.
 - (vii) To transmit to P/W minor sabotage instructions.
 - (viii) To maintain P/W morale and discipline.
 - (ix) To spread propaganda and deception amongst the enemy (these letters were sent in clear - News Letters).

- (x) To obtain from P/W names of British collaborators with the enemy and the enemy's methods of undermining and employing them (names were passed to M.I.5 who listed them and worked up cases against them).
- (xi) To instruct P/W to compile black lists of enemy commandants, guards, etc.
- (xii) To pass to Senior British Officers, W.O's. and N.C.D's. instructions for future conduct.

I.S.9(Z)

59. Formation. Like other Sections of I.S.9, I.S.9(Z) came into being in January 1942. It was responsible for the production, distribution and despatch of escape and evasion aids. Prior to the formation of I.S.9, it had been part of M.I.9(b) and had already passed from the experimental to the productive stage when it became a separate Section. Up to the spring of 1943, head of section was a Major after which a Squadron Leader was appointed head of I.S.9(Z). An organisation chart is at Appendix "F".

60. The Early days. There was very little to go on when the work of providing aids to escapers and evaders was embarked upon. In the case of P/W Camps, the methods of getting escape material to P/W's. during the last war had been disclosed in detail in books written by successful escapers and other P/W's. These books had been carefully studied by the German High Command and, as I.S.9 early discovered, formed the basis of the instructions issued to all German Camp Commandants as to how to prevent escapers and how to discover escape material sent in parcels to P/W's. These published details made I.S.9(Z) work a hundred times more difficult. The old ways had, in the main, to be discarded and new methods of concealing escape gadgets devised. Ways of concealing compasses for personnel going on operation were also invented and eventually vast quantities of gadgets were produced. Some idea of the variety and volume of material sent to P/W Camps and also distributed to personnel for evasion purposes are given below:-

- (a) Aids to P/W Camps. - 338,550 lire, 131,350 francs, 58,500 Belgian francs, 8,305 Dutch guilders, 707,730 marks, 9,247 maps, 3138 compasses, 1942 passes, 427 sets of dyes and items such as Railway maps of Germany, hats, make-up boxes, composite tools and German uniform badges. 25 receiving sets, 120 rubber stamps, 7 typewriters and 86 destructors re German aircraft.

- (b) Evasion Material. - 1,301,937 round brass compasses, 100,354 pencil clips, 22,310 cigarette lighters, 560,200 aids boxes, 348,102 phrase cards, 1,665,922 maps, 62,710 Blood Chits, 59,986 aids boxes (F.E.), 20,805 telescopes (F.E.), 9,080 A/C instructions (F.E.), 2,085 M/B instructions (F.E.), 38,326 special food boxes (F.E.), 504,000 special matches (boxes), (F.E.), and 20,087 heliographs. Also canvas, jungle boots, typewriters, language records and ski-boots.

61. Parcels to P/W Camps.

- (a) It was evident very early on that our P/W's. would have to depend largely on the British Red Cross for food. It was decided, therefore, that, so far as I.S.9(Z) clandestine work was concerned no attempt should ever be made to get contraband articles into the Camps under the protection of Red Cross labels. Next-of-kin parcels (one every quarter to each P/W) were also banned, since they were sent under the auspices of the Red Cross. I.S.9(Z) never broke this rule in any way. The means adopted for getting escape material into Camps was mainly through certain fictitious firms, clubs and organisations which I.S.9(Z) invented. In order to gain the confidence of the Germans, I.S.9(Z) first sent a letter to each Camp Commandant stating that money had been collected to supply our P/W's with games, books and comforts, in an endeavour to lighten the burden of their captivity and that a consignment of parcels would shortly arrive which it was hoped he would allow the S.B.O. or Camp Leader to distribute. The first, and one of the most successful, of I.S.9(Z)'s "phoney" organisations was given the name "The Prisoners Leisure Hours Fund". A list of the organisations, firms, etc. used at various times is held at M.I.9 Records. In order to conceal the contraband material as well as possible a few well known and reliable firms were taken into I.S.9(Z)'s confidence who entrusted the work of making cavities in the articles to be despatched, and of loading them with escape material to a few of their most trusted workmen. It speaks well for the integrity of these craftsmen that, so far as I.S.9(Z) know, never once was the game given away in this country. In 1943 through the skill and ingenuity of the P/W's. themselves, it was possible to

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send out all-contraband parcels to many Camps without any concealment of the articles inside the parcels whatsoever, the P/W's. themselves being able to steal them before they were handled or examined by the German censors.

- (b) The method of despatch of parcels entailed detailed arrangements with the Post Office Censorship Dept. The parcels were sent in sealed mail bags to their P/W Section at Aintree. On receipt, each parcel was stamped as having been examined, although no examination was actually made by the Censorship officials. The parcels were then mixed with genuine parcels despatched from various stores and other licence holders and sent to their destinations.
- (c) The following statistics show the volume of work involved in the despatch of parcels to our P/W's:-

Parcels Despatched

Type	1941	1942	1943	1944	1945 13 mths.	Total
Straight	329	4844	2556	1410	144	9283
Special	618	1024	929	854	100	3525
Total	947	5868	3485	2264	244	12808

Straight parcels included several hundred packages of tobacco and cigarettes which were used for bribing the guards and also for exchanging for German currency. The despatch of parcels to P/W Camps ceased at the end of March 1945, as the end of the war was by then within sight.

- (d) On the return of P/W's. after the liberation, Escape Committees of various R.A.F. Camps made constructive criticisms. Stalag Lufts I, III and VI considered that the best method of introducing escape aids into camps was by means of undisguised parcels, the parcels to be kept small and to be addressed either to the S.B.O. or to specified individuals. Before adoption of this method, contact to be established with the Camp in order to ensure that P/W's. are able to abstract such parcels. Warning of despatch to be sent well in advance and in duplicate.
- (e) Oflag IVC reported that towards the middle of 1941, parcels were X-rayed but even then some parcels were abstracted by P/W's.

- (f) Stalag Luft III said that games parcels were the best method of concealing escape aids. A first rate carpentry job, e.g. in poker chips, etc. could not be detected unless the articles were completely destroyed.
- (g) Stalag Lufts I, III and VI (Stalag Luft I chiefly supplied from American sources as classed American camp) considered that a greater quantity of supplies, especially radio parts, should have been sent by I.S.9 and at an earlier date; also that more attempts should have been made to comply with requests for specified articles. There is no doubt that it is unfortunate that more energy was not shown in obtaining radio parts in the early days of 1943; later, when an R.A.F. officer took over and all steps were taken to obtain radio parts, such items were difficult to get. On the other hand, the U.S.A. 'Z' section in 1944 had a large source of supply in America of radio parts for despatch to their personnel (all required for U.S.A. P/W's.). All R.A.F. Committees visited I.S.9(Z) and discussed these points in detail.

62. Evasion Material

- (a) As the war developed it became more imperative than ever that aids to avoid capture, particularly in cases where operational units were likely to land in enemy-occupied countries, should be produced. I.S.9(Z) worked on the production of an aids box which eventually contained the following articles:- Water bottle, sweets, peanut bars, compass, razor and soap, Halazone tablets (for purifying water), Benzedrine tablets (for counteracting fatigue), fishing line. It was a standard pattern and was issued to all Fleet Air Arm, R.A.F. and American Air Corps operational units, not only to those based in this country but to those in other theatres of war as well. It was also issued in large quantities to special assault troops, raiding parties, etc. In the Far East, a special form of packing was devised for this Far East box which preserved the contents under tropical conditions.
- (b) Purses, containing maps, a compass, a hacksaw and currency of the country over which they were operating to the value of £12 were also issued to operational units.

- (c) Other items issued included special flying boots (the tops of which could be cut off, converting them into shoes), blood chits, phrase cards, posters for placing in briefing rooms.

63. Equipment for Agents.

- (a) During 1943 and 1944, I.S.9(Z) clothed and equipped many agents selected by I.S.9(D)/P.15 for work in connection with our clandestine organisations in Western Europe. The preparation of containers for dropping supplies of all kinds to our agents on the Continent was also a big part of their work. A special clothing store in Regent Street, London, W.1. was instituted where agents could be fitted out.
- (b) During 1944, I.S.9(Z) was also used for the purpose of obtaining boating equipment for Holland in connection with the evasion activities of I.S.9(W.E.A.).
- (c) The following items indicate the variety of articles issued on behalf of I.S.9(D)/P.15 and, through them, I.S.9(W.E.A.) :-

Food, special food packs, clothing, aids gadgets, tyres, binoculars, purses, phrase cards, tooth brushes, wireless equipment, soap, cotton, razor blades, needles, hacksaws, compasses, first aid equipment, special type waders, infra-red equipment, 'Q' type dinghies, flasks of rum and whiskey, silent sten guns.

In addition special equipment, such as 'S' phones, canoes and certain types of explosives were drawn from other departments and included in the items despatched.

64. Awards Bureaux. On the establishment of our Awards Bureaux in France, and Belgium, during the autumn of 1944 (and after V.E. Day in Holland), I.S.9(Z) despatched thousands of parcels of food for our helpers also clothes of all descriptions. Many of our helpers were compensated in kind, in preference to money payments, particularly in Holland where goods were practically unobtainable. The parcels contained such items as tins of meat of all kinds, tea, coffee, sugar, salt, biscuits, jam, suits, sheets, ties, shoes, hats, cloth lengths, overcoats, bicycles, etc. Shipping the goods across the Channel was the biggest problem, but by perseverance and persistence, I.S.9(Z) managed to get space allotted by both sea and air (the latter by the co-operation of the Air Ministry and Transport Command).

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65. Suggestions and Notes - Production, Distribution and Despatch of Escape and Evasion Aids. The following are suggestions and notes which have been based on the working of I.S.9(Z) during the 1939/45 war :-

- (a) That an adequate staff for production, distribution, despatch and research work for the technical section be authorised at the outset. The head of the section should be an officer (Intelligence) with commercial experience in civil life as he has to liaise with many commercial firms. A proportion of the research staff should be escapers and evaders.
- (b) That all possible thought must be devoted both prior to war and in the next war to devising new gadgets. This is more important in the case of aids sent to P/W Camps (and the methods employed in doing so) than in the case of evasion equipment, as the latter is primarily intended for use before capture by the enemy. It will be essential prior to war to keep abreast of wireless developments and to carry out research of wireless equipment (especially small types of W/T).
- (c) It is equally acknowledged by all three services and the Americans that the work performed by I.S.9(Z) was an important contribution to the war effort as a whole. Many people owed their lives and liberty to the equipment devised and issued by I.S.9(Z).
- (d) The reports received from returning P/W's. on wireless activities in P/W Camps were most impressive. It is considered that I.S.9(Z) might have been able to do more than it did in this matter if it had possessed more expert knowledge of the subject. In the event of another war, it is reasonable to expect a considerable use of wireless communication with P/W Camps. It is suggested, therefore, that a fully trained wireless expert should be allowed for in a future establishment of the technical section. As main communication with P/W's. will probably be by W/T, it will be imperative to carry out research work prior to a war.
- (e) I.S.9(Z) was handicapped by not having its own workshops and mechanics to experiment in devising and making new evasion and escape equipment. It is strongly recommended that in a future technical section, a fully equipped workshop and trained instrument mechanics be supplied.

- (f) Once the experimental stage has been passed and a more or less standard pattern of escape equipment agreed, the emphasis is then upon production in bulk, and the technical section becomes a producer and distributor on a large scale. Whilst time spent on reconnaissance is seldom wasted, too much effort put into experimenting can jeopardise the output of articles badly needed by the troops.
- (g) Before issue to aircrew, gadgets should be tested at Royal Observatory (during last war, it was found that cuff links and suspender gadgets affected Wellington compass).
- (h) Evaders and escapers should be encouraged to visit the Technical Section. During last war, many useful suggestions were adopted for aids box as a result of such visits.

I.S.9(D)/P.15

66. Formation. This section was formed in the spring of 1941 for the purpose of assisting evaders and escapers in enemy occupied Western Europe to avoid capture by the enemy and to return to this country. It was controlled in its activities by the over-riding authority of S.I.S. and was, in fact, started as M.I.6(D). An organisation chart is at Appendix "G".

67. The Build Up. Clandestine escape, as a specialist form of Intelligence, was an entirely new development. It had no tradition or technique derived from the last war. The oft repeated statement that Nurse Edith Cavell, who apparently worked for S.I.S. during the last war, had been discovered through assisting a prisoner of war seemed to dictate the whole attitude of S.I.S. towards the Section. They were determined to prevent evaders and escapers from involving them in any way. This attitude may have been correct from their own security aspect, but it was a terrific handicap to those trying to build up an organisation. It was only after two years that S.I.S. began to realise the need for more than nominal support of I.S.9(D)/P.15. This was due to their realisation that increased numbers of evaders on the Continent were coming within the orbits of their organisations and endangering their agents. This rather negative form of support continued to the last and had the inevitable effect of restricting the scope of I.S.9(D)/P.15's work in every country in which it was concerned.

Nevertheless, as the final results prove, considerable successes were achieved.

68. Agents. The section had great difficulty in obtaining suitable agents for the work. Most of I.S.9(D)'s contacts with the French, Belgian and Dutch

Intelligence Services were originally arranged by S.I.S., whose ignorance of and lack of interest in the rapidly increasing evader problem spread to their opposite numbers in the Allied Services. The Belgian and French were, therefore, inclined to adopt the attitude that the problem was so unimportant that a very low priority should be given to I.S.9(D)/P.15 in recruiting agents. Moreover, it was not until 1943 that they really saw any point in assisting anybody but their own nationals out of enemy-occupied territory. The Dutch, in the same way, were totally disinterested and openly hostile to risking Dutch lives in this manner. They omitted to realise until too late the quite important political consequences that work done on behalf of British and American subjects in this manner might have. They have now realised the extent of the organisations built up in Holland, particularly during the months after Arnheim, and are more than a little mortified to find that they literally know nothing about the work done by their compatriots employed by the Section. This apathy towards the work of I.S.9(D)/P.15, however, was probably the main cause of its considerable success for, to achieve anything, it had to work on its own. It led to the Section running an organisation which few people in England knew anything about, but which had a marked influence on public opinion on the Continent. The better type of underground worker distrusted his own Intelligence Services and preferred to enrol in an escape movement which had no political bias and a more humane aspect than mere espionage. The Section, therefore, was able eventually to obtain a remarkably high standard of agents without the assistance of either of S.I.S. or of the Allied Intelligence Services.

69. Operations. The high quality of agents enrolled led to this small section of three officers being able to achieve considerable success in the operational sphere. This was particularly true of sea operations and air landings. During the months of 1944, when M.T.B's. were crossing to Brittany, I.S.9(D)/P.15 was quite outstanding in its successful handling of boat evacuations. The enthusiastic co-operation and support of the Royal Navy were most important contributing factors to these successes.

70. Air Ministry. I.S.9(D)/P.15 considered that the Air Ministry took little interest in the work of their section on the grounds that in spite of the enormous numbers of rescued airmen who made strong representations to the Air Ministry, no support was forthcoming. The particular interest that the Section had in Air Ministry support was in obtaining sufficient priority in

/aircraft

aircraft from Bomber Command special squadrons to carry out air evacuations and parachute droppings, but priority was always low. They agree that this attitude was quite comprehensible, in view of the danger involved of losing aircraft and the fact that the time factor, in so far as evaders were concerned, was of relative unimportance.

It is considered that I.S.9(D)'s criticism is not justified as all schemes for evacuation were most carefully considered by Air Ministry but were turned down on account of undue risk to aircraft and other reasons.

71. Conclusions. I.S.9(D)/P.15 was hampered all through by lack of staff. The subservience of one Secret Intelligence organisation to another did not pay. The work of S.I.S. and I.S.9(D)/P.15 was quite different, and it was only natural that the young organisation, with no tradition behind it, should be looked upon with suspicion by the parent organisation. The W/T and training facilities supplied by S.I.S. were much appreciated, but it did not help when operations planned as a result of the facilities given were obstructed on the grounds of policy.

72. Recommendations. In the event of another war, I.S.9 have strongly recommended that if the necessary War Establishments can be obtained a separate M.I.9 organisation should be set up with its own communications and agents. By this means, the evasion organisation can be studied as a subject separate from other forms of Intelligence. The training as given by S.I.S. is considered the model on which agents should be instructed.

Awards Bureaux

73. The duties of the Awards Bureaux at Paris, Brussels and The Hague (with sub-office at Copenhagen) were to interview helpers and make recommendations for rewards and awards. Close contact was kept between these Bureaux and A.I.1(a)/P/W (London Office) who were able to give full details regarding the names of many helpers and R.A.F. evaders. The Royal Air Force Escapers Club also helped by supplying the Awards Bureaux with lists of additional helpers (obtained from members of the Club) which augmented the Awards Bureaux records.

74. The head of the Paris Bureau was an R.A.F. (Intelligence) Officer and at the Brussels Bureau an ex-P/W (R.A.F.). The Commanding Officer or 2 i/c of Awards Bureaux / Allied Screening Commissions should be either an evader or an intelligence officer. Experience has shown that an evader is the most suitable type of person for attachment to the R.A.F. Section engaged on Awards Bureau work.

/Officers

Officers employed on investigation work should have a good knowledge of the language of the country concerned. They should be capable of ensuring that helpers fill up the questionnaires accurately, be interested in the people and what they have done and also be capable of listening sympathetically to their stories. In the last war, W.A.A.F. Officers, the majority of whom were bilingual, carried out excellent work in the clerical departments and should be again earmarked for Awards Bureaux work, if required. An adequate O.R. W.A.A.F. staff S/T is essential. The R.A.F. investigators must be supplied with cars and drivers (with knowledge of language if possible).

Air Liaison Officer, M.I.9.

75. Formation. Prior to the establishment of the post of Air Liaison Officer, M.I.9, liaison was carried out with M.I.9 by A.I.1(a)/P/W at Air Ministry. On the establishment of the A.L.O. post, the A.L.O. decided to work at M.I.9. It is now clear that this decision was correct as it is essential that the A.L.O. should be housed in the M.I.9 buildings in order that he becomes fully "au fait" with the daily current problems of M.I.9/I.S.9.

76. Suggestions and Notes - Air Liaison Officer, M.I.9. At the request of the D.D.M.I.(P/W), a memorandum of "Lessons learnt" based on the working of A.L.O., M.I.9 during the late war together with a memorandum "Post-War Policy - M.I.9 Training" was compiled by the A.L.O. and a copy of each is held by Air Ministry. The majority of the points set out in the above memoranda have been included in this paper but the following suggestions and notes are set forth below:-

- (a) That all R.A.F. and W.A.A.F. personnel be placed on A.I.1(a)P/W establishment - such personnel then come under A.C.A.S.(I) and this cuts out the Special Duties List under Air Ministry Unit.
- (b) That an adequate clerical staff including drivers be authorised at the outset.
- (c) In May 1944, the Air Ministry issued instructions to the A.L.O., M.I.9 that he would be responsible for transmitting all information to British and Allied operational Commands regarding the locations of P/W Camps and movements of P/W's. so that Groups and Stations could be kept informed and the risk of bombing by Allied aircraft be reduced to a minimum. This became a most important task during the invasion of Germany when camps were constantly on the move. The procedure for circulation of Location of P/W Camps and

/Movements

Movements of O/W's. was as follows:-

- (i) As soon as information was received regarding location of camps and movements of P/W's., the data contained therein was immediately telephoned to H.Q. Bomber and Fighter Commands, the W.D.L.O.(U.S.A.A.F. - who signalled the information to U.S.A.A.F. Commands and M.A.A.F.) and A.I.3(c)1. The information was confirmed by Interim Notifications issued by A.L.O. At the end of each month, D.P.W. issued a broadsheet (on a wide distribution) which incorporated the data included in the Notifications.

Notes. - Information was obtained mainly from D.P.W.,
Recco Units and Base (by telephons).

- (ii) A.L.O. was also responsible for obtaining photographs of P/W Camps requested by D.P.W. The procedure adopted was to ask R.A.F. Station, Medmenham whether suitable air cover existed. If this was not forthcoming, J.P.R.C. was requested to arrange for sorties to be flown. Photographs were then distributed to all R.A.F. and U.S.A.A.F. Commands.
- (iii) A special list of P/W Camp Illustrations and Information Sheets (giving descriptions of camps, airfields etc. in vicinity, defences etc. - record booklets held at Historical Branch, Air Ministry) was also circulated to all R.A.F. and U.S.A.A.F. Commands by A.I.3(c)1 with whom close touch was kept by A.L.O. as A.I.3(c)1 required information regarding identification of camps. Arrangements were also made for repatriated ex-P/W's. and Evaders and Escapers to visit A.I.3(c)1 and much valuable information was given by these personnel.

Experience showed that a less complicated procedure would have been to have carried out the above work direct with M.I.9. This, however, proved to be impossible as the welfare of all P/W's. came under D.P.W. If the occasion again arises, I would recommend that such work be carried out by D.P.S. in close liaison with A.I.1(a)P/W, who should have a sub-section working with the former.

AIR MINISTRY INTELLIGENCE IN WARPart V : Chapter 18LESSONS TO BE LEARNTINTRODUCTION

1. Under peace-time conditions, the scope of air intelligence is necessarily circumscribed and for obvious reasons can bear no relation in magnitude or opportunity to its development to meet the requirements of a major war. This is true in 1946, as in 1939, but with the difference that the European War of 1939-45 showed for the first time the tremendous scope and importance of air intelligence, not only as a source of information concerning the enemy, but also as an indispensable service upon which the efficient employment of our own and allied air forces became in many respects dependent. The air war in 1914-18 never developed in approachable magnitude to that of 1939-45 although the gaining of air superiority then, as now, proved to be a major factor in the strategy of the opposing sides; the early state of technical development and limited striking power of the air-forces of the time, together with the comparatively late stage at which they began to be employed in appreciable strength, never called for the development of air intelligence to a comparable degree.

2. There was therefore no worthwhile background of experience on which to plan and devise the organisation and functions of Air Intelligence in war, or by which its ultimate scope and potentialities could be envisaged; in this respect Air Intelligence, being virtually untried, was not so favourably placed as compared with the other two services for which the experience of the 1914-18 war did at least form a valuable foundation on which to build. Moreover, the swift and far-reaching range of the striking power of modern airforces, and their high flexibility as compared with land and naval forces in relation to their strategical and tactical employment, all imposed the greatest responsibility for rapid, accurate and trustworthy intelligence both for defence and for the successful conduct of offensive operations. It will be seen therefore that in 1939 Air Intelligence was an unproved yet vital element in the prosecution of the war; it became an indispensable factor in the undertaking and planning both of operations and strategy at the highest level in all theatres.

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ORGANISATION

3. The organisation ultimately evolved by the last year of the war (See Chapter 1, Appendix E) represents the most efficient system which, in the light of the fullest experience, could meet the very heavy burden of commitments on Intelligence at Air Staff level, progressively developed and improved with the course of the war. Imperfections existed, and certain developments might well have been initiated earlier than they were.
4. An important development in organisation at Air Ministry, inevitable with its growing complexity and the development of the war, was for instance, the separation in April 1944, under separate Directorates, of Operational Intelligence (under D.of I.(O)) and Technical Intelligence (under D.of I(R)); this became essential owing to the weight of work and responsibility becoming too great to be undertaken by a single Director. It might with advantage have taken place earlier.
5. The appointment of these two Directorates was in reality a corollary to the change-over of Intelligence sections from a geographical to a functional basis in 1941. It is clear that the practical considerations (Intelligence is required on all countries and only a strictly limited amount is available) make necessary in peace-time the maintenance of intelligence in relation to foreign air forces on a geographical basis. In war almost all work is in connection with the enemy air force or air forces and, owing to the amount of information available, this work must be handled by sections organized on a functional basis. Additional sections interested in Allied or potential Allied or hostile air forces may be necessary on a geographical basis. A rapid change-over has to be envisaged should the threat of war again materialise, and in the interests of efficiency and smooth running it would probably be found that the establishment of separate Directorates covering these two aspects of Intelligence should accompany this change. There are grounds for believing that the separation of intelligence on aircraft production, and also perhaps on airfields, under D.of I.(R), from Operational Intelligence, was an error which should not be repeated in war in view of their direct bearing on the operational side of intelligence. Intelligence on these matters can be, and usually was, co-ordinated by discussion between

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-6-

sections in the two directorates, but teamwork is facilitated if sections can be grouped as closely as possible according to their work. Overlapping is unavoidable, and partisanship is less likely to be dangerous if rivalry in the same sphere between two directorates is avoided. Moreover, it is fatal for a production section to issue a report showing a large increase in production of, say, jet engines if the order of battle section knows that it is out of the question, say for personnel reasons, for the enemy jet force to be increased, and it is equally embarrassing if the order of battle people forecast an increase in jet squadrons when the airfields section knows that there is no accommodation for them.

6. In general it may be said that, small though it was, the organisation existing in 1939 provided a sound basis for the building of the Intelligence structure in the sense that the major requirements had already been anticipated. Thus single sections existing in 1939 e.g. Security, Foreign Liaison and Signals Intelligence, came to be expanded into entire Directorates or Deputy-Directorates by 1942. It was inevitable that the development of the Intelligence organisation came about by means of a lengthy process of trial and error under pressure of the steady extension of the war itself, but, even more, the light of experience revealed a vast field of Air Intelligence beyond anything imagined under peace-time conditions. This revelation is, therefore, one of the main lessons to be learnt from war-time experience; although, in matters of detail, differences would inevitably arise in any future emergency, the principal features of the Intelligence structure necessary to meet such conditions have been made clear and preparations to meet them could with confidence be initiated again on the lines evolved at the concluding stages of the 1939-45 war.

7. It cannot, however, be too strongly stressed that, no matter how desirable a sound Intelligence organisation may be if it is to afford the highest possible degree of efficiency to the service as a whole, this efficiency is primarily dependent upon the quality and ability of the individual persons composing the staff at all levels. Unless this is of a high order and ^{is} qualified above average ~~for~~ undertaking work calling for sound judgment and painstaking and detailed study of matters of the highest intricacy and complexity, coupled with much responsibility, the Intelligence Staff, however well organised, will be unable to fulfil the

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demands imposed on it. The question of qualifications and selection of Intelligence personnel is further reviewed at paras. 30-38 below.

FUNCTIONS (See Appendix ^{to this Chapter})

8. The principles on which an Intelligence Service functions have been described as resembling very closely those of human intelligence, with sources as its senses, with a collating centre as its thinking brain drawing on past experience and upon expert knowledge, and with a presentation system as its voice. In fact, the closer an Intelligence Service resembles a single perfect human mind, the more effective will it be. The diagram attached as an Appendix to this chapter shows the essential principles of this organisation.

9. The function of Intelligence is to conduct a perpetual attack on the security ^(not order) of foreign powers, whether in war or peace, and in conducting such an attack there is constant need for improvisation to exploit any transient and favourable factors which may arise unforeseen. This in turn demands flexibility and adaptability both as regards organisation and mentality of its personnel; whatever the aspect of Intelligence, whether dealing with scientific and technical air matters, or with targets, airfields, production or order of battle, these broad principles will continue to hold good.

10. Intelligence may be covert or overt, and it is the main function of the majority of Air Ministry Intelligence sections to act as collating centres or "brains" on particular subjects, accepting input of raw material by source and producing digested output according to subject, an intricate process which is one of the difficulties of intelligence work. It will be seen from the foregoing chapters, however, that certain sections or directorates e.g. Photographic Reconnaissance, 'Y' Service, or P/W Interrogation perform a dual function; on the ^{one} other hand they act as collating centres, while at the same time certain aspects of their collated output in turn serve as source material to other sections, e.g. Order of Battle and Organisation sections, in the final distillation of the most fully refined operational intelligence picture. It follows that the whole ^{fabric of intelligence is closely interwoven and must of necessity be} of uniform high quality since the existence of a weak point tends inevitably to create flaws elsewhere in the system.

11. The staff of the collating centre should be kept as small as possible, because the fewer individual minds there are in it, the more it resembles the human mind; the more information an individual can cover, the greater

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the chance of those fortunate correlations, vital to Intelligence, which can only occur when apparently unconnected facts from totally different sources are appreciated by a single mind.

11. The policy and practice of the presentation system require considerable thought, judgment and literary competence. Upon a clear and concise presentation system depends to a large degree the ability of Intelligence to convey its conclusions and reasoning with conviction and rapidity in such a way as can be readily assimilated and impressed upon minds wholly outside the Intelligence sphere; if it fails in these respects, it fails in its fundamental duty. The presentation of Intelligence must above all be scrupulously honest and devoid of any trace of prejudice or personal bias; it can only carry weight if its integrity is assured.

12. With regard to "overt" or non-secret intelligence, the study of this in the form of publications etc., is essential, since the overt information of today is often the secret information of yesterday and is, therefore, valuable as past knowledge in the secret plan. In some cases it may even become the basis of to-morrow's "top secret" activity. For example, the published discovery of uranium fission in 1939 started the top secret Anglo-American work of the next six years; moreover, the cessation of scientific papers on uranium in America and England indicated to a German observer that we must have been working on the bomb problem. The collection of overt information, particularly in peace-time, is therefore, very important and it can serve moreover as a basis for briefing secret sources. The briefing of sources is of special importance, since war-time experience showed all too clearly that much effort was wasted and, in the case of agents considerable risk was run, owing to failure to provide clear briefing as to the specific nature of intelligence material required. Nothing must be allowed to stand between the collating staffs and their collecting agencies. If they become estranged through bad organization, security barriers or laziness, the whole operation of intelligence is stultified.

EXPLOITATION AND APPLICATION OF INTELLIGENCE

To the Conduct of Operations

13. It was in this field (corresponding to the collating and presentation systems)

/that

(In field of collection & exploitation) ^{Also}

that the most important lessons in the handling of Air Intelligence came to be learnt. Earlier in this chapter* it has been stated that Intelligence performed an indispensable service upon which the Allied Air Forces depended to a high degree for their efficient employment, in addition to its no less important value in appreciating the enemy air force; this statement may perhaps provoke certain scepticism. Experience nevertheless has shown that without the backing of an efficient and reliable Intelligence Service, the most highly competent, well-equipped and manned, and powerful Air Force can achieve little.

14. One of the characteristics of an Air Force is that its operational element cannot stand a relatively high wastage rate for more than a very limited period; this was shown repeatedly during the war when Bomber Command and the U.S. 8th Air Force were forced to modify or restrict the scope of their operations following periods of heavy losses. It was the constant function of Intelligence to assist in reducing this risk to the lowest possible proportions by providing in the shortest possible time the most complete and detailed picture of all aspects of the enemy defences, technically and otherwise, thus rendering possible the institution of the necessary countermeasures on the most comprehensive scale.

15. Similarly the exploitation of such widely varying sources as Photographic and Prisoner of War Intelligence, Order of Battle and Signals Intelligence provided the basis on which it was possible to plan the routing, selection of target, and the provision and tactical employment of fighter escort so as to provide the maximum possible degree of immunity from heavy losses. Without such safeguards it may with confidence be held that operations by heavy bombers until the autumn of 1944 could have been rendered prohibitive or at the very least highly uneconomical.

16. Again Intelligence by the provision of target material supplied the means whereby the range and striking power both of strategic and tactical air forces could be effectively applied against the selected objective. Each aircraft on every bombing mission carried with it its target map based on material derived from numerous sources, and devised and printed by Air Intelligence, using a technique and methods developed in the course of long and exhaustive experience. The whole system of target intelligence, involving the visual presentation of objectives in such a manner as to offer the greatest simplicity in their identification has become a permanent and essential adjunct to the fighting efficiency of an Air Force.

* at para. 1

17. The part played by Air Intelligence in the selection of targets for strategical bombing was among the less distinguished of its services. Its part was, to a certain extent unavoidably, confined to advice on targets directly connected with the enemy air force, but representation on the Combined Strategic Targets Committee was on too low a level for the proper authority to be exercised, and the service rendered directly and indirectly to Bomber Command was inadequate and unsatisfactory. While the Command made full use of such facilities as the Central Interpretation Unit, there was insufficient direct contact between Air Ministry Intelligence and the intelligence staff of the Command, with the result that policy was formulated by the operational staffs at Air Ministry, and Bomber Command without full use being made of advice which only the intelligence staffs could provide.

18. The foregoing remarks apply predominantly to the application of Intelligence at Air Staff level to the strategic employment of heavy bomber forces; it is in no degree less true or applicable in the case of Tactical Air Forces in the field whose requirements are similar in character. In such cases, however, Air Staff Intelligence requires to be supplemented by local tactical Intelligence of no less high quality, provided within the framework of each Tactical Command.

To Technical Development

19. A no less important aspect of Intelligence is the accumulation by Scientific, Technical and Signals Intelligence of as complete a knowledge as possible of the enemy's ~~current~~ equipment, with its performance, its weaknesses and its potentialities, as well as of his trends of future development. With such a picture, the Operational Commands and the ~~planning~~ research staffs must be kept continually and immediately informed of current developments so that they may plan their offence and defence accordingly, and so that our own designers may keep abreast or even ahead of the enemy's technical development and practice. An important lesson in this field is the importance of ensuring that development staffs are prepared to exploit the intelligence put at their disposal. It is useless to capture a new enemy gun if it is to remain untested for months, or to disclose developments in airborne interception gear if the equipment for the appropriate countermeasures is not to be promptly designed and put into service.

To High Level Policy and Plans

20. At the highest level of Air Staff Operational Planning and Policy, the
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application of Intelligence made an equally important contribution to the reaching of decisions of the highest importance not only with regard to the strategic disposition and employment of the Allied Air Forces but also in relation to home defence. The complete and exhaustive assessment of the enemy air potential in all its aspects e.g. dispositions, efficiency, striking power and commitments, together with current and future development in technical and aircraft equipment, provided an accurate picture based on sound judgment and exhaustive analysis essential to the effective evolution of Allied policy. Intelligence was thus able to make important contributions, among others, to the conduct of the offensives against the German oil installations (assessment of strength and capabilities of fighter defence) and against the German transportation system (target intelligence and collation of basic data).

21. Air Intelligence further influenced Air Staff policy, particularly during the years 1939-42 when German air power was in the ascendency. Upon the picture presented from time to time the deployment and adjustment of the fighter and A.A. defences of Britain were dependent; further, the detailed study of enemy methods and technique in the operational employment of the German Air Force provided valuable data and experience from which it was possible to profit in the building up and development of the R.A.F. and U.S. Army Air Force. Above all, the estimation of the enemy air potential provided the yardstick whereby the allocation and deployment of the Allied Air Forces could alone be accurately gauged and the undertaking of Allied military and naval operations be planned. This was demonstrated most clearly in the Mediterranean theatre during 1941-42 in relation to the North African campaign, the defence of Malta and the Allied landing in N.W. Africa. In the latter case, apart from an inaccurate forecast of the enemy ability to provide air reinforcement, Intelligence was able to give reasonable assurance against the possibility of any large or rapid build-up of enemy air strength in Spain and at the same time to discount the likelihood of any effective or large scale air attack on Gibraltar; these factors played a most important part in relation to the final mounting of the operation. It must be remembered that Air Intelligence, through the responsibilities of A.C.A.S.(I) as a member of the J.I.C., and the appointment of air intelligence officers in the Joint Intelligence Staff, plays a big part in all major decisions, apart from the purely air side of its work.

No decision is ever made without the advice of the J.I.C., and this is usually unquestioned by the Chiefs of Staff, and so directly influences the Cabinet. Moreover, A.C.A.S.(I)'s responsibilities are not confined to air matters. He has an equal voice, whatever the subject under report, this voice is the voice of Air Intelligence, and must be backed by wide knowledge and an authoritative and ~~impartial~~ appreciation of the whole situation, or enemy plan and potential, in which the air factor, if one exists, may be given particular attention, but must occupy its correct place in the picture.

At Working Level

22. It is clear that the trustworthiness of Air Intelligence in its application to the conduct of the war was founded upon the successful application of Intelligence at the working level of Deputy and Assistant Directorates and their subordinate sections. The absence of any background basis of previous experience (and also of any preconceived ideas) meant that every branch and section was obliged to build up its methods and system ab initio; in course of time, with ever growing experience and background, they were able to develop their own specialised technique to meet their particular functions and the demands progressively imposed on them. It was in this field that most important lessons of permanent future value came to be learnt; moreover, the successful application of Intelligence was almost wholly due to individual enterprise and initiative springing from the resourcefulness of officers with great intellectual ability of the most varied trends drawn from many walks of life.

23. Outstanding examples of this are to be found notably in the development and application of Photographic Reconnaissance, the Interrogation of Prisoners, Scientific Intelligence (including Signals Intelligence and the 'Y' Service) and in the whole field of the study of the operational aspects and organisation of the enemy air force. It came to be realised that worthwhile results could only be achieved by the closest scrutiny of every detail of intelligence, their systematic collation and evaluation, the vigorous adherence to fact and truth however unpalatable, the shunning of every inducement to "wishful thinking" and resistance to pressure of outside influence, however strong to produce results not consonant with reality. Absolute independence and freedom from an unwarranted desire to please have come to be realised as vital to the retention

of objectivity and the creation of an Intelligence Service upon which full reliance can be placed. Of really vital importance in this respect is the vexed and fundamental problem of when intelligence should be released. It is here that the intelligence officer needs all his skill. It is no use keeping back information till it is useless, or withholding it when, though ^{immature} miniature, it may be the catalyst to someone else's investigations. It is equally harmful to broadcast intelligence which is inaccurate or alarmist, or which may lead the layman to draw wrong conclusions. To strike a nice balance in this matter is a grave responsibility, calling for thorough knowledge of the subject and the soundest and most level-headed judgement.

DEVELOPMENTS

24. It is evident that among the developments of Air Intelligence during the war, some will remain as permanent accretions of value to the scope and efficiency of the Service as a whole; others, however, being necessarily only transient in character and therefore incapable of continuation in peace-time, must inevitably disappear yet leave an enduring record to serve not only as a basis of historical study but also as a future guide to their potentialities, requirements and functions.

25. Permanent Features Among developments of lasting value may be included those affecting Scientific and Technical Intelligence, Photographic Intelligence, Airfield and Target Intelligence, the 'Y' Service and certain aspects of Security Intelligence. While it is true that, except for Airfield Intelligence, these subjects were covered by the Intelligence organisation already existing in 1939, in most cases they existed only in embryonic form. The searching test of practical experience in war, accompanied by the full realisation of their functions as integral parts of a living and vital Intelligence Service, constitutes in sum a most valuable legacy of the 1939-45 war. The technique and methods evolved will remain, and doubtless will continue to develop in consonance with future research and requirements. In particular, Air Scientific Intelligence will be a keystone in the edifice having regard to the future development of radar and other signals matters, guided missiles and the atomic bomb, both from the point of view of national defence and our own scientific research. A further lesson to be learnt is the study of Airfield Intelligence in all its aspects, a subject which before the war scarcely existed and whose function and purpose only came to be recognised with the sudden impact of hostilities as an indispensable factor in the waging of war against enemy air power.

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26. Other sides of Intelligence not applicable to peace-time are those concerned with censorship, radio monitoring, clandestine operations and other ancillary activities in all of which important experience was gained.

27. The Legacy of War. There is therefore an important legacy from the test of war, covering every important aspect of Intelligence activity which, after the most searching tests, has left Air Intelligence established as a reliable and indispensable asset and as a service upon which the most exacting demands are made; these are unlikely to be less important in the future than they have been in the past. The extent to which the service has been permanently strengthened, whether directly or indirectly, from the point of view of operational efficiency and scope, should ensure that it continues to fulfil its functions effectively also in peace-time, even though its opportunities may then be greatly restricted.

28. In reviewing the achievements and developments of Intelligence, it has been emphasised that from very small beginnings it grew into a vast and complex organisation built up largely by the individual skill and effort of its members. Its personnel at all levels were in fact the mainspring of this achievement, and the method of their selection and their qualifications to undertake what in all essentials was an entirely new commitment in Air Staff work are reviewed in the following paragraphs.

PERSONNEL.

29. Regular Officers. It has first to be recognised that during the greater part of the war, and particularly after 1940, there were virtually no regular officers in the Air Intelligence organisation below the level of Director or Deputy Director at Air Ministry or of C.I.O. at Commands; their total number at the closing stages of the war probably did not exceed 15-20 out of a total of some 700 officers in A.C.A.S.(I)'s Department alone. The remainder were almost exclusively drawn from civilian life, ^{many} with no previous service experience of any kind.

30. Although the need for expansion had been envisaged before the war and officers from the Staff College had been earmarked for Intelligence duties, it was found in practice when war came that the urgency of other Service

/requirements

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requirements absorbed the majority. In any case they would have been insufficient in number to meet the rapid growth which took place. It must be accepted, moreover, that the training and experience of normal service life under pre-war conditions in the Air Force did not in most cases make regular officers necessarily qualified for the work entailed in Intelligence duties.

31. War-time Commissions. In the circumstances, the policy of commissioning Intelligence officers direct from civilian life (not only for Air Ministry, but also in even greater numbers for Commands, Stations and Units, both at home and overseas) was inevitable and thanks to careful and searching selection in the light of growing experience, proved very successful. The appointment and selection of Intelligence Officers for duties wherever they may be required depends in a very high degree on the choice of the right personnel, having regard to the particular qualifications which they possess and which happen to be called for. These personal factors have to be reckoned with as a prime essential to the efficient working of an Intelligence Staff at any level, and particularly so at Air Ministry; they cannot be left to the haphazard chance of indiscriminate postings.

32. Qualifications. Intelligence is best compared to a jig-saw puzzle in which there are never quite enough pieces to complete the picture which itself is constantly changing. The problem resolves itself therefore into a struggle to guess the shape of the missing pieces and, simultaneously, to predict the manner in which the picture will change next. It follows that a good Intelligence officer, however employed, must possess at least a modicum of such general qualities as:- mental alertness, a capacity for concentration, patience, perseverance, a powerful memory and above all the ability to deduce a whole from an incomplete selection of apparently unrelated parts.

33. Over and above these general qualities there are certain special qualifications which the individual officer must possess or acquire through training. These include (a) initiative and enterprise to investigate and exploit new or potential sources of information, (b) a faculty for critical appreciation of evidence, (c) an aptitude for research, (d) a high

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standard of accuracy, (e) a command of English and (f) some knowledge of foreign languages. It was further revealed that the critical and analytical faculties found in persons of high academic distinction enabled them to make outstanding contributions to the development of Intelligence.

34. It does not of course follow that every individual Intelligence officer should be outstanding in all these respects, but upon the successful marshalling and integration of these characteristics depends the successful exploitation of Intelligence and the ability to carry the conviction to the Operational and Planning Staffs that an Intelligence picture is in fact sound. Experience has shown that officers drawn from the Law, Academic and Scholastic professions, Journalism, and other branches of Letters, Research Institutions and Museums, and certain walks of ^{Industry and} Commerce have commonly proved the most successful as Intelligence Officers.

35. The German System. In contrast the German Air Staff Intelligence personnel were drawn exclusively from the ranks of regular officers with emphasis on their operational background. No attempt was made to introduce civilians on war-time commissions on any appreciable scale in any branch of Air Intelligence; ~~and~~ the Germans ~~also~~ failed to exploit the widely varied qualities and ability offered by this source of recruitment, ^{and thus failed} ~~or~~ to secure the important expert continuity which was so successful in the R.A.F.

As a rule, German Intelligence was closed to regular officers only; ^{I have} ~~known~~ ^{one} ~~of~~ ^{the} ~~exceptions~~ ^{was} ~~however~~ ⁱⁿ the counterpart of A.D.I.(K), ^(- intensification of P/W.) ~~where all~~ ~~the~~ ~~officers~~ ~~were~~ ~~certainly~~ ~~not~~ ~~regulars.~~ I have substituted "Air Intelligence" for "G.A.F.", because in the G.A.F. as a whole, war-time commissions were, of course, granted on a large scale.

38. Future Maintenance of Intelligence Staff. ~~Hence~~ It might be argued that in any future emergency an Intelligence Staff can again be assembled without difficulty and that it is therefore immaterial that regular officers in peace-time should receive special Intelligence training. This however is not so. In the first place, the precise nature and importance of Intelligence in relation to the Air Force is now known, whereas before it was untested and far from fully appreciated; in any future emergency an efficient Air Intelligence Staff and organisation will therefore be expected from the start since the Operations Staff will depend greatly upon it. Again a

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period for expansion and development and for the acquisition of training and experience might not in future be available; if, for instance, the commitments and responsibilities which devolved upon Intelligence between 1943-45 had been imposed between 1939-42 it would have been a sheer physical impossibility for them to be met for lack of organisation, manpower and experience.

39. It has to be admitted that the maintenance of an efficient Intelligence Staff in peacetime presents considerable difficulties, not only because it lies outside the normal orbit of a regular officer's activities and lacks appeal, but also because the material and opportunities for training are in a large measure restricted in peace-time. The best solution appears at present to be that about one third of the number of Intelligence posts required in peacetime should be held by regular officers and that the remaining two-thirds should be held by officers who will make their career in Intelligence and will form the nucleus for the great demand and rapid expansion which is to be expected in wartime.

From experience gained in war, the importance of Senior Intelligence Officers, particularly heads of sections, being thoroughly versed in the Intelligence requirements of air operations cannot be too strongly emphasised. Although there may be considerable difficulties, both in peace-time and in war, they should maintain a close personal touch with Command Intelligence at home and, where necessary overseas, so that waste of effort may be reduced to a minimum and the ever-changing requirements of the Operational Commands may be kept continually in mind. In war-time, too, Intelligence should be strongly represented in Planning Staffs, so that a detailed picture may be quickly available and may be elucidated from first-hand knowledge; if Planning Staffs be not educated to an appreciation of the value of Intelligence, then the efforts by that Intelligence may be mitigated to the detriment of a whole national war effort.

CONCLUSIONS

40. To sum up, therefore, Intelligence, which may be defined as "the provision of information of value to those who plan and conduct operations, or formulate policy, and likewise to those who design our own aircraft and equipment", is to be regarded as a positive and active element impinging

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upon almost every aspect of Air Staff policy, strategy and planning.

This is indispensable as the only means of providing in time to be of value - that clear picture of the enemy from every angle, and therewith the eye and vision, without which Air Power cannot be efficiently employed. It is vital as a factor not only in defence but in the active carrying of the war to the enemy.

Its functions are not confined to the study of foreign or opposing air forces, but by virtue of the far-reaching effects and striking power of offensive air warfare extend to almost every angle of the enemy war potential be it military or economical.

42. It follows therefore that it is of the greatest importance that, even though the methods and technique of Intelligence may not be fully comprehended, the realisation of the part which Intelligence can play should be fully understood and appreciated, not only by those upon whom responsibility in air matters rests at the highest levels, but also by those to whom the handling and employment of air forces in the field is committed. This in turn can spring only from confidence and conviction in the soundness and reliability of the deductions presented by Intelligence; the high reputation gained in the past under the searching tests of war entitles this confidence to be maintained in the future, conditioned only by the provision of personnel of the right calibre and by the problem of maintaining efficiency due to the limitations of Intelligence material under peace-time conditions. The lessons taught by the experience of war have been examined in full: their application lies in the future.

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