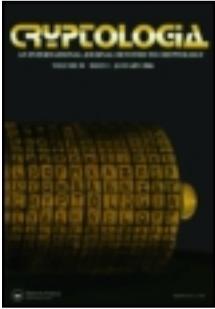


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The 1942 Reorganization of the Government Code and Cypher School

CHRISTOPHER GREY AND ANDREW STURDY

Abstract This paper analyses the organization of the Government Code and Cypher School (GC & CS) at Bletchley Park during the Second World War. The complexities and peculiarities of the organization are overviewed and a periodization provided. The main focus is on the pivotal 1942 reorganization, which is explained in terms of the changing scale of GC & CS following the successful attack on the Enigma machine cipher, and in terms of organizational politics. The more minor 1944 reorganization is also described.

Keywords Alistair Denniston, Bletchley Park, Edward Travis, Government Code and Cypher School, Organization

Introduction

It is now over thirty years since the wartime work of Britain's Government Code and Cypher School (GC & CS) at Bletchley Park (BP) became public knowledge, and few would dispute its centrality in the history of modern cryptanalysis. Within the great volume of scholarly and more popular literature on the subject, much attention has been paid to technical aspects of both cryptanalysis and cryptology, to the development of electronic computing and of course to military history. Since the early 1990s, much has also been learned of the working lives of GC & CS staff of the codebreakers [14] and, increasingly, of the more "mundane" work of the thousands of people in technical, clerical, and other capacities [12, 17, 18].

Scattered within this literature, there are indications relevant to another area of interest: the way in which BP was organized and managed. To date this has received little systematic exploration. As BP staff member Mavis Batey has commented, "...most people, like Hinsley in the Official History, have been searching for the cryptographic and intelligence material and had to ignore the wealth of down to earth information on the administrative side until now." [10, p. 135]

There are certainly partial exceptions to this oversight [1, pp. 448–455; 11, pp. 322–338], but the most sustained and rigorous effort to analyse BP's organization comes in the recent work of Ratcliff [20, pp. 72–105], although the latter is primarily concerned with the (even more neglected) area of German cryptological and cryptanalytic operations. We will of course have occasion to refer in more detail to these works, but our opening point is the relative neglect of the topic in hand. What is more, nowhere in the literature has anyone with a specific expertise in organizational analysis considered the organization of BP.

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This paper aims to begin to address this *lacuna* by presenting the first findings of a research project on BP from an organizational analysis perspective. This wider project is concerned with the entirety of the management and organization of BP, and as such cannot be reported in a single paper. Instead, we focus primarily on the pivotal moment in the organization of BP: its re-organization in January 1942, an area already identified as needing further research [20, p. 259n]. This moment can be considered in various ways. It marked a transition in the leadership of BP from Commander Alistair Denniston to Commander (later Sir) Edward Travis. It also, arguably as we will show, marked a transition from a small, rather *ad hoc*, organization to a larger, more formalised and industrialised, organization. In this sense, whilst specific in focus, this episode is central to understanding the wider organizational history of BP.

The research project upon which this paper is based has drawn upon a number of sources. Firstly, we have consulted most of the extensive secondary literature on BP, within which, as we have indicated, it is possible to find numerous passing (and occasionally more sustained) references to organizational issues. Secondly, we have consulted the National Archive (NA) (at the Bletchley Park Trust [BPT] Archive), the most relevant parts of which are the HW 3 and HW 14 series, and also the Denniston (DENN) Archive at Churchill College, Cambridge. Of particular importance are two documents. Even before the end of the WW2 there was a concern to record what had happened in BP, and to learn lessons from it for any future conflict. This gave rise to Frank Birch's *History of British Sigint* [2] and Nigel de Grey's Memorandum of 17th August 1949 (NA/HW 14/145)—both substantial documents with much to say about organizational issues. Thirdly, we have interviewed or corresponded with fifteen surviving members of BP staff, contacted through the Bletchley Park Trust and selected according to the light they might be able to shed on organizational issues. The interviews, which were tape recorded, took place in 2004 and 2005, and have been supplemented by drawing on some 200 interviews with ex-employees of BP held in the BPTA. This is not the place to consider the methodological issues raised by such retrospective testimony, which has been discussed elsewhere [22], but suffice it to say that we used the interview material with considerable caution as no more than an adjunct to the main, archival work.

As we have indicated, the paper is written from the perspective of organizational analysis. Therefore, before moving to the primary focus of the 1942 transition, we begin the paper with a general consideration of the nature of BP as 'an organization,' concluding with a sub-section in which we provide a periodization of the organization. In the second, and main, section of the paper we describe and analyse the 1942 reorganization. In a briefer third section, we outline the more limited reorganization which occurred in 1944. In the conclusion we indicate the scope for further work.

The Organization of BP

On 28th March 1943, Nigel de Grey (Figure 1), then the second in command at BP wrote an ironically worded memorandum on its organization. It is worth quoting at length, for, as a covering note from Commander Travis, by then BP's head, recognized, it contained "a great many truths":

"I suppose that if you were to put forward a scheme of organizations for any service which laid down as its basis that it would take a lot of men



Figure 1. Nigel de Grey (image courtesy of Bletchley Park Trust Archive).

and women from civil life and dress some of them in one kind of clothes and some of them in another, and told all those dressed in black that they came under one set of rules and all those dressed in white under another and so on and then told them that they had a double allegiance, firstly to the ruler of their black or white or motley party and secondly to another man who would partly rule over all of them, but only partly, any ordinary tribunal would order you to take a rest cure in an asylum.

But suppose that the tribunal were somehow foolish enough to adopt your idea and in order that you might begin your work said ‘We will now lend you some tools—they may not be quite what you want but you must make do with them, and tell us when they get blunt and we’ll see if we can sharpen them for you,’ some higher power would presumably lock up the tribunal as a public menace—or if it were in Russia or Germany, shoot them out of hand.

Yet that is in fact the precise organization of BP.

Now it happens that BP has been successful—so successful that it has supplied information on every conceivable subject from the movement of a single mine sweeper to the strategy of a campaign and the Christian name of a wireless operator to the introduction of a secret weapon. (NA/HW 14/71)

These paragraphs go to the heart of many organizational issues at BP. Like much else at BP the way that it was organized is a matter of great complexity, but standing back from the detail, there were three particularly unusual organizational problems.

- The fact that it was not, strictly speaking, a single organization (nor, of course, was it a single site). There was a mixture of civilian organization, largely in the form of the Foreign Office,¹ and the three service organizations (each with a male and female branch) of army, navy and air force.² Administratively, GC & CS was also related to SIS, in the sense that ‘C’,³ the head of the latter, was also the ultimate head of the former. Taken together, this meant that there could not be a unitary command and control structure of the sort normally found in, for example, a business. Rather, it was more like a large and complex joint venture.
- The fact that, because of security considerations, very few individuals knew the ‘big picture’ of the purpose and function of the organization.⁴ This made it difficult to know the real value of the work being done with obvious potential implications for motivation and morale.
- The fact that BP contained a huge range of different kinds of work, from highly non-routine and skilled intellectual work, through routine clerical and data collection to cleaners, drivers and ancillary staff. In many cases, individual jobs themselves required a mixture of the extraordinary and the routine. Thus the organization had to be able to allow creativity and individuality (not to say eccentric and forceful personality) whilst also developing highly standardised procedures.

These judgments are, of course, relative. Ratcliff has put much emphasis on the centralization of Sigint at BP, the harmony of inter-service relations, and the extent

¹Until 1943, a number of civilians were employed by agencies other than the FO, including civilians employed by the service ministries. From spring 1943, all civilians were relocated to the FO, somewhat simplifying the very confused picture in the period 1939–1943, although Post Office employees, and possibly others, were “on loan” to the FO and continued to have their employment administered by the Post Office. Financially, it was “the adopted child of the Foreign Office with no family rights” (DENN 1/4, p. 2).

²This in itself is a simplification. It was not until 1942, that the personnel of each service fell within a (more or less) unified administrative and command structure within BP and, on the army side, this was not really fully effective until August 1943. Moreover, in June 1942, the RAF repudiated the agreement and the command structure remained fragmented throughout the war. In all, it was an “intolerably complicated” situation according to Nigel de Grey [2, p. 474].

³During the relevant period, ‘C’ was, until December 1939, Admiral Sir Hugh Sinclair and, thereafter, Colonel Sir Stewart Menzies.

⁴To give one of many examples: “It was a very curious organisation. We were very, very departmentalised. You never discussed your work with anyone except your little group you worked with. I hadn’t a clue what was going on in the rest of the Park and nobody else had a clue what we were doing” [21, p. 37].

to which staff were aware of the significance of their work [20, pp. 72–105]. This assessment appears to be made relative to what obtained in German, and to a lesser extent US, Sigint organizations at the time, and no doubt it is correct. However, compared to a ‘normal’ commercial or military organization it certainly appears anomalous. Within organizational analysis, the standard reference point for such organizations is the bureaucratic ideal-type propounded by Max Weber [23], and BP certainly departs in many respects from this [cf. 11, p. 324]. In any case, what is unquestionably true is that to those involved at the time, the organization of BP, and civilian-service relations in particular, were problematic, as the earlier quotation from de Grey shows. Indeed, in the official internal history [2], its organization was described as “freakish.”

Despite the complexities of the organization, the amount of purely administrative overhead was remarkably small (that is, the administration of BP as against administrative effort associated with the actual activity of codebreaking and intelligence such as indexing, one area of the organization of BP that has been well-researched [3, 4, 6]): never higher than 12% of total staffing and, by the end of the war, under 8% [2, pp. 469–470]. For example, on 31st December 1944, 765 people were employed in “administration” as compared with 8089 in “operations” (NA/HW 14/154). However, this slimness was partly because payroll work was undertaken by the various employing institutions (e.g., Foreign Office and Services) whilst, at least from March 1942, buildings, drainage, power and heating administration was undertaken by the Ministry of Works and Buildings. It must also be said that this figure scarcely describes the full extent of activity that might be called managerial and which included the administrative work of, for example, Section Heads.

There are in existence a number of organizational charts of BP (NA/HW 3/152 and 3/96), with varying amounts of detail, which changed at different times, and these reveal something of the way that the service lines of command were nested within the BP structure. In practice this meant a constant administrative effort to reconcile what were in effect cross-cutting management structures (since service personnel were ultimately bound within their own hierarchies) and to attempt to standardise all manner of procedures across these structures. Since these were necessarily a matter of negotiation, much of the organizational work was essentially political in character—as Birch [2] puts it “a patchwork of extemporised expedients.” This may be seen to reflect the wider intelligence community of which GC & CS was a part:

In the years before the Second World War several bodies within the structure of government shared the responsibility for intelligence. They were far from forming a single organisation. [13, p. 3]

However, as Davies argues [8], it would be misleading to see GC & CS as simply reflecting this wider pattern since it had minimal interaction with, for example, MI6. Rather, as we have already indicated and will return to, the range of institutions and interests involved provides a better explanation of the fragmentation at BP.

In any case, much of how BP was organised could not be captured by organization charts. The ambiguity of BP’s formal structure is illustrated in an incident recalled by the American, Joseph Eachus, who, tasked in his capacity as the US Navy’s liaison officer to obtain an organisational chart of BP, was told: “I don’t

believe we have one.' I didn't pursue this with him, but I was never quite sure whether he meant we don't have a chart or we don't have an organisation." [16]

In fact, as we have indicated, some organizational charts did exist but, in a sense, either interpretation could have been correct, for despite a great deal of attention to formal procedures much of the organization was "informal," relying upon unofficial arrangements made between section heads, for example. Thus, through accidents of physical location and personal friendship the cryptanalysts of Hut 8 and the Hut 4 Naval section had relations that "were so intimate and cordial that administrative separation counted for little" [2, p. 94]. These kinds of relations are by definition difficult to recapture at this distance of time, since they rarely form part of the official record, but there can be little doubt that they contributed, probably significantly, to the successful functioning of BP. On the other hand, they needed constant monitoring since they were not necessarily productive. For example, in 1943, Travis (Figure 2) had to issue a warning against "cases where plans for improvement in organisation or transfer of work . . . has been discussed or even decided on without first consulting the Heads of the Sections concerned" (NA/HW 14/Directorate). This tension between informality and formality was a continual issue within BP, as indeed it is in most, if not all, organizations.

Leaving this aside for a moment, it is worth recognizing the scope and complexity of BP from an organizational point of view. We have alluded, and will return, to the issue of the variety of employing institutions. That around 10,000 people (NA/HW 14/145, p. 14; headcount issues are discussed in more detail below) were employed gives a sense of the scale of things. Even if we forget the administrative complexity of the codebreaking effort, and the distribution of the intelligence—that is, if we forget the core purpose of BP!—and just focus on the activity needed to support it, the scale was considerable.

Drawing upon Nigel de Grey's post-war review (HW14/145), we find that in July 1944, when BP was near to its maximum size, there were about 4000 billets (of various sorts) in force, with another 4000 accommodated through the services. There were over 30,000 meals served each week, on a near 24-hour basis. There were almost 34,000 miles of passenger journeys organised using 115 drivers. Associated



Figure 2. Commander Sir Edward Travis (image courtesy of Bletchley Park Trust Archive).

with the billeting was the organization of buses so that, according to one of our interviewees, in 1944, there were around 40 buses per shift, each with a seating capacity of around 40 (so, 1600 in total) transporting the staff in and out.⁵ Another interviewee, working in administration, recalls that “it was a *huge* logistical exercise, and it had to take place every day round the clock . . . that was a colossal administration in itself, the transport.” Travis’s annual report for 1942 refers to the efficiency with which the growing headcount was serviced so that “although the workers have increased by 100%, by excellent organization of the transport and billeting the weekly mileage of transport has only risen by 37.5%” (NA/HW 14/67).

These, as we have said, are examples of the scale of the support services needed to make BP function. But, in fact, to separate out such support services from the administration of work itself was one of the problems in the early years when, again quoting Travis’ 1942 report “the position was far from satisfactory because there was a complete cleavage between those responsible for the Station and those responsible for the work” (NA/HW 14/ 67). This refers to the fact that BP was initially a War Station of SIS. In November 1939, Commander Bradshaw was charged with General Administration of the GC & CS part of things but from October 1940 the Station was placed under the Joint Management Committee, consisting of Bradshaw for GC & CS and Captain Ridley for SIS. This joint control arrangement persisted (in various guises) until the 1942 re-organization (discussed in detail below) which unified all administrative powers in Travis (albeit that these powers were devolved by him to others) and was “undoubtedly an improvement” [2, p. 469]. It was also a task of daunting scale, for as well as managing the work processes and the support services at BP, it was necessary to manage relations with the services and ministries so that the intelligence product of the decoding operation was used to maximum effect.

Periodization of BP Organization

In view of the complexities we have alluded to, it seems highly unlikely that it will ever now be possible to provide a definitive picture of how BP was structured since even at the time “so bewildering was its organization that it defied diagrammatic representation” (NA/HW 43/2). However, it is useful to stand back from the detail and to think in terms of three periods.

Period One: September 1939–February 1942

Period Two: February 1942–March 1944

Period Three: March 1944–1946

In the first period, Denniston (Figure 3) was Head of GC & CS, whilst its Director was ‘C’, the Head of SIS. There followed the major reorganization in February 1942, perhaps the crucial set of changes, organizationally speaking, of BP’s history, which inaugurated the second period, in which Travis was Deputy Director (Service) or DD (S) and Denniston was Deputy Director (Civil) or DD (C), with the latter soon after being moved to London, with ‘C’ remaining as Director (and also based in London). There were other far reaching changes which are discussed below. The

⁵This recollection seems accurate given that there were three shifts per day over most BP operations and given that not all staff would use the bus service (as against walking, cycling, and in a very few cases driving).



Figure 3. Commander Alistair Denniston (image courtesy of Bletchley Park Trust Archive).

third period is marked by a less dramatic set of changes in March 1944, in which Travis becomes the (first) Director with Denniston remaining as DD (C), still in London, and ‘C’ becoming Director-General. At the same time, a new structure of Deputy Directorships was created.

Alongside these “regimes,” it is important to recognise the existence of a whole series of high-level (and, indeed, lower-level⁶) committees concerned with co-ordinating administrative functions across the different service lines. The principal of these were, in period one:

- The Joint Management Committee (JMC)—October 1940–May 1941;
- The Bletchley Park Committee—February 1941–? August 1941;
- The Joint Committee of Control (JCC)—April 1941–February 1942; and
- The Intelligence Exchange (IE) to ensure dissemination of outputs to relevant ministries (HW 3/158)—July 1941–?? but at least September 1944 and almost certainly beyond.⁷

⁶Particular mention may be made of the Communications Committee, certainly in existence in 1942 which undertook the major administrative tasks associated with the provision of adequate telephone facilities in the growing site. See [10]. It may be said here that the idea that BP was chosen as a site because of its equidistance between Oxford and Cambridge is almost certainly a myth: it was its position on a major artery on the telephone network that was central.

⁷Ratcliff sees the IE as having had a significant co-ordinative function [20, p. 88]. Yet one of our interviewees (who worked on non-Enigma GAF ciphers and later became the Director of GCHQ) saw it as having little practical impact. It is an area for further research.



Figure 4. Captain Alan Bradshaw (image courtesy of his grandson, Tim Robinson).

In period two:

- Weekly meetings of section heads and directorate—March 1942–October 1943;
- Expanded weekly meetings to include all autonomous section heads—October 1943–February 1944; and
- Continuation of IE.

So far as period three is concerned, part of what marks it out is the apparent demise of attempts to manage through “standing” committees, and a more directorate-focussed approach. The IE continued.

It is also worth recording that one of the principal features of continuity throughout these transitions was Commander (later Captain) Alan Bradshaw (Figure 4) who served as General Administrative Officer in period one, Assistant Director (Administration) or AD (A) in period two and Deputy Director (Administration) or DD (A) otherwise known as DD 2 in period three.⁸ He remains, perhaps, one of the unsung heroes of BP reflecting the relative lack of profile of purely administrative functions. One of our interviewees, who worked as his secretary, has provided vital

⁸On Bradshaw’s retirement in 1945 the DD 2 post was redesignated as DD (A), i.e., the two terms were not equivalent in that DD (A) denoted function and DD 2 denoted relative seniority.

information on this point. She explained that Bradshaw had to fight the view that “he’s just an administrator” in order to get things done in the face of powerful lobbies who not only saw their work as more important but who also acted as what Bradshaw called “empire builders”—that is, pursuing their own sectional interests for resources. All large, successful organizations need their ‘Bradshaw’—it is an unglamorous role and in the case of BP few people, even some who are very knowledgeable about its work, really recognise his importance. He was, according to our interviewee “not a man to be trifled with” but he “was a delightful man.” His contribution should not be forgotten.

Having recorded the contribution of Bradshaw to continuity at BP, we now return to the discontinuities implied by our periodization, for one helpful way of understanding the management and organization of BP is to focus in detail upon the transition points—and especially that of February 1942. By doing so, it is possible not just to shed light on the events themselves but also to gain a more general insight into the kinds of issues relevant to the organization of BP.

The 1942 Reorganization

It is possible to think of this transition as being between the Denniston regime and the Travis regime—that is, as a shift in leadership. But, it can also (or, perhaps it would be better to say, relatedly) be thought of in terms of a shifting organizational form in which BP moved from a period dominated by extreme uncertainty of resources and output, and by creativity and a ‘craft’ approach to work [1, p. 454] to more of a machine or production line for processing the large amounts of data [11, p. 322].⁹ To put it another way, in the words of Ralph Bennett who left BP for North Africa in 1942 and returned in 1943,

I had left as one of a group of enthusiastic amateurs; I returned to a professional organization . . . [14, p. 38]

This is an assessment echoed in Davies’ essay on BP organization [8], and although we will want to qualify it a little later on, it does give a rough sense of the changes that occurred in 1942. What is certainly true is that BP experienced a very rapid growth in both personnel and buildings throughout the war but especially from 1942. The changes which this was caused by and the administrative effort which it in turn caused were very considerable. So far as the physical fabric is concerned, this is painstakingly documented by Evans [5] and nothing can be added to that account here. As far as personnel is concerned, numbers rose from around 200 in September 1939, to 1576 in March 1942,¹⁰ but they then rose to a height of 8743 at the end of

⁹We obviously do not mean to imply that creative work ceased at BP after 1942, just that the bulk of the organization was now perforce engaged in a production line that had not hitherto existed.

¹⁰This figure was actually lower than it had been in 1941 because as part of the reorganization diplomatic and a little later commercial sections went with Denniston back to London. Headcount may have been 2500 prior to this.

1944 before dropping back to 5781 at the end of the war.¹¹ One can say that the period to March 1942 was marked by the larger percentage change, and that was significant in terms of management but the period from March 1942 shows a much larger absolute change and one which inevitably implies an appreciable change in organizational character.¹² As one interviewee in our study, who worked in administration, remarked “[In January 1941] it was all the embryo of the organization and it just got too big, we couldn’t be coping . . .”

Our point is that these changes, to some extent, with all they implied for management and organization, would have happened anyway. They were an inevitable result of the volume of, Enigma messages being decrypted and the evolving techniques and technologies being employed. Indeed these changes, were beginning to happen prior to 1942. In that sense, they should not be understood as being purely or even primarily about the personalities of Denniston¹³ and Travis, although these and others played a part [9]. One good piece of evidence in support of that assertion relates to recruitment. In the early years, this arguably bore some hallmarks of ‘amateurism’, but from 1941, that is, within Denniston’s period, it became much more with systematised C.P. Snow taking responsibility from Whitehall¹⁴ (10, p. 16). On the other hand, it can be said that Denniston’s approach to management made him unsuited to the developing situation at BP (and in histories of BP (e.g., 21, p. 79; 7, p. 202)¹⁵ usually is) and that he would have proved less effective in creating the structures for that situation:

He [Denniston] found himself in charge of a huge growing organization, a lot of us younger and in some ways thinking along different lines, and he got a bit outdated in some ways and was shunted out . . . he was a very good chap but he was overtaken by events (Ralph Bennett, cited in 21, p. 93).

We will return to, and qualify, this assessment shortly, but for now let us consider in more detail the 1942 changes and in particular, Denniston’s position.

¹¹These figures are drawn from personnel returns for BP (NA/HW 14/154) but it is the case that other estimates vary considerably so that a figure of 10,000+ is often given. What such discrepancies reflect is the organizational complexity of BP: what counts as ‘inside’ or ‘outside’ the organization? But the main point for our purposes is the change in the *order of magnitude* over the period. Nigel de Grey makes exactly these points in providing the rough figure of 10,000 (NA/HW 14/145, p. 14).

¹²Within organizational analysis, there are classic studies that show and predict that changes in organizational size have an effect on organizational structure and function either as a direct, albeit diminishing, correlation between headcount and complexity or as an indirect consequence of the increase in likelihood of repeated events [5, 19]. In general terms, increased size correlates to increased standardization and formalization (i.e., in effect, bureaucracy).

¹³Denniston says that “. . . when war was declared GC&CS was . . . already in a process of growth towards that vast and successful body whose full story will perhaps never be told.” (DENN 1/4, p. 21). This may be true but surely no real growth was mandated until the later success against Enigma. It could not have been known in 1939, so we interpret this document to be a retrospective defence against the criticism that GC&CS was unprepared in 1939, an interpretation bolstered by considering the entirety of DENN 1/4.

¹⁴Snow, later well known as a novelist, also recruited scientists for the atomic weapons project and other parts of the “scientific war.” It may also be of interest to note that Kim Philby, the Soviet Union spy, was also involved in the selection of some BP personnel.

¹⁵Although only concerned in passing with the reorganization of BP, the leading intelligence historian Christopher Andrew appears to take a similar view [1, p. 454].

There can be no doubt that his move from being Head of BP to DD (C), which also entailed his move from BP to London, was a *de facto* demotion, and his remaining with that title when Travis became Director in 1944 underscores this.¹⁶ No doubt there were many reasons for this but two sets of events stand out.¹⁷ One well-known reason was the growing frustrations which led Welchman, Milner-Barry, Turing, and Alexander to bypass Denniston (and, be it noted, ‘C’) to appeal directly to Churchill in a letter of 21st October 1941, for the resources which, famously, he sanctioned for “action this day.” This suggests a relative ineffectuality of Denniston in securing the growth needed (it should be noted that Denniston had been seriously ill in 1941). It is also a strong indication that he had lost the confidence of some of the key younger men at BP. It is also known that Denniston’s relations with Knox had been fraught since 1939, although in this case the administrative logic would seem to have been on Denniston’s side (NA/HW 14/22).

Our interpretation of the October letter rests not least upon the fact that in it there is lavish praise for “the energy and foresight of Commander Travis” and the statement that “[w]e do not know who or what is responsible for our difficulties, and most emphatically we do not want to be taken as criticizing Commander Travis who has all along done his utmost to help us in every possible way.” (NA/HW1/155). These phrases, coupled with the fact that there is an eloquent silence about Denniston, surely indicate that, in effect and, it may plausibly said, in intention (for these were highly intelligent men, who would surely not have been casual in their chosen wording), the letter communicated a lack of confidence in the latter quite as much as a plea for resources. Budiansky [7, p. 204] agrees with this assessment, and suggests even that Travis was complicit in the ‘coup’, whilst in an account of Denniston’s life and work, his son depicts Nigel de Grey in particular as having “ungently thrust my father from his job” [21, p. 71]. Further, Birch and Travis [9, p. 74] and supported by all of the key figures at BP except for Josh Cooper and John Tiltman [9, p. 69]. In any case, there were other, influential, voices being raised against Denniston in the corridors of power. Admiral Godfrey, Director of Naval Intelligence, argued that “Denniston has shown an amazing lack of imagination and pettiness of outlook” [7, p. 202].

The second key event, perhaps less well known, was the vitriolic dispute which broke out in Hut 3 in late 1941 and early 1942. This can itself be traced to one of the general organizational problems at BP, namely the overlapping lines of command (thus, again, it would be simplistic to see things solely in terms of ‘personalities’). In this case, relations between Commander Malcolm Saunders, then the Head of Hut 3, and the service sections, in particular Group Captain Robert Humphreys, the chief air advisor, in effect broke down.

An indication of the tone of the dispute (although not, of course, the rights and wrongs of it)¹⁸ can be found in Birch’s memo to Denniston accusing Saunders of

¹⁶Davies (8, p. 400) agrees with this assessment, although it should be noted that the organization chart of September 1944 clearly shows the line of command flowing directly from C to Denniston i.e. Denniston is not shown as subordinate to Travis. See Appendix.

¹⁷A third reason is said to have been Denniston’s appointment of his friends to two key administrative positions leading to it being “inevitably assumed that he was out of his depth” [9, p. 15].

¹⁸Although on this point, it may be noted that Saunders had been the recipient of a sharp rebuke from Denniston himself in October 1939 about interference in the work of others and was admonished “not to butt in on the jobs of others who are obviously better qualified to carry them out” (NA/HW 14/1).

“interfering, intriguing, creating and magnifying difficulties and misunderstandings, causing friction, undermining confidence and, incidentally, making proper liaison impossible” (NA/HW 8/23 see also NA/HW14/22 and NA/HW3/119, p. 4–6). Ralph Bennett notes that “something like chaos reigned” at this time (14, p. 31), and there are many other accounts confirming this. ‘C’ was several times called upon to intervene amongst the warring parties, and it seems a reasonable contention that this was a factor in Denniston’s being sidelined, even though he was often absent due to ill health when the conflicts broke out [9, p. 16]. It is certainly the case that in relation to a dispute between Denniston and Travis in 1940 about the conduct of a staff member, the latter threatened to raise it with ‘C’ and was chided by the former who wrote “[C] is at this time concerned with the question of policy and administration of national importance, and I think it almost unfair to him to trouble him with what really are minor matters which we can settle ourselves” (NA/HW 14/8). One interpretation of this is that Denniston was unwilling to have administrative disputes aired externally or that he believed that to do so would not commend itself to ‘C’, not least because his personal relations with Menzies, unlike those he had had with Sinclair, were poor [9, pp. 16, 79].

Overall, Birch refers to the administrative arrangements in 1941–1942 (not just in Hut 3) as having “results that brought GC & CS into disrepute” (2, p. 468),¹⁹ a perhaps not unnatural consequence of the administration having been a “rudderless vessel” (2, p. 177) from the outset. The reform of Hut 3 following Travis’s appointment to DD (S) resolved the issues through the appointment of Squadron Leader Eric Jones as Head of Hut who in turn initiated a system of duty officers (of whom Ralph Bennett was one). Saunders and Humphreys were moved. Eric Jones (who subsequently became Head of GCHQ, succeeding Travis, in 1952) is worthy of particular mention in an assessment of the organization of BP. With an industrial background, possibly in cotton manufacture in Manchester,²⁰ he seems, from the accounts of Bennett (14, p. 31), Millward (14, p. 26) and others to have been able to blend firmness and authority with a capacity to delegate and to allow innovation and freedom. Travis refers to this episode as one of “taking a tick out of a dog” and of appointing “a popular and respected Head . . . [whose] . . . even temper and calmness never fail to exert a deflationary influence upon a highly strung team” (HW14/67, p. 5).

Jones is noteworthy for that fact that his specialist expertise was not in languages, mathematics or intelligence but administration, and what would now be termed “people management”:

¹⁹Although Birch is here being quoted in his post-war capacity as the historian of Sigint operations, and although his account seems meticulous and well-researched, we should not of course forget that, as already shown, he had been an active player in the administrative disputes of the time and so is not quite a disinterested party.

²⁰Accounts of this vary, and are not really very important, except that they show how elusive historical accuracy is in relation to BP. Thus Eric Jones is variously described as having worked in cotton, carpet or biscuit manufacture in Manchester, Lancashire, Macclesfield, or ‘the Midlands’. In our work on this project, we have often encountered people who state with great certainty facts which turn out to be indeterminate. Of course we should strive for accuracy, but we should also recognize that BP, given its peculiar nature, will never yield all of its secrets.

He had left school at fourteen and had been in the cotton business in Manchester. He was very intelligent, didn't know German but understood organisation very well. He gave people a free hand. It all became crystal clear. Quite a lot of brainy people had the habit of resigning when they were miffed . . . but Jones dealt with them (21, p. 93).

As is often the case more generally, the capacity to combine control and innovation can be seen as one of the key dynamics of the BP organization, reflecting, in part, the peculiar mix of people and work found there. It can be argued that this was the balance which Denniston found hard to strike. It was both a strength and a weakness. Michael Smith (21, p. 178) argues with some reason that Denniston has been under-rated. He created the relaxed and creative atmosphere that allowed the early cryptanalytical breakthroughs to be made, and argued in a note to Travis in November 1940, that "one does not expect to find the rigid discipline of a battleship among the collection of somewhat unusual civilians who form GC & CS. To endeavour to impose it would be a mistake and would not assist our war effort." (NA/HW 14/8). Smith also points out that it was Denniston who had the foresight to bring the new generation of codebreakers, like Welchman and Turing, into BP.

The only rider we would add to this is to question the perhaps over-polarised picture of the Denniston regime being amateurish and 'laissez-faire' (even if, as Smith argues, having its own virtues) as compared to the professionalism of the more dynamic and interventionist Travis. Like all generalizations this needs to be treated cautiously, and there is ample evidence throughout the HW 14 series that Denniston was engaged in very extensive micro-management of BP, and in his disputes with Dilly Knox, the crux of the issue was Denniston's attempt to impose a degree of order, structure and specialization upon BP (NA/HW 14/22). It was noted earlier that his tenure as head itself saw a very significant expansion in terms of size, and a systematization of recruitment practices. There is therefore not only a great deal to be marked to the credit of his tenure but also a danger of oversimplifying our picture of his management style or achievements.

This is not just a matter of interpretation with hindsight. Looking at the contemporary documentation an interesting comment is to be found in Travis's annual report for 1942 (NA/HW 14/67). There, Travis acknowledges administrative difficulties but notes that: ". . . it must be recognised that the new Administration has had the advantage that many of the plans laid under the old regime [i.e. Denniston's tenure] have come to fruition during the past year."

If Travis was able to exhibit this degree of generosity towards his predecessor then we are surely justified in doing likewise. Within his lifetime, Denniston did not, however, receive much official generosity, and as Christopher Andrew points out, it is remarkable that he was not knighted [1, p. 488]. Andrew explains this as being all of a piece with the inter-war neglect of GC & CS. However, it seems more plausible to understand it in terms of the politics of the transition we have just described. The Downing Street letter must, after all, have been an embarrassment to Menzies and, along with the Hut 3 dispute, perhaps unfairly damaged Denniston's reputation. As noted earlier, relations between the two were not good, and apart from the lack of official recognition, C also appears to have been instrumental in Denniston's ungenerous pension arrangements [7, p. 79].

In March 1942, not only did Travis assume the role DD (S), and to all intents and purposes become the head of BP, but also a far reaching set of administrative changes were set in train. A system of Assistant Directorships was established of which the principal elements were an AD (S), Nigel de Grey, who was Travis's second in command; Bradshaw as AD (Administration) or AD (A) as mentioned above; Tiltman as Chief Cryptographer at AD level;²¹ and a secretary (in the meaning of a senior administrator), Dudley-Smith. These were supported by a small corps (probably 4) of clerical staff.

In establishing what was certainly in 1942 called the "directorate," Travis was acting upon a principle for, according to Nigel de Grey: "It was the policy of DD (S) that the 'top hamper' of the organization should be kept as light as possible and that the maximum of freedom . . . should be given to the Heads of Sections" [2, p. 464]. This should also serve to give the lie to any impression that the Denniston regime had been 'laissez-faire' whilst the Travis regime was about 'control'. Once again it was a matter of a balance between the two. What the 1942 structure did achieve was perhaps a greater clarity than had existed before. In 1941 there had emerged an informal grouping within a structure—"the wicked uncles" [21, p. 80] who had approached Churchill. By 1942, there was no such possibility or (so far as we know) desire. That is, the formal structure was a reasonably accurate reflection of the actual, informal realities. This does not, however, mean that there ceased to be any internal bickering. A curious memorandum was circulated by Travis in September 1942 lamenting a series of anonymous notes sent to him complaining about colleagues (NA/HW 14/Directorate), but what the content of these notes may have been is not known.

It is difficult to read the history and documents concerned with BP administration without recognising the extent to which 1942 was a watershed.²² As well as the new directorate, there was a new system of duty officers and, as we have noted, the introduction of Eric Jones into the crucial position of Head of Hut 3. But it should not be thought that the endemic problems of organizing BP disappeared. To take a principal example, the establishment of weekly meetings (see above) of the main heads was never satisfactory. Not all ministries bothered to attend [2, p. 466], and the expanded version of the meetings (see above) was "unwieldy" (*loc. cit.*) and no more than a rubber stamp.

There was also an attempt to integrate each service line of command so that Tiltman, Birch and Cooper would head the Army, Naval and Air sections within BP. However, it seems fair to say (and Birch says as much) that this fundamental issue of the relations between the different agencies contained within BP was never satisfactorily resolved,²³ bordering on "anarchy", according to Budiansky (7, p. 229). In April 1943, for example, it was felt necessary to specify (in the case of RAF and WAAF personnel) procedures for cases of conflict between BP administration and service orders.

²¹In effect, although not in title, replacing Dilly Knox.

²²A view confirmed to us in conversation with the late Peter Freeman, then the GCHQ historian, who commented on an earlier draft of this paper.

²³It seems likely that Naval section was the most successfully integrated, but this was already the case *before* the February 1942 changes. Denniston makes the point that the Naval section went back to the 1920s, whereas the Air section was not founded until 1935 (DENN 1/4, p. 15).

To this we should add another consideration. The new weekly meetings structure was shadowed in London by equivalent meetings under Denniston as DD (C). These virtually disappear from the histories and records of BP, yet a present-day student of organizations would surely conclude that what happened was a ‘political fix’ in which Denniston was sidelined but the fundamental nettle not grasped. What impact (if any) this had upon BP is an area which would repay further examination, but our initial assessment is that, as a fix, it ‘worked’, for if it had not then we would expect to have found reference to it within the directorate papers. This does, as she notes, somewhat mitigate against Ratcliff’s view [20, p. 93] of the key role of centralization to the success of British Sigint: for commercial and diplomatic Sigint left BP in 1942, and Denniston himself rarely returned thereafter [9, p. 71].

But the 1942 reorganization did more than initiate new structures. Returning to the point about the lack of desire to resurrect the ‘wicked uncles,’ we can make a sharper observation. In many respects, 1942 represented the advance of the ‘young turks’ over the ‘old guard’ personified by Denniston and his regime. What the new regime did was not just overhaul organization structures but also give the ‘young turks’ their head. Prime amongst these was Gordon Welchman (Figure 5), who held various roles including Head of Hut 6. As early as 1939, Welchman had presented suggestions for administrative reform to Denniston and, perhaps significantly, refers to having received a good reception from *Travis* [24, p. 76]. From all accounts, there can be little doubt that Welchman was one of the few who, early on, saw the organizational needs that the large-scale handling of Enigma decrypts would inevitably produce. Interestingly, in terms of this paper, he is also perhaps the only person who both worked at and wrote about BP to make links between his work and that of ‘management theorists’ such as the late Peter Drucker [24, p. 172] with which he became familiar while working for IBM after the War. For example, he describes his management team as “friends” [24, p. 125] and the regular meetings and reports he required of them, as well as the need to provide “what today we would call



Figure 5. Gordon Welchman (image courtesy of Bletchley Park Trust Archive).

feedback” [24, p. 126] to lower levels of staff in terms of how they had contributed to a specific achievement, either through individual communication or posting reports on noticeboards. Thus, in contrast to the strict secrecy and compartmentalisation of most of BP, he recalled: 535

I urged the people who were having the fun of breaking enigma keys or decoding messages signed by Adolf Hitler to miss no chance of reporting that some particular success had resulted from something done [in Hut 6]. . . I also requested feedback from Hut 3 . . . All this was aimed not only at boosting morale throughout Hut 6, but also at making sure that each part of the activity would know how its output was going to be used, so that it could itself devise methods that would increase the value of that output [24, p. 126]. 540

In keeping with this view, he claimed that “many good ideas came from our highly sophisticated ‘rank and file’ . . .” [24, p. 126], whilst at the same time he tried to ensure that all his staff were clear about their specific objectives. Furthermore, it has been claimed that Hut 6, at least at the more senior levels, operated in a meritocratic way whereby authority was based on ability rather than rank: 545

[The] whole structure [of Hut 6] was one where you might readily find a Major working under a Lieutenant or under a civilian, somewhat younger. Whoever was in charge was the person who had been judged to be more effective at doing it. It was meritocracy in spades and without regard to where you came from or whether you were a man or a woman, although I think we had a very large majority of men in the senior positions. [21, p. 136; see also NA/HW 3/119 p. 4]. 550
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Thus, the contribution and often frenetic activity of the *team* was emphasised: ‘we were like a pack of hounds trying to pick up the scent’ [21, p. 102], which is a useful corrective to the image of the individual genius, working in isolation and very much points the significance of the managerial and organizational effort within BP to harness individuals to the wider effort. This picture is consistent with Ratcliff’s account [20] of the informality and meritocracy of work practices at BP, and the extent of ULTRA-indoctrination. However, it is very important not to over-generalise from the cases of Hut 6 (or for that matter Huts 3, 4, and 8, where similar situations seem to have been obtained). These are important cases, and they are well-documented, but are not the only, and, in a purely statistical sense, not even the most typical, cases of working life at BP. Elsewhere, it certainly would be misleading to say that “some did not know how their work ‘fitted into the bigger picture’” [20, p. 81], for *most* did not. It is beyond the scope of this paper to give any detail on this point, but, for example, the lack of meritocracy in the Typex room (HW 14/145, p. 29) and ignorance of the big picture in the Y-stations (HW 14/19), as well as some of the recollections of BP staff [12] are indicative. It must not be forgotten that the great majority of those who worked at BP undertook mundane jobs, with little discretion and no real knowledge of their meaning, often having hoped when joining the services for travel and adventure. 560
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Returning to the main line of the present analysis, it can be said that Welchman is an important figure in the development of the organization of BP, not least with

his assumption of responsibility, from September 1943, for mechanical devices. His work impacted fundamentally upon what might be called the processes of BP. Yet it is intriguing to note that, despite his apparently jaundiced view of Denniston, what was, from an organizational point of view, the core of his proposals had been recognised by the first head of BP. For it was Denniston who, in his introduction to his 1940 Report to 'C', endorsed Welchman's view that "[i]n the past we have fitted the work to the huts as they became available. I believe greater efficiency could be obtained by arranging the huts to suit the work" [2, p. 178].

This does alert us again to the danger of drawing too sharp a distinction between the pre- and post-1942 periods. However, one fairly sharp distinction lies in the changing UK-US relationship. Although the entry of the US into WW2 in December 1941 does not exactly map onto the administrative shifts at BP, it does shadow them. Denniston headed two delegations to the US in 1941. The way that US-UK Sigint cooperation was brokered does not directly concern us here, and is itself the subject of a considerable analysis [11, 7] unsurprisingly since it laid the basis of a co-operation which endures to the present day, for which Denniston deserves much credit. It led to an amendment to the administrative structure with the creation in 1943 of an AD (Overseas)—Hastings—with responsibility for U.S. liaison. More generally, the U.S. entry into the war brought a growing U.S. personnel, as well as US equipment, into the overall Allied Sigint effort. BP had a clear technical lead in cryptanalysis but, in what might be seen as microcosm of the Alliance, the U.S. could bring so much more resource to bear upon the problem that this inevitably affected the organization of BP, even leaving aside the (relatively small) influx of personnel that occurred at BP itself. This is rather speculative, and would repay further research, but on Budiansky's account [7], the U.S. view of BP (as regards its administrative arrangements as opposed to its cryptanalytic achievements) was rather jaundiced, even if the experience of those Americans who worked at BP, such as Robert Slusser [14, pp. 74–76] was a positive one. Perhaps it is fair to say that there was a general pattern here, for Telford Taylor speaks of "friction" [14, p. 71] in Anglo-American Sigint co-operation, yet gives high praise to the actual relations he and his compatriots enjoyed at BP itself.

The 1942 reorganization was undoubtedly the most significant event in the development of the formal structure of management and organization at BP. It was not, however, the last and it is to this that we now turn.

The 1944 Reorganization

The transition on 1st March 1944, was not a result of the kinds of issues that had attended the end of the Denniston regime, nor was it of the same significance. It is difficult to find evidence of any particular event or events which caused it, but one interpretation is that it represents a vote of confidence in Travis and a move away from the somewhat fudged arrangement through which Denniston had been sidelined in 1942. For the principal shift is to consolidate Travis' position now as Director, and now knighted, whilst Denniston remained as DD (C), reporting to 'C' (now designated Director-General) and to all intents and purposes in a separate structure. This again seems like a political expedient, however, since on Denniston's retirement in May 1945, the role of DD (C) was incorporated into that of DD 3 (see below).

At the same time, all of the principal figures at BP were correspondingly promoted from Assistant Director to Deputy Director so that, as noted above, de Grey became DD 1 and the formal deputy to Travis, and Bradshaw DD 2 in charge of administration whilst Hastings became DD 3, still with responsibility for overseas (principally US) liaison. For the first time there was an acknowledged hierarchy between these posts (i.e., DD 1, 2, 3, etc.) which had previously been specified only in functional terms.

These three formed a particular cohort, “empowered to issue general instructions on my [i.e., Travis’s behalf]” (HW 14/Directorate). In this they were slightly differently positioned to the remaining four DD’s—Tiltman, Birch and Cooper of military, naval and air sections, and Wilson DD (Cypher Security Adviser). It seems plausible to infer that given the history of inter-service discord it would have created difficulties if any one service line had had the authority to act on Travis’s behalf. A new tier of Assistant Directors was also created, including Welchman with responsibility for Machines and Mechanical equipment and Eric Jones in his capacity as Head of Hut 3. This seems likely to have been a recognition of Jones’ personal value to BP since other Hut Heads (e.g., Milner-Barry) were not ADs.

These changes do seem to represent more than a general upgrading, and reflect, as we have suggested, a consolidation of the regime and, arguably, a more formalised and elaborate hierarchy—in effect an extra tier of management. This seems in keeping with the general theme of expansion, since BP was of course still growing at this point. But it also seems to indicate a more ‘directorial’ regime not just because of the literal growth of the directorate but because, as noted above, it is from this point onwards that the elaborate systems of meetings seems to have declined, with the exception of the Intelligence Exchange. Thus, the 1944 changes may be read as a centralisation of power. This is a rather tentative conclusion and requires further consideration, but it does seem plausible to read the changes as a growth in executive power and would be compatible with what would be expected in a maturing organization.

The issues involved in such maturation go beyond those of organizational size. It is well-established within organizational analysis [25] that the development of standardization and the structures that go with it can be associated with the nature of technology in use and in particular the distinction between ‘unit’ and ‘mass’ technologies. The former term refers to the production of one-off and specialised products, usually involving high degrees of ‘craft’ labour. The latter refers to the mass production of standardised goods, involving large elements of semi-skilled or unskilled labour. It can be argued that by 1944 the technologies in use at BP had become increasingly of the mass type so this, as well as the issue of organizational size (the two are clearly linked anyway), helps to explain the increasing standardization and formalization (i.e., bureaucratization) that occurred.

In addition, a third factor impacting upon bureaucratization is normally believed to be the extent of predictability or certainty in the organizational environment [25]. Without overstating the case, the situation in the early part of the war was necessarily one of much greater uncertainty about what, if anything, could be achieved by the cryptanalysts and what would be entailed once Enigma, in particular, had been broken. By 1944 there was much greater certainty that (barring a radical change in Axis cryptographic methods) most Enigma keys would routinely be broken and a greater knowledge about the volume of traffic which would have

to be processed. Thus, in relative terms, the environment stabilised and so standard, established routines and structures became both possible and desirable.

However, and not contradicting any of these points, there is another way of interpreting the 1944 changes. This is to do with the very success of BP. By 1944, the codebreaking effort constituted by far the most significant source of intelligence. In his history of the Soviet penetration of the British establishment Andrew Boyle notes that “[t]o a large extent, the counter-espionage activities of MI6 were a hollow pretence. Turing, Welchman, Knox and the small army of code-breaking academics had rendered them partly redundant” [15, p. 227]. BP was producing an “unending flow of priceless, first-hand intelligence” [15, p. 228]. With this being so, perhaps the enhanced status of Travis from 1944 is best understood as a recognition of the centrality of BP, and Sigint generally, within the intelligence hierarchy. After all, what had been a small, largely unproven outfit in 1939 was, by 1944, the almost taken-for-granted provider of an extraordinary wealth of operational and strategic intelligence. Intelligence services are only different from any other organization because of the secrecy of their work, and just as in any organization success raises status, so it may be inferred that the success of BP led to an upgrade of its status, with Travis’s elevation to Directorship as one result.

The essential structures created in March 1944 remained unchanged for the remainder of the war, although there were some relatively minor reforms in September 1944 when Tiltman joined the ‘inner directorate’ as DD 4 in charge of cryptography, being replaced as DD (MW)—i.e., Military Wing or army section—by Jacobs. At this point some new ADs were also created. In the appendix to this paper we provide a simplified version of the organizational chart depicting this final structure.

Conclusion

In this paper we have sought to describe and analyse the major organizational reform that occurred at GC & CS during its wartime years at BP, with the intention of clarifying a hitherto under-explored aspect of its history. This has a wider significance in terms of understanding the history of modern cryptanalysis. Ratcliff [20] plausibly claims that the success of the Allied Sigint effort can in large part be ascribed to the way it was organized and in particular she points to the centralization of Sigint expertise at BP. The research needed to understand fully the organization of BP has, however, hardly begun. With this paper, we have made some progress in this direction by the specific focus on the pivotal 1942 reorganization.

In our account of this reorganization we have sought to explain it in terms of broad changes in the size of the organization and the increasing routinization of work. We have also sought to explain the main details of the ‘micro-politics’ which precipitated the reorganization. However, we have also sought to nuance a little the implication in some of the literature which touches on the reorganization that there was a hard and fast break. Instead we suggest that there were elements of continuity and discontinuity in terms of the extent of formalization and control. In particular, we have suggested a rather less harsh interpretation than is normally given of Denniston’s leadership.

Pivotal as the 1942 reorganization was, in itself it only begins the process of understanding the organization of BP, and in future work from the project from which this paper is drawn we aim to rectify that. We have briefly gestured towards

issues of the informality of work practices, for example, but there is much more to be said about this. Of particular interest are the ways in which BP demonstrates many of the qualities of what are nowadays called “knowledge-intensive organizations.”

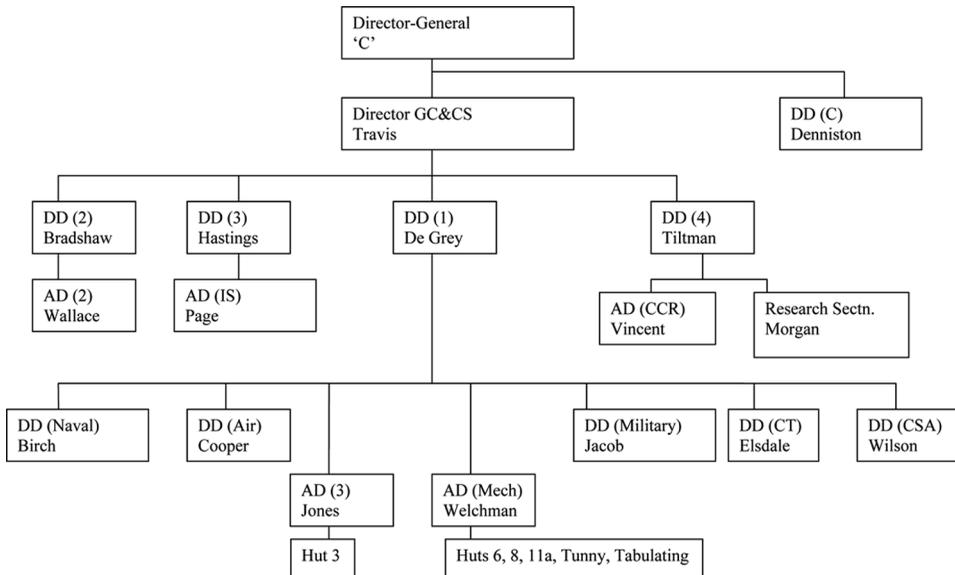
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Appendix

Simplified BP Organization Chart 18th November 1944



References

1. Andrew, C. 1985. *Secret Service. The Making of the British Intelligence Community*. London: Guild Publishing.
2. Birch, F. (undated). *A History of British SigInt*. Vols. I & II. GC&CS internal document, Bletchley Park Trust Archive.
3. Black, A. and Brunt, R. 1999. "Information Management in Businesses, Libraries and British Military Intelligence: towards a history of information management," *The Journal of Documentation*, 55(4), 361–374.
4. Black, A. and Brunt, R. 2000. "MI5 1909–1945: An Information Management Perspective," *Journal of Information Science*, 26(3), 185–197.
5. Blau, P. 1955. *The Dynamics of Bureaucracy*. Chicago: Chicago University Press.
6. Brunt, R. 2004. Indexes at the Government Code and Cypher School, Bletchley Park, 1940–1945, <http://www.chemheritage.org/pubs/asist2002/24-brunt.pdf>
7. Budiansky, S. 2000. *Battle of Wits. The Complete Story of Codebreaking in World War II*. London: Viking.
8. Davies, P. 2001. From Amateurs to Professionals: GC&CS and Institution-Building in Sigint. In *Action this Day*, edited by M. Smith and R. Erskine. London: Bantam, pp. 386–402.
9. Denniston, R. 2007. *Thirty Secret Years. A.G. Denniston's Work in Signals Intelligence 1914–1944*. Clifton-upon-Teme, Worcs, UK: Polperro Heritage Press.
10. Evans, D. 2003. *BP: The Development and Historical Function of the Fabric*. Mimeo: Bletchley Park Trust, U.K.
11. Herman, C. 1996. *Intelligence Power in Peace and War*. Cambridge, U.K.: Cambridge University Press.

12. Hill, M. 2004. *Bletchley Park People*. Stroud, U.K.: Sutton Publishing.
13. Hinsley, H. 1993. *British Intelligence in the Second World War* (Abridged). London: HMSO.
14. Hinsley, H. and Stripp, A., (Eds) 1993. *Codebreakers*. Oxford, U.K.: Oxford University Press.
15. Lawrence, P. and Lorsch, J. 1967. *Organization and Environment*. Cambridge, MA: Harvard University Press.
16. Obituary, December 19, 2003. *London Daily Telegraph*.
17. Page, G. (Ed.) 2002. *We kept the Secret. Now it Can be Told—Some Memories of Pembroke V Wrens*. Wymondham, Norfolk, U.K.: G R Reeve Ltd.
18. Page, G. (Ed.) 2003. *They Listened in Secret. More Memories of the Wrens*. Wymondham, Norfolk, U.K.: G R Reeve Ltd.
19. Pugh, D. and Hickson, D. 1976. *Organisation Structure in its Context: The Aston Programme*. London: Saxon House.
20. Ratcliff, R. A. 2006. *Delusions of Intelligence. Enigma, Ultra, and the End of Secure Ciphers*. New York: Oxford University Press.
21. Smith, M. 1988. *Station X*. Basingstoke, U.K.: Macmillan.
22. Summerfield, P. and Peniston-Bird, C. 2006. *Contesting Home Defence: Men, Women and the Home Guard in Britain in the Second World War*. Manchester, UK: Manchester University Press.
23. Weber, M. 1968. *Economy and Society*. New York: Bedminster.
24. Welchman, G. 1981. *The Hut Six Story*. London: Penguin.
25. Woodward, J. 1958. *Management and Technology*. London: HMSO.
26. Boyle, A. 1979. *The Climate of Treason*. London: Hutchinson.