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# The Worstest Manufacturer, Roderick Hill and 'the most courageous decision of the War': The Decision to Reorganise Britain's Air Defence to Counter the V-1 Flying Bomb

By Group Captain John Alexander

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**Biography:** Group Captain John Alexander specialised in air/land integration, in the Falklands in 1982 and various Middle Eastern campaigns, before spending six years in Afghanistan and Pakistan. A polemologist and two-time CAS Fellow at Cambridge and Oxford Universities, and now an Auxiliary, he has published in *Air and Space Power Review*, the *RUSI Journal* and *Asian Affairs*.

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**Abstract:** The first four V-1 flying bombs crossed the Channel in the early hours of 13 June 1944, exactly one week after D-Day; none were engaged and one reached Bethnal Green killing four people. When overnight 15/16 June the German Air Force launched 244 V-1s against London, the long-planned British counter V-1 defences, consisting of fighter, gun and balloon belts, brought down only thirty-three V-1s, including eleven shot-down by anti-aircraft (AA) guns, and seventy landed on London. This paper explores the decision to reorganise Britain's Air Defence during this crucial stage of the War.

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**Disclaimer:** The views expressed are those of the authors concerned, not necessarily the MOD.

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## Introduction

The first four V-1 flying bombs crossed the Channel in the early hours of 13 June 1944, exactly one week after D-Day; none were engaged and one reached Bethnal Green killing four people.<sup>1</sup> When overnight 15/16 June the German Air Force launched 244 V-1s against London, the long-planned British counter V-1 defences, consisting of fighter, gun and balloon belts, brought down only thirty-three V-1s, including eleven shot-down by anti-aircraft (AA) guns, and seventy landed on London. Over three thousand V-1s followed in the next five weeks, some with terrible lethality like the bomb which killed 121 people in the Guards' Chapel at Wellington Barracks on Sunday, 18 June. Yet only the most modern fighters were fast enough to engage the V-1s and the 1,000 AA guns deployed destroyed less than ten per cent of the bombs they engaged.

On 13 July 1944 Air Marshal Roderick Hill, the Air Marshal Commanding, Air Defence of Great Britain (ADGB), ordered, seemingly without reference to his superiors, the complete reorganisation of the air defence scheme: redeploying almost 1,000 AA guns and 23,000 men and women from the Kent Downs to a gun belt on the Kent and Sussex coast. The redeployment reordered and separated fighter and gun engagement zones, allowing the guns to exploit new US gun-laying radars and proximity fuzes, increasing the guns' lethality four-fold.

The decision, which Hill's daughter and biographer, Prudence, called the 'most courageous of the war',<sup>2</sup> warrants analysis for a number of reasons. First, it was controversial at the time as it prioritised AA guns over fighters, when Britain's previous air defence schemes since 1917 had prioritised fighters over guns, and thus far fighters had destroyed more V-1s than guns. Second, as the official histories note, the Air Staff suspected Prime Minister Winston Churchill's son-in-law Duncan Sandys, an MP and controversial Territorial Army AA senior officer until appointed a junior minister in 1941,<sup>3</sup> and chairman of the government's Operation Crossbow committee, had pressured Hill into the decision. Third, the decision remains contested in the historiography, with Colin Dobinson's recent and comprehensive history of AA Command in Operation Diver highlighting AA Command's and Sandys's accounts both differ from the official history, which credits an Royal Air Force (RAF) reserve officer with the idea.<sup>4</sup>

Additionally, much of the flying bomb historiography focuses on both the human cost and the Anglo-American Crossbow bombing operations to destroy the launch sites, rather than defence against the V-1s. The V-1s were to kill 6,184 people in the UK, out of the 51,509 killed by German bombing throughout the war, including 2,754 by V-2 rockets and 148 by cross-channel guns.<sup>5</sup> Another 8,696 V-1s and 1,610 V-2s were fired at Antwerp killing 3,440 Belgian civilians and 682 Allied servicemen, and a further 314 V-1s at Brussels.<sup>6</sup> The greatest human cost though was to the tens of thousands of slave labourers from occupied Europe forced to make the vengeance weapons in brutal conditions. The 81,000 tons of bombs dropped by the RAF and United States Army Air Force (USAAF) on Crossbow targets between early June 1944 and the end of August represented three per cent of all the bombs dropped by the British and Americans in all theatres during the war.<sup>7</sup> Yet, Hill's decision was made in the

context of enemy deep attack by uncrewed aerial systems requiring the integration of home defence and expeditionary operations in the same time and space, across multiple domains and service boundaries, and necessitating the rapid adaptation of new technology into an established integrated air defence system is still relevant today. Moreover, political imperative appears to have compressed the strategic and operational levels of command. This article uses unpublished archival sources to examine Hill's decision.

## **Operations Crossbow and Diver**

The Allied counter V-1 operations took place in a complex operational area. The Allied invasion of North West Europe, codenamed Overlord, was executed in the same time and space as supporting and concurrent operations, with necessarily complex command and control arrangements. These included the Fortitude deception plan, maritime and air anti-submarine and anti-surface operations, and the diversion of RAF Bomber Command and US Eighth Air Force from the Combined Bomber Offensive to support Overlord's transportation plan, under the control of General Dwight D Eisenhower, Supreme Commander Allied Expeditionary Force, as well as the amphibious and air assault itself. Moreover, UK air defence operations continued with the defeat of the German mini-blitz in early 1944, the need to protect the Overlord invasion force from German air reconnaissance and attack, and the anticipated German V-1 and V-2 vengeance weapons designed to indiscriminately kill British civilians.<sup>8</sup>

## **Operation Crossbow**

Crossbow was the codename for Anglo-American operations against the German V-1 (codenamed Diver) and V-2 weapons (codenamed Big Ben). In April 1943 the British Chiefs of Staff (COS) had recommended to Churchill that his son-in-law Sandys should head the Crossbow committee of scientific and intelligence advisors to establish the flying bomb and rocket threat, and devise counter-measures.<sup>9</sup> The Crossbow committee's co-ordination, combining Ultra intelligence and the RAF's Central Interpretation Unit's (CIU) analysis at RAF Medmenham resulted in the attack by 471 Bomber Command heavy bombers on the V-weapon research facilities at Peenemünde on 17 August 1943. In December, Air Marshal Bottomley, the Deputy Chief of the Air Staff who represented the Air Ministry on the Crossbow committee, reported to the COS that the CIU had detected 'ski-sites' in Northern France designed to launch the 'pilotless aircraft' at England.<sup>10</sup> By 2 April 1944, the medium bombers of Second Tactical Air Force (2TAF) and Ninth US Air Force, and the heavies of US Eighth Air Force and Bomber Command, now under Eisenhower's control for Overlord, had dropped 15,936 tonnes of bombs on ninety-six ski-site targets, and a further 3,806 tonnes on 'large sites', a euphemism for V-2 sites.<sup>11</sup> By May 1944 ten per cent of all Anglo-American bombing effort was directed at Crossbow targets.<sup>12</sup>

## **The Diver Air Defence Plan**

Meanwhile ADGB produced contingency plans for both the protection of the Overlord concentration areas and the anticipated V-1 offensive. Hill's ADGB had been responsible for Britain's air defence since November 1943 when Fighter Command was split between it and

2TAF. Hill reported through Air Chief Marshal Sir Trafford Leigh Mallory, Commander-in-Chief, Allied Expeditionary Air Force (AEAF), to the British Air Ministry, rather than to Eisenhower. Hill, a new three star in the US parlance of the time, had operational control of all elements of the integrated air defence system including the 250,000 men and women of the British Army's AA Command, under General Sir Tim Pile, General Officer Commanding-in-Chief AA Command, a four star since 1941.<sup>13</sup>

Hill's assessment was that the V-1 was another aircraft, only pilotless, and therefore the air defence scheme needed to be adjusted, but not radically changed, when the V-1 attacks started.<sup>14</sup> Britain's air defence had been a composite of increasingly integrated detection and warning, fighters, guns, balloons and searchlights since the first Zeppelin raids on Britain in 1915. It was first unified under a single commander, Major General E B Ashmore, as a result of Lieutenant General Jan Smuts' first War Cabinet report following the deadly German Gotha bomber raids of mid-1917.<sup>15</sup> Ashmore's first integrated air defence plan for the London Air Defence Area had layers of AA guns, to break up German bomber formations, with aircraft patrol lines behind.<sup>16</sup> The inter-war Steele-Bartholomew, Romer and 1934 Reorientation Schemes had inner and outer artillery zones, but by 1939, with the introduction of faster monoplane bombers and fighters the outer artillery zone was dispensed with, and London and other cities and ports had inner artillery zones only, called Gun Defended Areas, therefore providing fighters with the freedom to engage outside of these.<sup>17</sup>

Pile's AA Command is often overlooked. AA artillery claimed around one quarter of German aircraft shot down in the Battle of Britain and was the sole means of defence against night attack until the radar guided night fighter was developed. AA Command was a relatively static organisation manned by territorials or men unsuitable for the Field Army, and an increasing number of women of the Auxiliary Territorial Service were employed in all roles except firing the guns, including the prime minister's daughter Mary Churchill.<sup>18</sup> Pile claimed the technical aspects of air defence had forced his Command to become the most scientific arm of the Army.

It seems likely the Diver air defence plan was the result of combined ADGB and AA Command planning, with AA Command providing the AA gun expertise, notwithstanding AA Command's subsequent criticism of the plan. According to Pile's post-war despatch:

The decision to deploy [the guns] well inland was taken in order to reduce enemy jamming of radar equipment; to allow fighter aircraft the maximum area of manoeuvre and to leave the coast defences free to engage attacks by pilotless aircraft. It was not intended to use either static guns or mixed units [with men and women] in these places.<sup>19</sup>

It is clear from the maps produced at the time that the guns were sited in the Kent Downs in a belt designed to be as short as possible to cover the arcs between the probable launch zones in France and London. Scientific intelligence predicted the V-1s would approach London at heights of up to 6,000 feet, and therefore siting the AA guns in the Downs would enable them

to engage the V-1s while protecting their new gun laying radars (the GL Mk III) from expected German jamming.<sup>20</sup>

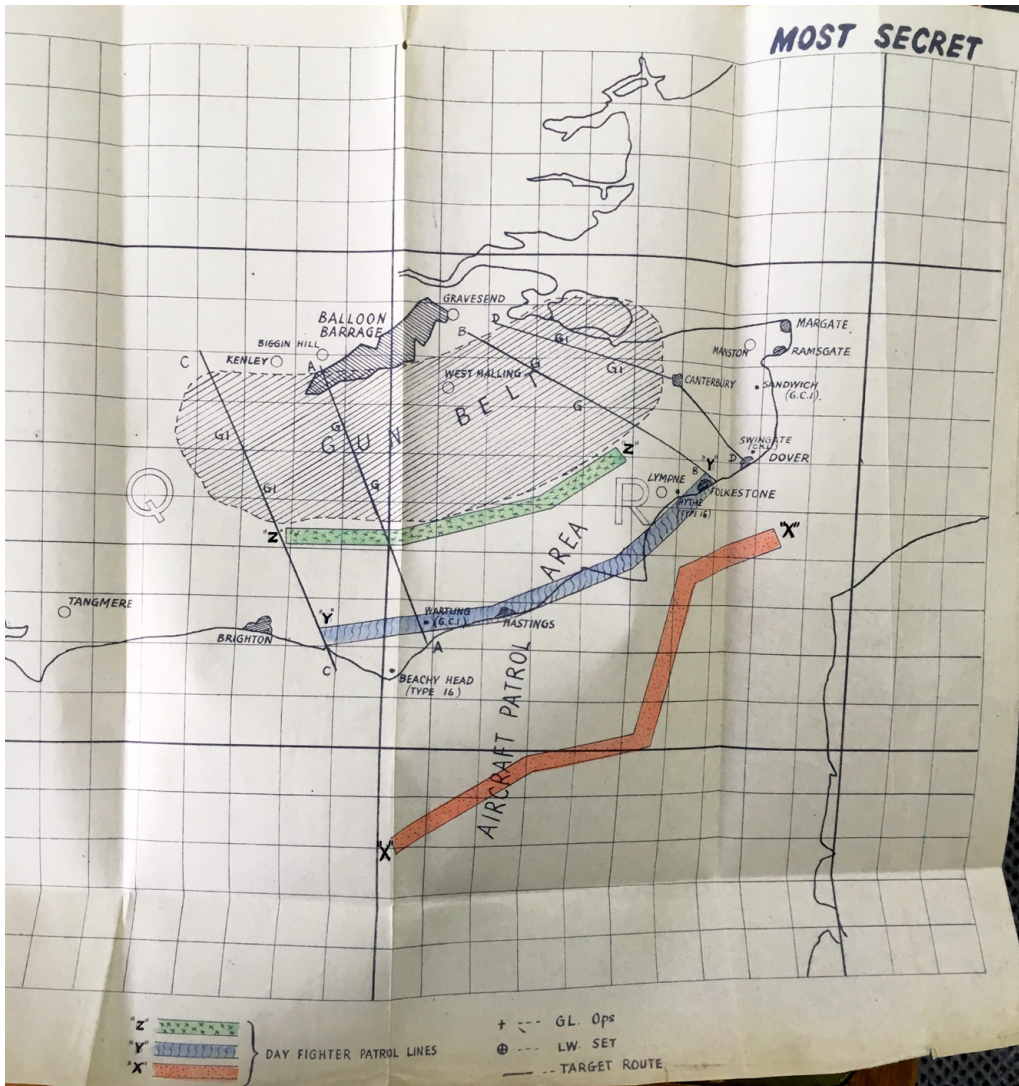


Figure 1. The Operation Diver Defence Plan, April 1944.<sup>21</sup> With Permission of The National Archives.

The redeployment of AA Command for the Diver air defence plan was executed on 16 June after the sustained V-1 attacks started. In three days, 376 Heavy AA guns (HAA), mainly 3.7-inch with some US Army operated 90 mm guns, and 592 light AA guns (LAA), mainly 40 mm Bofors, were deployed from London and other Gun Defended Areas to the gun belt on the Kentish Downs. That the redeployment was achieved in just three days was a remarkable performance given Pile's estimate that it would take eighteen days to redeploy.

Furthermore 560 RAF Regiment LAA guns (192 40 mm Bofors and 368 20 mm Hispano guns) were redeployed from ADGB airfields to the south coast, coming under AA Command.<sup>22</sup> On 18 June Eisenhower directed AEF that air attacks on V-1 sites had priority over all other targets except a battlefield emergency, following the War Cabinet's request.<sup>23</sup>

### **Initial Results**

From 12 June to 15 July, of the 4,361 V-1s launched, 2,943 were observed by the defences and 1,241 destroyed, with 1,270 reaching London (see Table 1). Fighters destroyed 824, AA guns 261 and another 55 hit balloons. The V-1s' speed limited the warning given to fighters and only the fastest fighters such as the Tempest could catch the flying bombs. The hazard of shooting down a flying bomb led to the fighter tactic of tipping the V-1 over with the wing, probably the iconic image of the V-1 defences, as shown in Figure 2.

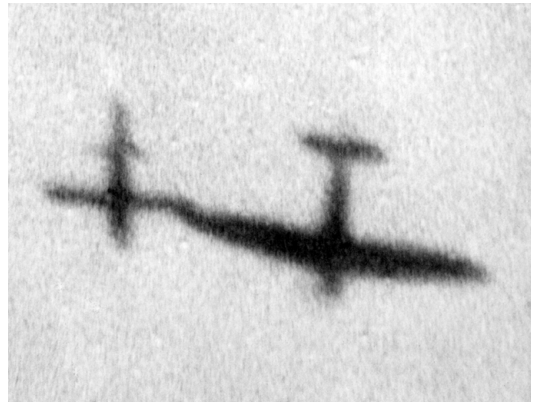


Figure 2. A Spitfire tipping over a V-1. 9 August 1944.  
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It was the AA guns' performance that was most disappointing. Given a target that took no evasive action, the guns were destroying less than ten per cent of the V-1s they engaged. One factor was the V-1's approach at between 2,000 and 3,000 feet was unexpectedly low; above the effective height of LAA and too low for the mobile 3.7-inch guns to be manually laid onto the target. Electronically-powered, and therefore faster laying, static 3.7-inch guns were redeployed from the Gun Defended Areas to the Diver gun belt but it took time to build emplacements for them, although Piles' Royal Electrical and Mechanical Engineers devised an improvised platform from railway sleepers. Furthermore, AA Command's guns, sighted for protection from German jamming, had their observation and field of fire blocked by foliage or built-up areas. Many if not all the RAF Regiment LAA guns on the coast were prevented from firing at V-1s during this phase because they were in the fighter belt. Furthermore, AA Command believed the method of weapon control which enabled fighters to enter the Diver gun belt in hot pursuit of the V-1s or in good weather (defined as being able to see the ground) was further restricting gun engagements.

### **The Redeployment Decision**

Roderick Hill was perhaps an unusual choice to command ADGB. Apart from a brief stint immediately beforehand commanding Fighter Command's 12 Group, his background was in test flying and development, with little operational command. A fine arts graduate from University College, London, in the First World War he had proved himself as an exceptional pilot, being one of the few who could master No 60 Squadron's Morane-Saulnier Type N

monoplane fighter, before commanding experimental units from 1917. He must have shown potential, as he attended the third RAF staff course, commanded No 45 Squadron in Iraq after Arthur Harris and in 1936 preceded Harris as AOC Palestine and Transjordan during the Arab Revolt, where he was responsible for introducing a strikingly modern method of close air support.<sup>24</sup> In 1942 Sir Wilfred Freeman told Portal that Hill was second rate, with 'poor judgement of men.'<sup>25</sup> Nevertheless, Hill was Leigh Mallory's choice first as AOC 12 Group and then to command ADGB.<sup>26</sup>

## The Worsted Manufacturer

The decision to reconfigure the air defence scheme followed a meeting between Hill and Pile's staff at HQ ADGB at RAF Bentley Priory on 10 July to deconflict fighters and guns. Pile suggested moving all the guns from the coast to the gun belt and keeping the fighters out of the belt to ensure total deconfliction, which Hill agreed to.<sup>27</sup> According to the Air Historical Branch (AHB) narrative, the official history, Hill's post-war classified report and his 1947 Despatch, before issuing the executive order Hill tasked his Deputy Senior Air Staff Officer (SASO), Air Commodore Geoffrey Ambler, to draft a note for Hill to explain to his fighter pilots why they would be excluded from the gun belt.<sup>28</sup>

Ambler had an unusual background for an air officer as he was an Auxiliary, an RAF part-time reserve, called up for the war. His civilian profession was running the family's textile mill in Bradford. Furthermore, he had read engineering and economics at Clare College, Cambridge, and after the war he invented the Amber Superdraft which increased tenfold the speed at which wool was spun and transformed the worsted spinning industry.<sup>29</sup> He had started flying in 1928 and was commissioned into the Auxiliary Air Force in February 1931, commanding first No 608 (North Riding) Squadron from 1934 to 1938, and then No 609 (West Riding) Squadron, both bomber squadrons. From 1939 to 1942 Ambler was a sector commander in Fighter Command, then in 1942 Commandant of the Royal Observer Corps, before becoming Deputy SASO at Fighter Command in 1943.<sup>30</sup>

Ambler wondered whether the proposed redeployment from the coast to the Kent gun belt went far enough and so he produced a formal appreciation (it would now be called an estimate) in accordance with the *RAF War Manual* overnight 12/13 July and seemingly not filed. He realised the best solution was deconfliction achieved by moving the AA guns to the coast, with fighters in front and behind.<sup>31</sup> On 13 July Ambler discussed the matter with Sir Robert Watson-Watt, the radar scientist also based at Bentley Priory, and member of the Crossbow committee. Watson-Watt agreed with Ambler, and together they quickly convinced Air Vice-Marshal W B Calloway, ADGB's SASO, and all three then convinced Hill. Watson-Watt conferred with Pile, and Hill called a conference to discuss the proposal for 1730 that afternoon, attended by Hill, Pile, Watson-Watt, Calloway and Ambler, and other ADGB and AA Command staff.<sup>32</sup>

Hill opened the conference by stating that following a comprehensive appreciation by Headquarters ADGB he had concluded the guns should be redeployed to the coast.

Pile agreed immediately. The decision is captured in the minutes, drafted as usual by Lieutenant Colonel C D Aarvold, an AA officer on Hill's staff, and these minutes were not subsequently challenged.<sup>33</sup> HQ ADGB's revised Operation Order, issued on 15 July, ordered a new Diver gun belt of 10,000 yards out to sea and 5,000 yards inland, and restricted fighters to above 5,000 feet when over it, and all other aircraft to above 10,000 feet. Guns outside of the gun belt could engage enemy aircraft but not V-1s. The seaward boundary of the gun belt was to be marked by marker buoys.<sup>34</sup> Furthermore, Hill notified Leigh-Mallory, who suggested starting with a trial scheme, which Hill said time did not allow. Hill informed the Air Ministry in a memo sent on 15 July, copied widely, which stressed the new plan 'was a tactical redeployment of the resources under my control' and forwarded a note from Ambler outlining the rationale for the redeployment.

Ambler's note, almost certainly based on his appreciation of just two days prior, outlined the advantages of the new plan for the 'co-ordination of Fighters and AA Guns', starting with fighters. As most fighter V-1 engagements had been overland, the new plan expanded the fighter zone overland, and allowed night-fighters the use of searchlights. Whereas deploying guns on the coast would, 'in the opinion' of experts, allow the best use of radar, the 'extensive use of VT [proximity] fuzes', and projectiles will fall into the sea, avoiding damage to property or civilian casualties. Furthermore, the new plan required only one 'rule of engagement' and both guns and fighters had absolute freedom within their zones.<sup>35</sup>

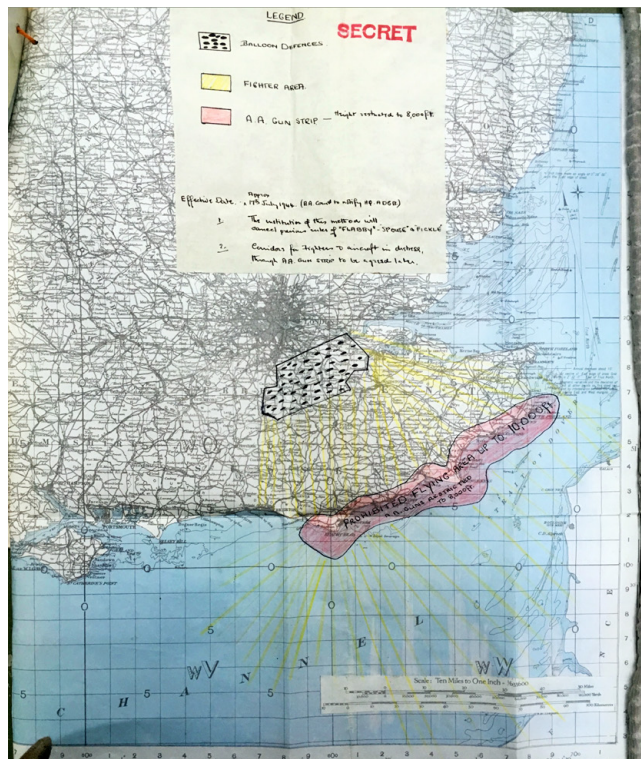


Figure 3. The Revised Operation Diver Plan, after 13 July 1944.<sup>36</sup> With permission of The National Archives.

## Results of the Redeployment

The new scheme had an immediate impact, broadly quadrupling the guns' lethality. As Ambler predicted, the scheme combined the increasing replacement of mobile manually laid 3.7 inch guns with the more effective electrically powered static guns (shown in Figure 4), the use of the new US SCR 584 gun-laying radars, and the new proximity fuzes (known as variable time

(VT) fuzes) in the 3.7-inch and US 90 mm HAA guns. The improved results are shown in Table 1 for the two time periods of the main offensive, both before and after the 15 July redeployment. Phases 2 and 3, the air launched attacks and the limited long-range attacks from the Netherlands, when Hill increasingly relied on guns to bring down launched V-1s and used his fighters for counter-force attack, are beyond the scope of this article.



Figure 4. Static 3.7-inch anti-aircraft guns emplaced on the promenade of a South Coast resort, 6 August 1944. IWM H39807 non-commercial licence.

The move to the coast allowed the efficient use of the VT fuse, which alone was estimated to be seven times more lethal to V-1s than the existing No 208 fuze, which had to be set to the anticipated range.<sup>37</sup> The proportion of V-1s engaged by guns that were destroyed rose from ten per cent before the reorganisation of the defence to 17, 24, 27, 40, 55, 60 and 74 per cent respectively in the weeks following. Furthermore, an improved barrage of 2,000 balloons, now set to the correct height for the V-1s, brought down fifteen per cent of the V-1s that entered it. Although many of the fifty-six RAF Regiment LAA squadrons were now in the gun belt,

with their engagements misleadingly recorded as AA Command in the Fighter Command Operational Record Book.<sup>38</sup> Furthermore, the RAF Regiment's 815 20 mm Hispano canons, whose estimated 412,000 rounds fired accounted for only seven V-1s, were increasingly withdrawn from the operations, though its 40 mm Bofors LAA guns remained.<sup>39</sup> As the RAF Regiment squadrons on the coast were often deployed forward of the Army's HAA guns, their tents were sometimes shredded by malfunctioning 3.7-inch VT fuzes. The RAF Regiment's contribution to Diver, just one paragraph in the authorised history, is a subject ripe for further research.<sup>40</sup>

Number of Bombs	Main Offensive		Phase 2	Phase 3	Whole Campaign
	12/6/44 15/7/44	15/7/44 5/9/44			
From Ramps	4,271	4,346	-	275	8,892
From Aircraft	90	310	1,200	-	1,600
Total Launched	4,361	4,656	1,200	275	19,492
Observed by Defences	2,934	3,791	638	125	7,488
Destroyed by Fighters	924	847	71	4	1,846
Destroyed by Guns	261	1,198	331	87	1,878
Destroyed by Balloons	55	176	-	0	231
By All Arms	1,241	2,222	403	91	3,957
Eluding Defences	1,693	1,569	235	34	3,531
Reaching London	1,270	1,070	66	13	2,419

Table 1. The Flying Bomb Offensive.<sup>41</sup>

## Duncan Sandys

The reason for the Air Staff's suspicion of Hill's decision was that Duncan Sandys had given Marshal of the Royal Air Force Sir Charles Portal, the Chief of the Air Staff (CAS), the impression he was making military decisions as chairman of the Crossbow Committee. Sandys, Joint Parliamentary Under Secretary at the Ministry of Supply, was from April 1943 chairman of the Crossbow Committee and reported personally to the War Cabinet. He co-ordinated V-weapon intelligence, counter-force and defensive operations, but he had no operational control. Hill and Pile attended the defensive operations element of the Crossbow Committee only, although Bottomley as DCAS attended throughout. When Sandys reported to the War Cabinet on 15 July, he was reporting Hill's decision of 13 July:

In the light of the operational experience gained to date the layout of the defences have been reviewed. As a result, it has been decided to make a number of important changes in our deployment plan for guns and fighters.

Sandys listed AA guns before fighters, though at this date fighters had destroyed four times as many V-1s as the guns, and his use of 'it has been decided' may have implied to Portal it was Sandys's decision, as Sandys was later to imply.<sup>42</sup> Sandys sent a more detailed report on the V-1 defences to the War Cabinet on 17 July and again used 'it has been decided'. Sandys was either implying his responsibility or, if not, circumventing Hill's chain of command by reporting directly to the War Cabinet, rather than through AEF, the Air Ministry and the COS' Committee.

As a result, several acrimonious exchanges between Portal and Sandys followed. When Portal reminded Sandys at the COS' Committee on 18 July of the constitutional responsibilities of the Air Ministry for air defence, Sandys admitted the new plan was 'settled' by Hill in consultation with Pile. The COS chairman, Field Marshal Sir Alan Brooke, evidently decided the military responsibilities needed clarification; hence the minutes stated the COS:

... agreed that the constitutional responsibility of the Air Ministry for the ADGB, and the responsibility of the COS Committee for advising the Government on the military aspects of defence measures, remained unchanged by any of the special machinery set up to deal with Crossbow.

This presumably is the 'first class row' and a 'tremendous beating of the drums' that Pile referred to in his later book *Ack-Ack*. In Pile's reading Hill was in trouble because he had sided with Sandys (and Pile) and hence Portal's statement that the responsibility must rest with Hill.<sup>43</sup> Another reading is that Portal is reminding Sandys (and Pile if he had a back channel to his former AA comrade Sandys) not to circumvent the military chain of command. Hill was the operational commander and had told the Air Ministry he was responsible for the decision in his 15 July memo.

Notwithstanding Portal's intervention on 18 July, Sandys on 25 July sent another report to the War Cabinet recommending a military decision, this time the desirability of increasing the number of fighter squadrons.<sup>44</sup> At the COS' Committee on the same day Portal, it seems, saw this as another attempt by Sandys to circumvent the chain of command. Portal reminded Sandys it was the Air Marshal Commanding ADGB's responsibility to judge whether he had sufficient fighters, for C-in-C AEF to allocate resources as appropriate, and in any case, Hill had stated he had enough fighters. Sandys responded saying he thought more fighters were necessary, to which Portal responded by telling Sandys if Leigh-Mallory needed direction he should seek it from the COS. Sandys was subsequently forced to change the wording of his report.<sup>45</sup>

Sandys held a lengthy press conference on 7 September after the first, most serious, phase of the V-1 offensive ended, when Allied forces overran the launch sites in France,

after which he was credited in the press for leading the successful counter-V-1 operations.<sup>46</sup> The photograph of the press conference at Figure 5 is illuminating, with Sandys standing, with Pile prominent to his right, Air Vice-Marshal William Gell, AOC Balloon Command, giving the impression by cleaning his glasses of someone who would rather be somewhere else, and Hill almost invisible in the background, far right, on Brendon Bracken, the Minister of Information's left.

Sandys' surviving transcript of the press conference focuses on the role of the guns, quoting the statistics that before the redeployment guns destroyed ten per cent of V-1s observed, and in the weeks after had increased to 17, 24, 27, 40, 55, 60 and 74 per cent, which got a cheer from the press. Sandys' credited both Hill and Pile for the 'bold step' of the redeployment to the coast.<sup>47</sup>



Figure 5. Duncan Sandys, Press Conference Ministry of Information, 7 September 1944 © IWM CH 13827 non-commercial licence.

In the questions and answers after Sandys' address, Hill reminded the conference that fighters had to date destroyed more V-1s than the AA guns, giving the overall figures up to 5 September of 1,900 V-1s destroyed by fighters, 1,560 by guns and 249 by balloons, and that the Tempest Wing alone had shot down 578 V-1s. The press was interested in the names of the fighter aces, such as Squadron Leader Berry who alone had destroyed 58 V-1s in a Tempest, and the role of the women on the guns, and whether they had leave. Pile gave a figure of 392 LAA guns for the RAF Regiment, which was the number of Royal Artillery LAA guns, whereas the RAF Regiment had provided up to 600 guns.

## Post War Accounts

### Pile: 'Fighter Command evidently thinking along the same lines'

After the war Pile countered the RAF version of the decision when he claimed in his 1947 Despatch that the redeployment of the gun belt in July 1944 was AA Command's idea:

Lt Col H J R Radcliffe MBS, at that time my Technical Staff Officer, suggested that we should re-examine the plan of locating the guns on the coast. This plan had always seemed to us to have great advantages from the gun point of view.<sup>48</sup>

In this Despatch Pile goes on to state 'Fighter Command [sic] were evidently thinking on the same lines' as Hill announced his decision on 13 July.

Pile's account is surprising given that he appears to have been highly regarded by Fighter Command. He joined the Royal Horse Artillery after getting into the Royal Military Academy at Woolwich (where Royal Artillery and Royal Engineer officers trained) at the second attempt, had a good First World War, after which the radical military strategist Colonel J F C Fuller convinced him to join the Tank Corps. Pile took part in the mechanised experiments, served at the RAF's School of Army Co-operation at Old Sarum. When the Government through the Inskip Review of 1937 decided to massively increase Britain's AA defences, and when Sandys joined, Pile was appointed to command the force, taking over from the future Chief of the Imperial General Staff, Brooke. Pile's success meant he was the only Commander-in-Chief to remain in appointment throughout the war. Lord Dowding and Hill, who both had operational control of AA Command, complimented Pile in their Despatches.<sup>49</sup>

Radcliffe, as the AA Command Technical Staff Officer, would have understood the advantages of redeploying the guns to the coast as he knew the potential of the forthcoming US SCR 584 radar and VT fuzes through representing AA Command on Watson-Watt's Crossbow scientific sub-committees. The benefit of using VT fuzes on the coast had been raised at the Inter-departmental Radio Location Committee on 20 June and on 28 June Radcliffe had undertaken to consider how AA Command would make best use of the SCR 584 and VT fuzes.<sup>50</sup> Radcliffe may have therefore raised the advantage of redeployment with Pile but there is no record of an AA Command request to Hill.

Pile's account in his 1949 book *Ack-Ack* is subtly different to his official Despatch: skimming over the decision and instead focusing on the Air Ministry's reaction, and that he believed Hill had sided with Sandys and himself to prioritise AA Command's guns over the RAF's fighters.<sup>51</sup>

### **Ambler and Hill: 'certain persons have decided to compete in order to gain credit'**

The RAF historian T C G James seemed aware that Pile might make contradictory claims when in late 1945 he wrote to Hill, Ambler and Watson-Watt to verify their accounts while drafting the AHB narrative. James asked Ambler for 'a significant minute or paper' to address 'the constitutional issues it raised with the Air Staff' and 'the wrong-headed notions the public have of who was responsible'. In his reply Ambler told James:

It is important to note here that this was the first approach to [ADGB] Command on this matter and at no time (to my certain knowledge) previously had any suggestion come from AA Command that the guns should be moved to the Coast. There is no doubt whatever that the proposal to move the guns to the South Coast came from Fighter Command [sic] and not from AA Command. [...] I have always felt that the decision to redeploy the guns in the heat of the battle and with politicians standing on hind legs and yelling was a most courageous and gallant act.<sup>52</sup>

Furthermore, Hill supported Ambler's account of the decision when he replied to James and noted that AA Command was always keen to be seen as separate. Although neither Hill nor Pile mention it, Air Marshal Hill was a recently promoted three-star in operational control of the four-star General Pile's command. Hill, forever the test pilot, also sent James his log book entries for the 62 counter V-1 sorties he flew during Diver in his personal Tempest V.

The James-Ambler correspondence continued into early 1947 when in Ambler's final note he wrote 'certain persons have decided to compete in order to gain credit', and again states that AA Command had never previously raised the suggested move, the 13 July meeting was organised by Hill to direct his decision, and though Pile and Radcliffe may have discussed it 'what a man states he had in his mind at a particular time is not accepted as evidence in any court.' He concluded that Pile's account was part of a single service ploy to ensure Army AA was not placed under RAF control in the future.<sup>53</sup> It is worth noting that Ambler had by now been demobilised and was once again a worsted manufacturer, and possibly therefore less tainted than others by service politics.

### **Sandys: 'the facts are the exact opposite'**

Meanwhile Sandys had convinced his father-in-law of his leading role in countering the V-1 and the decision to reorganise the defence. According to the historian David Reynolds' account of the writing of Churchill's *History of the Second World War*, Sandys drafted the 'Pilotless Bombardment' section of volume 6, first published in 1953.<sup>54</sup> Churchill's history credits Pile and Sandys for pressing for the move, and Hill and Pile for deciding on the move, with Sandys' approval.<sup>55</sup> Sandys' view was clear when he had earlier chastised Sir Archibald Sinclair, the Secretary of State for Air, for praising the role of the fighters: 'You have no grounds to claim that the RAF frustrated attacks by the V weapons. The RAF took their part but, in my opinion, their effort ranges definitely below that of the AA artillery.'<sup>56</sup> Yet, during the main V-1 offensive fighters destroyed 1,771 and guns 1,459, and overall guns destroyed just 32 more V-1s than fighters in all phases, as Table 1 shows, including March 1945 when Hill's fighters were attacking the launch sites and not flying defensive patrols.

When in 1956 Basil Collier drafted the V-1 chapter of the Cabinet Office official history, *The Defence of the UK*, he followed James' 1947 AHB narrative, Hill's classified report and despatch, and James' correspondence with Hill, Ambler and Watson-Watt.<sup>57</sup> When Collier sent his draft to Sandys for comment, adding that 'General Pile has since told us that a similar plan had been discussed at AA Command but thought unlikely to get Hill's approval', it provoked an extraordinary response. Sandys said he could not understand Collier's 'extraordinary insistence on proving exactly who was responsible for what'. Nevertheless, Sandys questioned the 'impression' that Hill was the person who initiated and inspired the plan for the reorganisation of the defences and that Pile merely 'assented to it'. Sandys wrote he was 'in a position to exercise quite considerable influence upon the policies of the commanders concerned' and furthermore:

To the best of my knowledge, the facts are the exact opposite. Pile, with my knowledge and support, had been badgering Hill for quite a while to make this change. [...] I get the impression that he was resisting this change, not on operational grounds, but because he was afraid of offending the feelings of his pilots. I was so dissatisfied with the position that I went to the Secretary of State for Air [Sir Archibald Sinclair] and asked him to consider the removal of Hill from his command. (I mention this last point as background information only. I have no wish for it to be made public).<sup>58</sup>

Yet there is no mention of any proposal to move the guns to the coast in the minutes of the Crossbow Committee or Hill's ADGB conferences, other than on 10 July when Pile asks for the reverse, that is for all the guns to be moved to the Kent gun belt, and on 13 July when Hill directs the move to the coast.<sup>59</sup> Furthermore, there is no record of Sandys seeing Sinclair to get him to remove Hill from command of ADGB. That does not mean he did not, but if he had it would have been an interesting meeting, with Sandys, Churchill's son-in-law and junior minister, asking Sinclair, a Secretary of State, leader of the Liberal Party, and Churchill's devoted friend since before the First World War. Furthermore, Sinclair had an excellent relationship with his CAS, the longest serving of the chiefs of staff, and the only one who was, like Sinclair and Sandys, a member of Churchill's 'other [dining] club'.<sup>60</sup> In these circumstances it would have been a brave call to remove an air marshal from command because Army guns had been poorly sited, and presumably it would have fallen to Churchill to decide between Sandys, and Sinclair and Portal. Furthermore, Sandys may have been 'being economical with the truth', as his father-in-law might have said, either when telling Portal at the COS meetings in 1944 that he had not sought to influence Hill or when telling Collier in 1956 that he had. Collier, who in 1944 was an RAF intelligence officer working V-1s in HQ ADGB, noted in pencil on Sandys' response that Hill's account was 'certified by everyone but Mr Sandys as correct; where is the evidence to back his claim?'.<sup>61</sup>

## Conclusions

Portal soon realised Hill had made the right decision. Bottomley reminded him of his scepticism of Hill's decision on 1 September 1944 and Portal replied in a hand-written note 'I think we had better send him an Air Council letter when we are confident that the FB [flying-bomb] is a thing of the past for London'.<sup>62</sup> The Air Council then sent thanks to ADGB, AA and Balloon commands. In late 1944 Portal asked Hill to chair the technical branches committee while still commanding ADGB. Hill, agreed on the condition Ambler replaced Calloway as his SASO.<sup>63</sup> After the war, Hill was appointed Air Member for Technical Services where he established the RAF engineering branch, before retiring to become Rector of Imperial College and then Vice Chancellor of the University of London. Sandys is perhaps best known now as the Secretary of State for Defence whose 1957 Defence Review decided the RAF's fighters should be replaced by surface-to-air missiles.<sup>64</sup>

Hill's decision was courageous not just because it occurred at a critical time in the V-1 offensive but also because of the political pressure implied by Pile and Sandys' subsequent accounts.

Fighters were to remain critical to V-1 defence after Hill's 13 July 1944 decision to reorganise the air defence scheme. Nevertheless, the effectiveness of the AA guns markedly improved when redeployed to the coast, as it allowed not just deconfliction, which had been Pile's concern, but also the use of the US SCR 584 radars and VT fuzes as they became increasingly available. By August the guns were shooting down more V-1s than the fighters, the static 3.7s averaged just 100-150 rounds per kill, down from 600 with the older fuzes and radars. Hill thus achieved the best integrated air defence available against the threat, integrating across service and operational domain boundaries and sensitivities, using the advice of Ambler, Watson-Watt, Pile and the gunnery experts like Radcliffe. The archival evidence supports Hill and Ambler's accounts of the decision, while Pile's despatch and book are factually accurate though somewhat misleading. Sandys' account is not supported by the archival evidence.

## Notes

<sup>1</sup> Winston S. Churchill, *The Second World War: Vol. 6: Triumph and Tragedy* (London: Cassell, 1954), 34.

<sup>2</sup> Prudence Hill, *To Know the Sky; the Life of Air Chief Marshal Sir Roderick Hill* (London: W. Kimber, 1962), 215.

<sup>3</sup> J. P. Harris, 'The Sandys Storm': The Politics of British Air Defence in 1938, *Historical Research* 62 (1989): 318–36.

<sup>4</sup> Colin Dobinson, *Operation Diver: Guns, V1 Flying Bombs and Landscapes of Defence, 1944-45*, Monuments of War (Historic England) (Swindon: Historic England, 2019), 195–208; Churchill, *The Second World War, Vol 6*, 41–42; Basil Collier, *The Defence of the United Kingdom*, History of the Second World War. United Kingdom Military Series Y (London: HMSO, 1957).

<sup>5</sup> *Ibid*, 528.

<sup>6</sup> Churchill, *The Second World War, Vol 6*, 49.

<sup>7</sup> Phillips Payson O'Brien, *How the War Was Won Air-Sea Power and Allied Victory in World War II* (Cambridge, United Kingdom: Cambridge University Press, 2015), 484.

<sup>8</sup> Horst Boog, 'The Policy, Command and Direction of the Luftwaffe in World War II', *Royal Air Force Historical Society Journal* 4 (1988): 42.

<sup>9</sup> *The Second World War: Vol. 5: Closing the Ring* (London: Cassell, 1952), 204.

<sup>10</sup> TNA, CAB 79/68/16 COS (43) 306 (O) 16 December 1943.

<sup>11</sup> TNA CAB 80/82 Memoranda (O) Nos. 306-390, DCAS 14th Crossbow Progress Report to COS (44) 313 (O) dated 2 April 1944.

<sup>12</sup> O'Brien, *How the War Was Won Air-Sea Power and Allied Victory in World War II*, 344.

<sup>13</sup> TNA, AIR 16/925 German Flying Bomb and Rocket Offensives: Air Operations by ADGB and Fighter Command, Directive of Air Defence of Great Britain, 17 November 1943.

<sup>14</sup> TNA AIR 16/451 Operations "Overlord" and "Diver": Simultaneous Air Defence Plan April 1944.

<sup>15</sup> TNA, CAB/24/20 G.T. 1451. War Cabinet. Committee on Air Organization and Home Defence Against Air-Raids. First Report, 16 July 1917.

<sup>16</sup> Edward Bailey Ashmore, *Air Defence* (London: Longmans, Green and co, 1929).

<sup>17</sup> Group Captain John Alexander, "Despised and Neglected?": British Fighter Defence, 1922-1940, *Air Power Review*, Battle of Britain 75th Anniversary Edition (Summer 2015): 162–81.

<sup>18</sup> Gerard J. De Groot, 'Combatants or Non-Combatants? Women in Mixed Anti-Aircraft Batteries during the Second World War', *The RUSI Journal* 140, no. 5 (1995): 65–70.

<sup>19</sup> General Sir Frederick Pile, 'The Anti-Aircraft Defence of the United Kingdom from 28 July 1939 to 14 April 1945', Supplement to the *London Gazette*, 16 December 1947, 5989.

<sup>20</sup> TNA AIR 16/451 Operations "Overlord" and "Diver": Simultaneous Air Defence Plan.

<sup>21</sup> TNA, AIR 20/10155 V1 Flying Bombs: Operation DIVER and Related Papers.

<sup>22</sup> Pile, *Dispatch*, 5982.

<sup>23</sup> TNA, CAB 79/76/7, COS (44) 197th Meeting, 16 June 1944.

<sup>24</sup> Group Captain John Alexander, "Teaching the British Army the Advantages and the Rebels the Effectiveness of Air Power": Air Land Integration during the Arab Revolt in Palestine, 1936–39' (RAF Museum Trenchard Lecture in Air Power Studies, 30 May 2019).

<sup>25</sup> Christ Church College Oxford, Box C, Folder 5, Senior Officer Appointments, undated Freeman to CAS, 1942. Quoted with Permission of the Head of the AHB.

<sup>26</sup> Denis Richards, 'Hill, Sir Roderick Maxwell (1894–1954), Air Force Officer', in *Oxford Dictionary of National Biography* (Oxford: Oxford University Press, 2011).

<sup>27</sup> TNA, AIR 24/618 Fighter Command ORB C - L, Minutes of a Meeting Held at HQ ADGB at 1000 hrs, 10 July 1944.

<sup>28</sup> T C G James, *AHB Narrative Vol 6 The Flying Bomb and Rocket Campaigns, 1944-AHB/II/117/2 (F)* (AHB, 1949), 134; Collier, *The Defence of the United Kingdom*, 381–84; AIR 16/1473 Operations of Air Defence Great Britain and Fighter Command during German Flying Bomb and Rocket Offensives in 1944–1945 (1948); Air Chief Marshal Sir Roderick Hill, 'Air Operations by Air Defence of Great Britain and Fighter Command in Connection with the German Flying Bomb and Rocket Offensives, 1944—1945', Supplement to the *London Gazette*, 19 October 1948.

<sup>29</sup> G. H. Ambler and Margaret Hannah, 'High Drafting and the Ambler Super-Draft System', *Journal of the Textile Institute Proceedings*, 41, no. 3 (1 March 1950): 115–23.

<sup>30</sup> Emily Winterbotham, 'Ambler, Geoffrey Hill', in *The Oxford Dictionary of National Biography*, ed. B. Harrison, L. Goldman, and D. Cannadine (Oxford: Oxford University Press, 2004).

<sup>31</sup> Air Ministry, *RAF War Manual, Part 1 Operations*, 2nd ed., Air Publication 1300 (London: Air Ministry, 1940). James lists Ambler's appreciation as Appendix 8 in the AHB Narrative but unfortunately in the AHB drafts and final copies have another document as Appendix 8.

<sup>32</sup> Basil Collier, *The Battle of the V-Weapons, 1944-45* (London: Hodder and Stoughton, 1964), 92–93; TNA AIR 16/457 Defences against Flying Bombs AHB Reference and Fighter Command File Reference: IIH/240/4/487A ADGB/S38621 Pt I' (July 1944), Agenda for a Conference to be Held at HQ ADGB at 1730 hrs on 13 July 1944.

<sup>33</sup> TNA, AIR 24/618 Fighter Command ORB.

<sup>34</sup> TNA, AIR 16/458 Defences against Flying Bombs (September 1944), Op Order 15/1944.

<sup>35</sup> TNA, AIR 24/618 Fighter Command ORB, Hill to AEF, 15 July 1944.

<sup>36</sup> TNA, AIR 16/458 Defences against Flying Bombs.

<sup>37</sup> TNA, WO 291/800 Analysis of Results Achieved with VT Fuses (T98) against Flying Bombs, table V.

<sup>38</sup> TNA WO 199/553 "Diver" (October 1944), ADGB signal 21 Jun 1944.

- <sup>39</sup> Churchill Archives Centre, DSND 2/3/9, CBC (44) 15 Meeting 25 Aug.
- <sup>40</sup> Kingsley M. Oliver, *The RAF Regiment at War, 1942-1946* (Barnsley: Leo Cooper, 2002).
- <sup>41</sup> Collier, *The Defence of the United Kingdom*, 523, Fractions rounded down. Not including continental targets.
- <sup>42</sup> TNA, CAB 79/79/11, CBC (44) 22. Fifth Report by Chairman of the Crossbow Committee.
- <sup>43</sup> Frederick Pile, *Ack-Ack: Britain's Defence against Air Attack during the Second World War*, (London: Panther, 1956), 334.
- <sup>44</sup> TNA, CAB 79/97/11 CBC (44) 31 dated 25 July 1944.
- <sup>45</sup> TNA, AIR 2/8419 HOME DEFENCE: General (Code B, 82/1): ADGB Plan against Flying Bombs (1944 1943), COS (44) 247th Meeting (O) dated 25 July 1944.
- <sup>46</sup> See for example the Daily Express, 7 September 1944.
- <sup>47</sup> Churchill Archives Centre, DSND 2/13, Papers Relating to the V1 and V2; Notes for 7 September Press Conference, accessed 7 June 2019.
- <sup>48</sup> Pile, *Despatch*, 5990.
- <sup>49</sup> Kenneth Macksey, 'Pile, Sir Frederick Alfred, Second Baronet (1884–1976), Army Officer', Oxford Dictionary of National Biography, 23 September 2004.
- <sup>50</sup> TNA, AIR 20/1548 "Crossbow": Interdepartmental Radio Location Committee Minutes; TNA, AVIA 11/51 Meetings of Scientific Sub-Committee on the Flying Bomb.
- <sup>51</sup> Frederick Pile, *Ack-Ack: Britain's Defence against Air Attack during the Second World War*, Panther Book; 623 (London: Panther, 1956), 334.
- <sup>52</sup> TNA, AIR 16/620 Re-Deployment of Anti-Aircraft Command against Flying Bombs, Ambler to James 7 September 1945.
- <sup>53</sup> TNA, Air 16/620 Ambler to James 21 January 1947.
- <sup>54</sup> David Reynolds, *In Command of History: Churchill Fighting and Writing the Second World War* (London: Allen Lane, 2004), 398–99, 452, 498.
- <sup>55</sup> Churchill, *The Second World War, Vol 6*, 41–44.
- <sup>56</sup> Winston Churchill and Sir Archibald Sinclair, *Winston and Archie: The Letters of Sir Archibald Sinclair and Winston S. Churchill 1915-1960.*, ed. Ian Hunter (London: Politico's, 2005), 413, WSC to AC 28 March 1945.
- <sup>57</sup> Collier, *The Defence of the United Kingdom*.
- <sup>58</sup> TNA, CAB 101/90 The Defence of the United Kingdom, B. Collier: Comments on the Draft by D. Sandys.'
- <sup>59</sup> Churchill Archives Centre, DSND 2/3, Official files relating to German V weapons, 1943-1945. The Papers of Lord Duncan Sandys.
- <sup>60</sup> Christ Church College Oxford, Portal Archive 2, Box B, Pamphlets, The Other Club Rule Book, 1941. Quoted with Permission of the Head of the AHB.
- <sup>61</sup> TNA CAB 101/90 Comments on the Draft by D. Sandys.
- <sup>62</sup> TNA, AIR 2/7876 HOME DEFENCE: Ground Defence Against Air Attack (Code B, 82/2): Defence against Flying.
- <sup>63</sup> Christ Church College Oxford, Portal Archive 2, Box B, AOC-in-C Fighter Command 1944, CAS to Hill, 13 December 1944. Quoted with Permission of the Head of the AHB.

<sup>64</sup>Louisa Brooke-Holland, Claire Mills, and Nigel Walker, 'A Brief Guide to Previous British Defence Reviews', Briefing Paper (Westminster: House of Commons Library, 9 July 2018); T C G James, 'The Impact of the Sandys Defence Review on the Royal Air Force', *Royal Air Force Historical Society*, no. 4 (1988): 9–29.

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