British Exploitation of German Science and Technology from War to Post-War, 1943-1948.

Charlie Hall

Ph.D. History

University of Kent

August 2016

ABSTRACT

The aim of this thesis is to present a rounded picture of British efforts to obtain information on German science and technology, both military and civilian, after the Second World War. This endeavour was conducted for numerous reasons – to secure some form of reparations, to improve defence capabilities for any future conflict, and to ensure that Germany possessed no lasting scientific war potential – and in various ways – the examination of laboratories and factories, the confiscation of equipment and documents, and the interrogation of experts. In some cases, these same experts were detained, brought to Britain, and occasionally offered work at government research establishments or private companies, in order to exact long-term benefit for Britain from the occupation of Germany. Unsurprisingly, an endeavour of this nature encountered difficulty from multiple quarters, including public opposition in Britain, conflict with other initiatives, such as reconstruction, in Germany, and competition with foreign powers, most notably the Soviet Union.

As a result, this thesis sits at the intersection between various fields of historical inquiry. It incorporates elements from the history of intelligence, such as the necessarily secretive nature of many of the exploitation operations and the involvement of high-level intelligence bodies in the direction of the programme; from diplomatic history, not least how exploitation was affected by the reconfiguration of Britain's status on the world stage as it was steadily eclipsed by the United States and the Soviet Union; from the history of science, as the programme encompassed some of the most significant technological developments of the period, including the atomic bomb, the jet engine and guided missiles; and from military history, both because the first units and individuals concerned with the initiative were military and because many of the most valuable spoils removed from Germany were of a warlike nature. Ultimately, though, the narrative presented in this thesis is primarily concerned with British policy – policy towards occupied Germany, science and technology, and the nascent Cold War – and how this evolved throughout, and was shaped by, the deeply transformative period surrounding the end of the Second World War. The story of the British exploitation of German science and technology is, therefore, a crucial, but thus far understudied, facet of Britain's adjustment to the new post-war era in 1945.

ACKNOWLEDGEMENTS

This thesis is the product of more than three years' work and, though I take full responsibility for the finished product, I could not have reached this position without the support provided to me by many other individuals, of whom only a handful can be mentioned specifically here.

First among these are my supervisors – Ulf Schmidt and Stefan Goebel – who have served as enormously helpful guides through the world of academia and through the notoriously convoluted process which is the completion of a PhD. Not only have they offered me advice and comments on every aspect of my work, ranging from the broadest research themes to the minutiae of footnote formatting, they have also acted as my champions and have given me great enthusiasm for any future I might have in this field.

In addition, the School of History at the University of Kent (my academic home for seven years) has provided the ideal intellectual and social environment in which to complete my research and my thanks go to all members of staff, but particularly to Juliette Pattinson, Mark Connelly and Philip Boobbyer, who have all shown me great kindness during my time here. Among my peers, Markus Wahl deserves special gratitude, not least for his invaluable insight into German-language material on my topic, which would have otherwise eluded me. The other members of the Doctoral Colloquium in Contemporary History have all offered very gratefully-received opinions on my work at various stages of completion, and have been excellent companions on the doctoral journey.

Beyond the university, the support of my parents, Vicki and Ian, has been, in this as in all I do, unwavering and wholehearted throughout. Without their encouragement, generosity and faith in me, I know without doubt that I would not be where I now am.

Last, but by no means least, my thanks and love go to Annamarie, who has invested in this thesis almost as much as I have over the past three years and who has served as my motivator in moments of idleness, cheerleader in moments of doubt, sounding board in moments of contemplation, and my proofreader-in-chief throughout. Having her by my side has been utterly essential to the completion of this project.

TABLE OF CONTENTS

LIST OF ABBREVIATIONS

In Text

All abbreviations, acronyms and codenames are as they appear in the original source material.

For definitions of some of the more significant terms listed here, please see the appended glossary.

30AU	No. 30 Assault Unit	UK
ADI	Assistant Directorate of Intelligence	UK
Alsos	War Department Scientific Intelligence Mission	US/ALLIED
ASLIB	Association of Special Libraries and Information Bureaux	UK
BAOR	British Army of the Rhine	UK
BBRM	British Bombing Research Mission	UK
BBSU	British Bombing Survey Unit	UK
BIOS	British Intelligence Objectives Sub-Committee	UK
BW	biological warfare	
CAFT	Consolidated Advance Field Teams	ALLIED
CATOR	Combined Air Transport Operations Room	ALLIED
CCG(BE)	Control Commission for Germany (British Element)	UK
CCS	Combined Chiefs of Staff	ALLIED
CDEE	Chemical Defence Experimental Establishment (Porton Down)	UK
CIC	Combined Intelligence Committee	ALLIED
CIOS	Combined Intelligence Objectives Sub-Committee	ALLIED
CIPC	Combined Intelligence Priorities Committee	ALLIED
COGA	Control Office for Germany and Austria	UK
CW	chemical warfare	
DCOS	Deputy Chiefs of Staff (Committee)	UK
DSIR	Department of Scientific and Industrial Research	UK
EAB	Economic Advisory Board	UK
EDU	Enemy Documents Unit	UK
EIPS	Economic and Industrial Planning Staff	UK
EPCOM	Enemy Publications Committee	UK
EPES	Enemy Personnel Exploitation Service	UK
ERDS	Enemy Research & Development Sub-Committee	UK
FIAT	Field Information Agency, Technical	ALLIED
FIAT (Br.)	Field Information Agency, Technical (British Element)	UK
FIAT (US)	Field Information Agency, Technical (US Element)	US
FO	Foreign Office	UK
G-2	Military Intelligence	ALLIED
GED	German Economic Department	UK

G(T) & CW	General (T-Forces) & Chemical Warfare	UK
HMSO	His Majesty's Stationery Office	UK
I.E.T. Groups	Investigation of Enemy Technique Groups	*proposed*
IDCGS	Inter-Departmental Committee on German Scientists	UK
JEIA	Joint Export/Import Agency	UK/US
JIC	Joint Intelligence (Sub-)Committee	UK
JIC-CCG	Joint Intelligence Committee, Control Council for Germany	UK
JIOA	Joint Intelligence Objectives Agency	US
LFA	*Luftfahrtforschungsanstalt* (Aeronautical Research Institute)	GERMAN
MAP	Ministry of Aircraft Production	UK
MEW	Ministry of Economic Warfare	UK
MFA&A	Monuments, Fine Art & Archives	ALLIED
NID	Naval Intelligence Division	UK
NKVD	People's Commissariat for Internal Affairs (security service)	SOVIET
OSRD	Office of Scientific Research and Development	US
RAE	Royal Aircraft Establishment (Farnborough)	UK
RAF	Royal Air Force	UK
RAT	Reparations Assessment Teams	UK
RDR Div.	Reparations, Deliveries and Restitution Division	UK
RM	Royal Marines	UK
RN	Royal Navy	UK
RNVR	Royal Naval Volunteer Reserves	UK
SCAEF	Supreme Commander Allied Expeditionary Force	ALLIED
SHAEF	Supreme Headquarters Allied Expeditionary Force	ALLIED
S.H. Parties	Sealing & Holding Parties	*proposed*
SIAS	Scientific Intelligence Advisory Service	UK
SIS	Secret Intelligence Service	SIS
SPD	*Sozialdemokratische Partei Deutschlands* (Social Democratic Party)	GERMAN
SPOG	Special Projectile Operations Group (*Backfire*)	UK/US
STIB	Scientific and Technical Intelligence Branch	UK
STRB	Scientific and Technical Research Board	UK
T-Force	Target Force	ALLIED
TPA	Technical and Personnel Administration	UK
TIIC	Technical Industrial Intelligence Committee	US
USAAF	United States Army Air Force	US
USFET	United States Forces European Theatre	US
USSBS	United States Strategic Bombing Survey	US

Footnotes (primary sources)

All abbreviations are as they appear in the relevant archives.

IWM	Imperial War Museum
TNA	The National Archives, Kew
AB	Atomic Energy Authority (and predecessors) papers
ADM	Admiralty papers
AIR	Air Ministry papers
AVIA	Ministry of Aviation papers
BERCOMB	Berlin Commission (British) *[signal shorthand]*
BT	Board of Trade papers
CONCOMB	Control Commission for Germany (British Element) *[signal shorthand]*
CONFOLK	Control Office for Germany and Austria *[signal shorthand]*
CAB	Cabinet Office papers
DEFE	Ministry of Defence (and predecessors) papers
FO	Foreign Office papers
HW	Government Communications Headquarters (GCHQ) papers
LAB	Ministry of Labour papers
PREM	Office of the Prime Minister papers
RB	Research Branch
TROOPERS	War Office *[signal shorthand]*
WO	War Office papers

Note

While the terms 'Soviet Union' and 'Russia' are not interchangeable, many contemporary sources use them as such and, in fact, the terms 'Russia' and 'Russians' are far more common in the primary material than 'Soviet Union', 'Soviets' or 'USSR'. I have aimed to avoid this erroneous elision where possible but of course all primary material is presented with the original terms. In nearly all cases, where 'Russia' or 'Russians' is used, the author of the source is referring to the Soviet Union or the Soviet government or people.

INTRODUCTION

'This officer feels that we may just as well acknowledge the situation for what it is between Russia and the Western powers: A completely open race for the best talent and skill Germany has to offer.'[1]

This statement, made by an unnamed British intelligence officer of the Field Information Agency Technical – one of the core organisations of the Anglo-American scientific and technical exploitation programme – in Germany in August 1946, was remarkably perceptive and prescient. By this time, it was indeed fair to characterise the search for the scientific and technical spoils of Germany as a fierce contest between all four of the victorious Allies – Britain, France, the United States and the Soviet Union – though this would increase in both ferocity and scale as time passed. This contest did not, however, take the form of a mad scramble defined by smash-and-grab techniques and unrestrained acquisitiveness; these elements certainly featured but the bigger picture was that all the occupying powers, including Great Britain, operated comprehensive exploitation programmes, staffed and directed by civil servants as well as soldiers, and guided by coherent policy and strategy. During the war, the British military establishment had embraced science and technology, though often slowly and begrudgingly, and the impact that new developments could have on the course of conflicts had become increasingly apparent. To paraphrase Winston Churchill, science in Britain had been 'fanned by the crimson wings of war' and emerged in a position of new prominence in 1945.[2] As a new world order was established after the war, under the long shadow cast by the atomic bomb, the V-2 rockets, and countless other major wartime technological developments, it was apparent to policy-makers in Britain and beyond that science and technology may well also provide the key to future supremacy. Britain and its erstwhile allies, each now responsible for a specific portion of occupied Germany, all recognised that the quickest way to obtain a technical advantage over their rivals would be to purloin it from the carcass of the Third Reich.

[1] TNA, FO 1031/59, 'Periodic Intelligence Report No. 2', 6 August 1946.
[2] Winston Churchill, 'MIT Mid-Century Convocation', 31 March 1949. http://libraries.mit.edu/archives/exhibits/midcentury/mid-cent-churchill.html [accessed 22 January 2016]; see also David Edgerton, *Warfare State: Britain, 1920-1970* (Cambridge: CUP, 2005).

As Britain and the other main post-war powers settled into their new roles and sought the technology which could give them an edge on the battlefield or at the negotiating table, the exploitation initiative came into its own. However, the roots of exploitation go back a little further than this and were predicated on the belief among the Allies that, despite their own appreciation of science and technology, Nazi Germany exceeded them as a true scientific behemoth and one which had made unparalleled advances in countless fields of research during the war. Michael Neufeld describes exploitation as 'a campaign that remains unique in the history of modern warfare', largely because at the end of no other recent war has the perception been so strong that the defeated opponent was in possession of technologies equal or superior to that of the victorious powers.[3] Although it has been argued that these perceptions were inaccurate,[4] their accuracy is actually of fairly limited relevance – what matters is that they were supported by experts, internalised by policy-makers and thus became a driving force of post-war strategy.[5] Armed with this viewpoint and with the whole of Germany practically at the mercy of its occupiers, it is no wonder that the British sought to extract what they could from their former enemy, and thus exploitation became a key occupation policy.

It is worth briefly mentioning here that although the term 'exploitation' (which was used by contemporaries) has obvious connotations of unfairness and mistreatment, those responsible for its conduct in the post-war period would not have seen these as relevant; instead they used exploitation as a synonym for utilisation and saw what they were doing as the justifiable use of a resource which was freely available to them.[6] Other terms are slightly more problematic – 'loot' and 'plunder' for instance, with their connotations of mindless battlefield barbarity, were generally avoided by those involved in exploitation and instead they became staples in the vocabulary of those who sought to cast aspersions on the legitimacy or ethical rectitude of the initiative. Their use in retrospect, especially by historians, should be done only with great caution as their negative implications can

[3] Michael J. Neufeld, 'The Nazi Aerospace Exodus: Towards a Global, Transnational History', *History and Technology*, 28 (2012), 49.
[4] David Edgerton, *Britain's War Machine: Weapons, Resources and Experts in the Second World War* (London: Allen Lane, 2011), 290-2.
[5] Brian Balmer, *Secrecy and Science: A Historical Sociology of Biological and Chemical Warfare* (London: Routledge, 2012), 73.
[6] Clarence G. Lasby, *Project Paperclip: German Scientists and the Cold War* (New York: Atheneum, 1971), 4. For a wider discussion of the morality of exploitation, see Chapter Six below.

misrepresent the true nature of the exploitation scheme. In this thesis, these words are almost completely avoided, and used only in the appropriate context. 'Expropriation' has also not been used here and is almost entirely absent from the primary material too, probably on account of its more narrow legal definition (as will be discussed, the relationship between exploitation and the law was more flexible than this would permit) and the fact that it tends to apply only to physical property, and not to skills or know-how.

Science and technology was not the only area of German expertise which the Allies exploited at the end of the war. As Cold War divisions became more apparent, Britain and America began to see Germany as a tool to be wielded against Soviet aggression and territorial ambitions. While much of the former Third Reich lay in physical and structural ruin, its human (and some material) resources remained generally available for use. Certain sections of Nazi personnel, among them scientists and engineers, had an impressive reputation and the victors were keen to capitalise on having these experts in various fields at their disposal. Even senior Nazis believed that this utilisation would form a part of Allied post-war policy – in an interrogation which took place in British captivity after the war, former Reich Minister for Food and Agriculture and committed Nazi ideologue, Richard Walther Darré, shared his belief that the British would take SS men with a bad record and 'make a legion out of them and use them somewhere in their colonies as soldiers. In a year or two they will have an excellent front line unit which will save English blood.'[7] Although this particular scheme never materialised, a similar tactic was adopted by both the French and the Americans: the French Foreign Legion employed SS anti-partisan specialists to hunt down guerrillas in the jungles of Indochina while the Americans tasked SS-*Hauptsturmführer* Klaus Barbie, the so-called 'Butcher of Lyon', with tackling the German Communist Party in Bavaria.[8] A better-known case is that of Reinhard Gehlen, who, between 1942 and 1945, headed the Wehrmacht General Staff's *Fremde Heere Ost* department, which handled intelligence (with mixed success) on the Red Army – this expertise led the Americans to redeploy him, after a year-long debriefing in the United States, to the US zone of Germany

[7] TNA, WO 208/4969, Interrogation of Richard Walther Darré, October 1945.
[8] Richard J. Aldrich, *The Hidden Hand: Britain, America and Cold War Secret Intelligence* (London: John Murray, 2001), 181.

where he established the Gehlen Organisation, which was concerned with intelligence on the Soviet Union and which employed several former SS and SD operatives.[9]

As this shows, the victorious Allies had no real qualms with utilising German personnel of all stripes after the war, often with little or no regard for their political records or wartime activities. Science and technology was certainly the area where this exploitation was carried out most comprehensively and on the largest scale though, as this was perhaps Germany's most desirable asset at war's end. US Brigadier-General Leslie Groves, head of the Anglo-American Manhattan Project, took a keen interest in parallel German efforts to develop an atomic bomb and dispatched an Allied team to gather the brightest minds of the German project in 1945. Regarding the successful capture of Werner Heisenberg, the Nobel Prize-winning German nuclear physicist, Groves later described him as 'worth more to us than *ten divisions* of Germans', qualifying this by adding that 'had he fallen into Russian hands, he would have proven invaluable to them.'[10] This shows not only how important German scientists and technicians were believed to be, but also that any success in the exploitation endeavour was viewed not only in terms of the benefit to the West but also in terms of the negative impact on the Soviets.

The importance and scale of the exploitation programme means that it has some place in the public consciousness to this day. In the preface to his 1990 book on American exploitation, *Science, Technology, and Reparations*, John Gimbel remarked that 'most reasonably informed people' know something about the Allied recruitment of German scientists and the competition between the Western powers and the Soviet Union for their services.[11] In the course of this present research, it has become clear that this still holds true today, albeit to a lesser extent, especially in Britain – a country whose exploitation programme is frequently forgotten beside its larger American equivalent. Certain elements of exploitation lore have greater currency than others; the name Wernher von Braun generally has high levels of recognition and in many ways his story has come to symbolise

[9] Norman J.W. Goda, 'The Gehlen Organisation and the Heinz Felfe Case', in David A. Messenger and Katrin Paehler (eds.), *The Nazi Past: Recasting German Identity in Postwar Europe* (Lexington, KY: University Press of Kentucky, 2015), 273ff; Constantin Goschler and Michael Wala, *Keine Neue Gestapo: Das Bundesamt für Verfassungsschutz und die NS-Vergangenheit* (Berlin: Rowohlt, 2015).

[10] Leslie R. Groves, *Now It Can Be Told: The Story of the Manhattan Project* (London: Andre Deutsch, 1963), 244, emphasis in the original.

[11] John Gimbel, *Science, Technology, and Reparations: Exploitation and Plunder in Postwar Germany* (Stanford: Stanford University Press, 1990), vii.

the wider exploitation narrative. As a scientist in Nazi Germany, he was instrumental in developing the V-2 rockets (primarily assembled by slave labour in underground factories) which fell on London and Antwerp in the latter part of the war, but after the war he was whisked off to the USA, never called upon to answer for any war crimes, and then contributed significantly to the American space programme, earning the affectionate nickname, 'the Father of Rocket Science', along the way.[12] His tale, with its undertones of injustice and cover-up, has earned him a place in the popular consciousness, especially in the United States, and his fame (or infamy) was cemented when, in 1965, he became the subject of a song by satirist Tom Lehrer, who lyrically and perhaps aptly described him as 'a man whose allegiance is ruled by expedience'.[13]

Wernher von Braun (and the legacy of exploitation which he represents) has appeared in popular culture remarkably often, considering that exploitation was supposedly highly secretive and not for public consumption. It is widely accepted that von Braun was the main inspiration for Peter Sellers' portrayal of Dr Strangelove in the 1964 Stanley Kubrick film of the same name, while another interpretation appeared in *The Right Stuff* (1983), a film which also gave prominence to the quip, apparently originally attributable to one of President Eisenhower's advisors, that 'their Germans are better than our Germans'.[14] Elsewhere, large sections of the plot of Joseph Kanon's bestselling novel, *The Good German* (later adapted into film), depict elements of the exploitation programme and the 2016 BBC drama series, *Close to the Enemy*, focused on concerted British efforts to recruit one particularly intransigent (fictional) German scientist after the war.[15] More widely, passing references to the scheme in general can be detected across popular media, from television to video games.

There are two themes which are common throughout the vast majority of these cultural references to exploitation – one is the overwhelming focus on the American initiative and a simultaneous neglect of the parallel efforts of the British (or French); the

[12] On von Braun, see Wayne Biddle, *Dark Side of the Moon: Wernher von Braun, the Third Reich and the Space Race* (London: W.W. Norton, 2009); Michael Neufeld, *Von Braun: Dreamer of Space, Engineer of War* (New York: A.A. Knopf, 2007).

[13] Tom Lehrer, 'Wernher von Braun', 1965. https://www.youtube.com/watch?v=QEJ9HrZq7Ro [accessed 13 January 2016].

[14] *Dr Strangelove or: How I Learned to Stop Worrying and Love the Bomb*, dir. Stanley Kubrick (USA: Columbia Pictures, 1964); *The Right Stuff*, dir. Philip Kaufman (USA: Warner Bros., 1983).

[15] Joseph Kanon, *The Good German* (London: Sphere, 2004); *Close to the Enemy* (UK: BBC, 2016).

second is the portrayal of the scheme as shadowy and clandestine, a sinister conspiracy which should be seen as one of the Allies' dirtiest post-war secrets. While it is true that certain elements of the programme were considered 'top secret', this often had more to do with the sensitive nature of the material which was gleaned from Germany, such as that pertaining to chemical, biological or atomic weapons, than any attempt to hide the basic nature of the scheme from the public – indeed, articles concerning exploitation appeared in the press with relative frequency and it was discussed quite openly several times in the House of Commons.[16] Negative imagery of the scheme has also been reinforced in more recent journalism on the subject, which commonly arises when a new batch of related documents are released to the public in government archives. In one such article, appearing in the *Daily Telegraph* in August 2007, words such as 'loot' and 'abduct' are used to describe British methods, which are also directly compared to those of the Gestapo.[17] It is usually the case that veracity plays second fiddle to sensationalism and the search for a big story, and one of the main aims of this present study is to challenge these prevailing evaluations and present a more accurate and lucid picture of post-war British exploitation. However, a cultural history of exploitation, encapsulating the ways in which the scheme has been portrayed since and engaging with the concepts of memory and public consciousness, would certainly shed a new and interesting light on the subject. Although Monique Laney touches on this briefly in *German Rocketeers in the Heart of Dixie*, there is no doubt a richer seam of potential research here, albeit one that does not fall under the necessarily limited purview of this thesis.[18]

In addition, exploitation did not exist in isolation and therefore should not be studied as such. As mentioned above, one of the main areas of discourse on this topic has been related to the competition over German scientific and technical spoils between East and West and the links which this implies to the beginning of the Cold War. Post-war Germany was the crucible in which the geopolitical structure of the second half of the twentieth century was forged and so it is unsurprising that it was also here that the very first chapter of the Cold War arms race between the Soviet Union and the West was written. This

[16] Balmer, *Secrecy and Science*, 59.
[17] 'How Britain put Nazis' top men to work', *Daily Telegraph*, 30 August 2007.
[18] Monique Laney, *German Rocketeers in the Heart of Dixie: Making Sense of the Nazi Past in the Civil Rights Era* (New Haven, CT: Yale University Press, 2015).

provides what is essentially the central contention of this present study – that concerns about the Soviet Union, and the desire to prevent them from making full use of Germany's scientific and technological resources, became the driving force of the British exploitation programme, at the expense of practically any and all other considerations. Other historical accounts have challenged the significance of exploitation at this particular juncture in international relations, arguing instead that exploitation is just one instance in a long-running tradition of technology transfer between nations and, moreover, that it is a case of limited historical significance.[19] This present study aims to show that on account of the circumstances, the organisation, the execution, and the ramifications of post-war exploitation, this argument does not hold up under close scrutiny.

Although this study posits that exploitation was inextricably connected to the dichotomous rivalry of the Cold War, it also rests on the assumption that exploitation was not a fixed or static programme, but rather one which evolved and changed considerably during its lifespan. For instance, the importance of concerns about Soviet intentions and potential aggression in Europe began as a relatively minor factor and grew throughout, later becoming the defining priority of the whole initiative. This process followed a different trajectory within the British programme than it did in the American equivalent which is, in part, why it warrants such close examination here. Other external pressures played an important role in shaping the exploitation scheme and the course which it followed, including economics and occupation politics, which again were experienced differently by the British officials than they were by their counterparts across the Atlantic. On the whole the British exploitation programme, though relatively small, was unique and should be studied as such, rather than being considered, as it often has been in the past, as a mere offshoot or subsidiary of the larger and better-known American operation. One of the primary responsibilities of this thesis is to show that the British exploitation programme is worthy of this individual analysis and that research based on this principle is sufficiently robust.

[19] Volker Berghahn, 'Technology, Reparations, and the Export of Industrial Culture. Problems of the German-American Relationship, 1900-1950', in Matthias Judt and Burghard Ciesla (eds.), *Technology Transfer out of Germany after 1945* (Amsterdam: Harwood, 1996), 4.

The bulk of the literature on exploitation has, somewhat disconcertingly, followed the trends evident in popular culture and press representations of the subject. Not only is coverage disproportionately weighted towards the American programme, but the portrayal of the scheme rarely strays beyond notions of government conspiracy and clandestine activity by shadowy intelligence agencies, particularly regarding the employment of Nazi experts in the Allied countries almost immediately after the war. Many of these are lurid accounts written by journalists or non-academic historians, who have built their research around their (sometimes predetermined) conclusions, rather than the other way around. In some cases, the title of the book alone betrays its emphasis on scandal, such as Linda Hunt's *Secret Agenda* or Tom Bower's *The Paperclip Conspiracy*, while others abandon any semblance of subtlety and state their outrage clearly on the front cover, as in Eric Lichtblau's *The Nazis Next Door: How America Became a Safe Haven for Hitler's Men*.[20] It is clear why these authors have opted for a sensationalist approach, and why it seems like an appropriate lens to apply to exploitation, but in reality, as Brian Balmer has shown, secrecy in these circumstances is rarely a straightforward concept.[21] Other accounts instead focus on the remarkable acts of daring undertaken by the commandos who were responsible for some of the early episodes of the exploitation story, describing them as 'forgotten heroes' and often failing to sufficiently discuss the fact that their actions constitute only a very small part of the wider initiative.[22] While this present study acknowledges that the exploitation programme obviously had the potential for controversy and certainly trod some uncertain ethical and legal ground, as well as involving some very real occasions of enterprise and heroism in the field, it also hopes to reposition the discourse on this topic away from sensationalism and into the territory of scholarship.

The work which has achieved this most significantly in the past, and one which I therefore seek to align this present study with most closely, is Gimbel's *Science, Technology, and Reparations* which provided the first scholarly account of the American exploitation

[20] Tom Bower, *The Paperclip Conspiracy: The Battle for the Spoils and Secrets of Nazi Germany* (London: Grafton, 1988); Linda Hunt, *Project Paperclip: The United States Government, Nazi Scientists and Project Paperclip, 1945-1990* (New York: St Martin's Press, 1991); Eric Lichtblau, *The Nazis Next Door: How America Became a Safe Haven for Hitler's Men* (Charlottesville, VA: Mariner, 2014); Annie Jacobsen, *Operation Paperclip: The Secret Intelligence Program that Brought Nazi Scientists to America* (Paris: Hachette, 2014).
[21] Balmer, *Secrecy and Science*, 1.
[22] Sean Longden, *T-Force: The Forgotten Heroes of 1945* (London: Constable, 2010); Nicholas Rankin, *Ian Fleming's Commandos: The Story of 30 Assault Unit in WWII* (London: Faber & Faber, 2011).

programme. There is no denying that it is an important and revealing book – the result of over ten years of intensive research by a historian who had studied the American occupation for over 30 years. Gimbel focuses heavily on material exploitation, that is, the removal of documents, equipment and finished products, and does not go into much depth when discussing the recruitment of German scientists and technicians themselves. As a result, he also commits a large section of the book to attempting to assess the value of the material which the USA was able to secure from Germany. Gimbel also focuses almost exclusively on the American efforts and clarifies in his preface that, except for occasional brief references, the book does not deal with the parallel endeavours of the other Allies.[23]

In his review of Gimbel's book, Raymond Stokes comments that 'detailed examinations of the French, British, and even the Russian counterparts to the American programs would be useful', but to date these remain elusive.[24] This thesis aims to redress this in the British respect, and though it would not be fair or appropriate to consider this work a companion piece to Gimbel's book, there are numerous parallels which were deliberately sought and are happily acknowledged, and certainly both works exist in the same historiographical environment. In addition, this thesis discusses *both* the material and personnel exploitation which the British conducted and posits that greater significance should be attached to the latter, as this had further-reaching ramifications and was more closely entwined with the Cold War rivalry. Cementing his position as an authority on the history of exploitation, Gimbel also produced several articles on the topic, including one which provides an interesting exploration of the relationship between exploitation of personnel and denazification (his focus throughout remains on the American programme).[25]

Science, Technology and Reparations made a substantial impact upon its publication in 1990 and three years later the German Historical Institute in Washington DC hosted a conference to consider Gimbel's work and his conclusions. A further three years later the proceedings of that conference were published as an edited volume entitled *Technology Transfer out of Germany after 1945*, and this book provides the majority of the extant

[23] Gimbel, *Science, Technology, and Reparations,* xi.
[24] Raymond Stokes, 'Intellectual Spoils', *Science*, 248 (1990), 1241.
[25] Gimbel, 'US Policy and German Scientists: The Early Cold War', *Political Science Quarterly*, 101 (1986), 433-451; Gimbel, 'German Scientists, US Denazification Policy and the 'Paperclip Conspiracy'', *International History Review*, 12 (1990), 441-465; Gimbel, 'The American Exploitation of German Technical Know-How after World War II', *Political Science Quarterly*, 105 (1990), 295-309.

historiography on American exploitation. Once again, and following Gimbel's lead, the British, French and Soviet efforts are only mentioned peremptorily.[26] It includes discussions on the nature of intellectual property within reparations policy, denazification in science, and the reconstruction of the German economy on terms that allowed for its reintroduction to global markets. As a product of Gimbel's work, it largely takes his conclusions and expands on them – that is, it examines the wider implications of exploitation for both Germany and America, rather than re-evaluating the programme itself. Another product of Gimbel's book was John Farquharson's 1997 article which explored whether one of Gimbel's key contentions – that the American occupation featured a central conflict between 'governors' and 'exploiters' – could be extrapolated and applied to the British zone. In answering this question, Farquharson gave a good overview of the British programme and the main debates surrounding it, before concluding that 'the idea of "governors versus exploiters" is not a valid summary of the British occupation'.[27] This present study also considers this question and finds that Farquharson's conclusion is not perhaps wholly accurate. Paul Maddrell approaches the subject from a somewhat different angle by discussing how British post-war scientific intelligence on the Soviet Union emerged from the experience and structures of exploitation, which further develops the idea that exploitation represented a significant intersection between science and technology, intelligence-gathering, and military strategy – an assumption which lies at the core of this present study.[28]

There are three slightly older histories of exploitation which are also worth mentioning here – Michel Bar-Zohar's *The Hunt for the German Scientists* (1967), Clarence G. Lasby's *Project Paperclip* (1971), and Christopher Simpson's *Blowback* (1988).[29] With all now being many years out of date, they can provide little more than a rough outline of the exploitation programme, with few details, especially as it was not until the 1990s and 2000s that many of the more pertinent official documents were made available. They attempt to make up for this dearth of archival material with a wealth of anecdotal evidence, which

[26] Judt and Ciesla (eds.), *Technology Transfer*.
[27] John Farquharson, 'Governed or Exploited? The British Acquisition of German Technology, 1945-48', *Journal of Contemporary History*, 32 (1997), 42.
[28] Paul Maddrell, *Spying on Science: Western Intelligence in Divided Germany, 1945-61* (Oxford: OUP, 2006).
[29] Michel Bar-Zohar, *The Hunt for the German Scientists* (London: Arthur Barker, 1967); Lasby, *Project Paperclip*; Christopher Simpson, *Blowback: America's Recruitment of Nazis and its Impact on the Cold War* (London: Weidenfeld & Nicolson, 1988).

though often fascinating and revealing, is difficult to trace or verify and thus only of minimal value. As with Gimbel, their emphasis is overwhelmingly on the American programme though, unlike Gimbel, they all primarily discuss the interrogation and recruitment of German specialists rather than material exploitation. In addition to these histories based on anecdotal evidence, there are also several memoirs and personal accounts of work in various aspects of the exploitation initiative which can provide a valuable insight into the period. Leslie Groves' *Now It Can Be Told*, Samuel Goudsmit's *Alsos* and Boris T. Pash's *The Alsos Mission* all deal with the Anglo-American investigation of German atomic physics (a key precursor to full exploitation) from slightly differing perspectives.[30] *Attain by Surprise* is an edited volume of recollections which amounts to a unit history of 30 Assault Unit, the first British team tasked with any element of exploitation, while Michael Howard's *Otherwise Occupied* is an annotated collection of the author's letters home to his parents written while he was serving with exploitation troops in Germany after the war.[31] All of these works provide fascinating insights into the real work of the individuals involved in this programme, which could not otherwise be obtained from official documents or elsewhere, but there is an underlying risk of bias or, particularly in the case of senior figures such as Groves, the accounts being written with an eye to painting a favourable picture for the sake of posterity. Furthermore, these sources usually focus on only a very limited part of the wider scheme and due to the diversity of experience within the exploitation scheme, cannot be easily extrapolated or considered to be indicative of the programme as a whole. This is not to diminish their validity as historical sources in a general sense, only that their relevance to this study, which is primarily concerned with government policy, is more supportive or peripheral than it is central or integral.

Naturally, it is necessary to situate any study of exploitation within the history of the British occupation more broadly, but literature on this topic is sadly also lacking.[32] Aside from a 500-page official history which provides little more than a dry factual account with

[30] Groves, *Now It Can Be Told*; Samuel A. Goudsmit, *Alsos* (New York: American Institute of Physics Press, 1996); Boris T. Pash, *The Alsos Mission* (New York: Charter Books, 1980).
[31] David Nutting (ed.), *Attain by Surprise: The Story of 30 Assault Unit* (Chichester: David Colver, 1997); Michael Howard, *Otherwise Occupied: Letters Home from the Ruins of Nazi Germany* (Tiverton, Devon: Old Street, 2010).
[32] Once again, scholarship on the American occupation is far more extensive. See John Gimbel, *The American Occupation of Germany: Politics and the Military, 1945-1949* (Stanford, CA: Stanford University Press, 1968); Detlef Junker (ed.), *The United States and Germany in the Era of the Cold War*, vol. I (Cambridge: CUP, 2004); Klaus-Dietmar Henke, *Die amerikanische Besetzung Deutschlands* (Munich: Oldenbourg, 1995).

practically no analysis,[33] the only academic work in English dedicated solely to this topic is Ian Turner's 1989 edited volume *Reconstruction in Post-War Germany*, which includes chapters from many established scholars on everything from denazification and propaganda to currency reform and the coal and steel industries, all within the British zone.[34] While this has proved a highly valuable work of reference during the present research, it is over 25 years out of date and lacks the benefit of more recently released primary material. In addition, the fragmented nature of an edited volume means that discussion of some of the more holistic themes is, in places, disappointingly absent. Turner's work is mirrored somewhat by an earlier German-language work, edited by Josef Foschepoth and Rolf Steininger, which does contain chapters which examine dismantling and industrial control, both peripherally relevant to the present study.[35]

As a point of comparison, works on the other occupation zones have featured greater engagement with the issue of exploitation. Norman Naimark's study of the Russian occupation of Germany includes a chapter which exclusively examines the Soviet utilisation of German science, alongside discussions of economics, democratisation and security,[36] while Klaus-Dietmar Henke's work on the American occupation contains a sizeable evaluation of US personnel exploitation, and is remarkable for its consideration of German responses, including organised protest, to the scheme.[37] The closest to an equivalent book on the British zone is the relevant entry in Volker Koop's *Besetzt* series which, despite being largely a journalistic account, does provide some interesting detail on the 'theft' of German patents by the British occupiers, as part of dismantling policy.[38] More recently, with the wider release of pertinent files, there has been a move towards studying distinct facets of occupation policy across the zones, including Francis Graham-Dixon's *The Allied Occupation of Germany* which focuses on the post-war refugee crisis (and the relationship between occupiers and occupied) and Jessica Reinisch's *The Perils of Peace*, which examines public

[33] F.S.V. Donnison, *Civil Affairs and Military Government North West Europe 1944-6* (London: HMSO, 1961).
[34] Ian Turner (ed.), *Reconstruction in Post-War Germany: British Occupation Policy and the Western Zones, 1945-55* (Oxford: Berg, 1989).
[35] Josef Foschepoth and Rolf Steininger, *Die britische Deutschland- und Besatzungspolitik, 1945-49* (Paderborn: Ferdinand Schöningh, 1985). All German-language material has been appraised and utilised with the support of a bilingual colleague.
[36] Norman Naimark, *The Russians in Germany: A History of the Soviet Zone of Occupation, 1945-1949* (Cambridge, MA: Harvard University Press, 1995).
[37] Henke, *Die amerikanische Besetzung Deutschlands,* 742-776.
[38] Volker Koop, *Besetzt. Britische Besatzungspolitik in Deutschland* (Berlin: be.bra, 2007), 135-8.

health in occupied Germany.[39] There has not yet been a comparable monograph which primarily discusses scientific and technical exploitation policy.

The international dimension of this present study, and particularly the fact that Britain's exploitation scheme paled in comparison to the scale and resources of its American counterpart, means it is also necessary to engage with narratives of Britain's steep decline as a world power during the post-war period. While there have been several histories which show that Britain's influence diminished drastically after 1945 (a process which had actually begun during the war, or even before) and was largely replaced on the global stage by the new powers of the United States and the Soviet Union, the story of exploitation shows that Britain did not immediately accept this new role and was instead still in a position to actively compete with both the USA and the USSR for the best scientific and technical spoils of Germany, even if the ultimate success rate remained relatively low.[40]

In general, the history of the exploitation programme sits within the history of the post-war period as a whole which, in recent years, has become a distinct area of research in its own right. The dominant work in this field is arguably Tony Judt's *Postwar* which reimagines its titular subject matter as a distinct historical concept rather than a mere temporal descriptor while also attempting, and by any fair measurement succeeding, to provide a history of all aspects of life in Europe between 1945 and the book's publication in 2005.[41] Though this immense scope is part of what makes this book stand out, some topics are inevitably dealt with in much greater depth than others, and what emerges can, in many ways, be seen as a history of ideas. One of the most important elements of Judt's interpretation is his examination of the legacy of the Second World War on subsequent European development and his conclusion reinforces this, with particular reference to the Holocaust. This study, as a history of the post-war, shares many of Judt's overarching themes, not least that the unusual programme of exploitation, despite being in essence a Cold War phenomenon, emerged very much as a product of the unique conditions of the

[39] Francis Graham-Dixon, *The Allied Occupation of Germany: The Refugee Crisis, Denazification and the Path to Reconstruction* (London: IB Tauris, 2013); Jessica Reinisch, *The Perils of Peace: The Public Health Crisis in Occupied Germany* (Oxford: OUP, 2013).

[40] David Reynolds, *Britannia Overruled: British Policy and World Power in the 20th Century* (Harlow: Longman, 1991); B.J.C. McKercher, *Transition of Power: Britain's Loss of Global Pre-eminence to the United States, 1930-1945* (Cambridge: CUP, 1999); Anne Deighton, 'Britain and the Cold War, 1945-55', in Mervyn P. Leffler and Odd Arne Westad (eds.), *The Cambridge History of the Cold War,* vol. I (Cambridge: CUP, 2012), 112-132.

[41] Tony Judt, *Postwar: A History of Europe since 1945* (London: Pimlico, 2007).

war which preceded it. Furthermore, Judt's history rests on the concept that Europe entered a discrete new phase after 1945 – that the end of the war marked a caesura, or 'zero hour', in European history, and even more so in Germany (the German expression '*Stunde Null*' gave rise to the term 'zero hour'). This has subsequently sparked a historiographical debate about whether 1945 truly represented such a sharp break with the past or whether this was an illusion and there was, in fact, greater continuity across this apparent barrier than perhaps one first assumes.

At first glance, 1945 (and specifically 8 May 1945, the date of the German unconditional surrender) does appear to be an obvious historical caesura for the German people[42] – marking the end of the Second World War and the beginning of the Cold War as well as the collapse of the Third Reich and the beginning of the Allied occupation. However, numerous historians have challenged this as a valid historical turning point, instead characterising it as an artificial break constructed by those, mostly Germans, who were keen to leave a tarnished past behind them and make a fresh start. Ian Buruma comments that there are no real 'clean slates' in history, no matter how much they may be desired following a particularly unpleasant or traumatic period, while Jeffrey K. Olick warns of the artificial 'temporal boundaries' which historians often create and how these can lead to an ignorance of the continuities and discontinuities which surround them.[43] Richard Bessel, in his book, *Germany 1945*, which provides an in-depth study of this important year of transition and upheaval as well as a comparative examination of the early occupation policies of the four Allies, offers up perhaps the most compelling appraisal of this contentious term. Bessel suggests that 1945 was a fundamental break with the past *because* the German people wanted it to be, and that it is the role of historians not to judge this desire to be free from the horrors of war and Nazism but to understand it and its significance.[44] Similarly, in her generational approach to twentieth century German history, *Dissonant Lives*, Mary Fulbrook finds the 'zero hour' concept unconvincing in terms of structures or personnel, but does acknowledge that there was a genuine desire for a fresh

[42] Ian Kershaw, *The End: Germany, 1944-1945* (London: Penguin, 2012).
[43] Ian Buruma, *Year Zero: 1945 – A History* (London: Atlantic, 2013); Jeffrey K. Olick, *In the House of the Hangman: The Agonies of German Defeat, 1943-1949* (Chicago: University of Chicago Press, 2005).
[44] Richard Bessel, *Germany 1945: From War to Peace* (London: Pocket Books, 2010), 396.

start.[45] This idea, that conceptions of change and continuity in Europe at this time were influenced by 'social discourse, practice, and behaviour', is explored in greater depth by Bessel and Dirk Schumann in the co-edited volume *Life after Death*, which summarises that the 1940s and 1950s are 'the hinge on which the history of Europe in the twentieth century turns [particularly] in the political and military spheres'.[46] Certainly, exploitation sits within this interpretation as a distinct feature of the critical, transformational post-war period, both deeply shaped by the Second World War and geared towards transcending it.

More generally, the history of exploitation does not completely coincide with either the acceptance or dismissal of 1945 as a point of dramatic change. Exploitation neither began nor concluded in 1945 and the end of the Second World War was, in fact, a relatively insignificant event for the exploitation officials – it simply marked the fairly nominal shift from a military operation to an occupation policy and presented the opportunity to gradually increase the scope and range of their activities. Instead, a different periodisation is relevant here and this thesis suggests that it is not about a single point of dramatic change, on 8 May 1945 or otherwise, but rather about a longer period of transition, running approximately from 1943 to 1948. This timeframe would have felt familiar to many German citizens who experienced 8 May as just another day of hardship in the difficult period which ran from the military defeat at Stalingrad in 1943 until the currency reform brought in by the Allied occupiers in 1948 or the establishment of German nation-states in 1949.[47] It would also have resonated with the German scientists who were selected for exploitation – though the nationality of their employer might have changed, they continued plying their specialist trade in much the same way after the war as they had during it. Efforts were even made by the British to treat the scientists with similar levels of respect as they had been familiar with in the Third Reich in order to minimise friction and thus maximise productivity. Similarly, it would also seem valid to the British officials tasked with conducting the programme – the planning, preparation, and early missions of exploitation began as soon as the tide of war began to shift in the Allies' favour in 1943 and merely continued, albeit on a

[45] Mary Fulbrook, *Dissonant Lives: Generations and Violence through the German Dictatorships* (Oxford: OUP, 2011), 260.
[46] Richard Bessel and Dirk Schumann, 'Introduction: Violence, Normality, and the Construction of Postwar Europe', in Bessel and Schumann (eds.), *Life after Death: Approaches to a Cultural and Social History of Europe during the 1940s and 1950s* (Cambridge: CUP, 2003), 4-5.
[47] Olick, *In the House of the Hangman*, 27.

larger scale, after the German surrender and into the post-war years. This transitional periodisation also holds up in broader assessments of contemporary diplomacy and military strategy – Julian Lewis argues that these years marked a 'crucial period' in which Britain transitioned from fighting Germany to fighting the Soviet Union.[48] Indeed, while it seems counterintuitive that the Cold War could have started while the Second World War was still being fought, it has been argued that many British officials, especially those within the intelligence community, never ceased to see the Soviet Union as the real enemy, even while the two countries were working in close coordination to defeat Nazi Germany, and this allowed for a swift and smooth adjustment to the new paradigm after 1945.[49] In short, the Cold War constellation, which lasted in Europe until 1989-90, emerged from this short transition period between war and peace.[50]

British exploitation adheres to this notion of a transition phase because, as will be shown in this thesis, its origins dated back to the first commando raids and exploitation missions of 1943 and it was not truly wound down until 1948, when the impending creation of an independent West German state made it increasingly unviable. As noted above, the changes signified by the end of the war had little real impact on the conduct of the programme as a whole. This present study, therefore, aims to offer a new approach to the histories of exploitation, the British occupation of Germany, and the start of the Cold War. This will be achieved by contending that the American exploitation programme is not the only one worth studying and that the British, although junior partners in this respect, still contributed to this policy in a meaningful way; by asserting that exploitation was a central part of the occupation strategy of the British authorities in Germany and that the relationship between the 'governors' and 'exploiters' was more complex than detailed elsewhere; by showing that exploitation and British foreign policy, particularly towards the Soviet Union, were inextricably entwined; and lastly by showing that exploitation provides evidence, not of dramatic change in 1945 nor of a complete lack of it, but rather of a five-year period of steady transition, as Britain moved from the last war into the next – a war in

[48] Julian Lewis, *Changing Direction: British Military Planning for Post-War Strategic Defence, 1942-47* (London: Sherwood, 1988).
[49] Aldrich, *The Hidden Hand*.
[50] Stefan-Ludwig Hoffmann, 'Germany is No More: Defeat, Occupation and the Postwar Order', in Helmut Walser Smith (ed.), *The Oxford Handbook to Modern German History* (Oxford: OUP, 2011), 593-4; Hans-Peter Schwarz, 'The Division of Germany, 1945-1949', in Leffler and Westad (eds.), *Cambridge History of the Cold War*, 133-153.

which the parameters were substantially different than in any conflict Britain had seen before.

The road to this thesis began with an interest in how nerve agents – a central but unused component of the Nazi chemical warfare arsenal, and almost completely unknown to the Allies during the war – were transferred to the British armoury in 1945.[51] This was the opening which led into a much wider exploration of how this process of enforced technology transfer took place but the limited literature on offer was, as shown above, both sensationalist and generally preoccupied with the American programme. Wider reading began to reveal that the parallel British endeavour had a narrative of its own and that this did not have to follow the lines of an enormous government conspiracy; instead it became clear that this was a largely unexamined and yet significant element of British occupation policy and one which could provide a fresh perspective on science and technology, intelligence-gathering, military strategy, and diplomacy in this critical period of British history. It is prudent to note here that if this thesis was to be pigeon-holed into any one particular field of study it would be modern British history, albeit with a transnational outlook – although Germany provides the setting for the narrative, this study focuses mostly on British organisations, their policies, and the resultant actions.[52]

In fact, it is perhaps wise to delineate exactly what the purview of this study is and, arguably more importantly, what it is not. The primary focus is the British government, encompassing both the civil service and the military (who shared the responsibility for the occupation of Germany), and the narrative herein charts the preparation for, and execution of, exploitation as conducted by organisations under the aegis of the British government, which were the ultimate instigators of the scheme. While numerous other groups had agency as part of this process – the individual British investigators, the German scientists and technicians, the communities in both Germany and Britain which were affected by

[51] Ulf Schmidt, *Secret Science: A Century of Poison Warfare and Human Experiments* (Oxford: OUP, 2015), 157-217; Ulf Schmidt, 'Accidents and Experiments: Nazi Chemical Warfare Research and Medical Ethics during the Second World War', in Don Carrick and Michael Gross (eds.), *Military Medical Ethics for the 21st Century* (Farnham: Ashgate, 2013), 225-244.

[52] On the transnational approach, see Jan Rüger, 'OXO: Or, the Challenges of Transnational History', *European History Quarterly*, 40 (2010), 656-668.

either the removal or introduction of these specialists – this study is primarily concerned with the government policy itself. A key touchstone for this approach was Brian Balmer's history of the British biological warfare programme which focuses on both government policy and the way in which this was influenced by military scientific and technical experts.[53] Future research on the roles of the other actors in this process will no doubt add new dimensions to the understanding of the exploitation programme as a whole, not least a grasp of the human experience involved, but for the first account of the British scheme, it seemed logical to begin with the policies and actions which formed its essential framework. It is certainly hoped that what might be deemed a 'top-down' approach adopted here will later serve as a starting point for, and be augmented by, further studies which discuss the agency of other relevant groups (especially the German experts involved) and which therefore contribute towards a sociocultural history of exploitation. In addition, this is neither an economic nor a legal history, though elements of both do feature (such as the profitability of technology transfer and the law surrounding patents), but the necessary brevity of this study and the breadth of the material covered within means that it would not be feasible to fully do justice to these sizeable subjects here. Moving forward, what would be of immense value to this field is a fair and balanced assessment of the economic benefits derived from exploitation by each of the occupying powers (and of individual firms and companies therein), and of its corresponding impact on Germany.

Of course, the epistemological positioning of this thesis has necessarily shaped its research methodology which, on account of the relative lack of secondary literature on the subject, has relied heavily on primary material. As the focus of the study is government policy and procedure, the bulk of the material has been archival, in particular the official documents – minutes of meetings, civil service correspondence, memoranda, and so on – to be found in the National Archives at Kew, as well as the Final Reports filed by the exploitation agencies on all manner of topics, which are held at Churchill College, Cambridge. In addition, these have been supplemented by the personal diaries and correspondence of the British investigators themselves, found within the collections of the Imperial War Museum. As mentioned above, a full examination of the human experience of

[53] Brian Balmer, *Britain and Biological Warfare: Expert Advice and Science Policy, 1930-65* (Basingstoke: Palgrave, 2001), 6ff.

exploitation does not fall within the ambit of this study so these personal papers were mostly used to explore how the policies of the British government were actually enacted on the ground, by those who formed the 'frontline' of the programme. In addition, studying contemporary press reports gave some indication of the impact the scheme had in Britain, and how the government managed this, but there is doubtless a larger story to be explored here too. Those wishing to understand more about the human experience may wish to pursue an oral history approach, but this was not considered to be particularly compatible with a history of policy and initial efforts to establish contact with the relevant figures proved fruitless. In short, therefore, the aim here is to use archival documentary evidence to craft a comprehensive history of the British exploitation of German science and technology between 1943 and 1948, from the point of view of the British governmental bodies which both initiated and directed it.

Within this overarching purpose, there were several smaller aims which the thesis sought to achieve. The first was to understand how exploitation was first conceived in 1943-44 and how it developed into the large operation which it was by 1946 – what had occurred during the latter part of the war and immediately after its conclusion, first to make exploitation a plausible scheme at all, and then to raise it to a position of such prominence and significance? Secondly, the scarcity of literature on British exploitation meant that there was very little evidence of how Britain actually conducted exploitation on the ground. Did it follow the American methodology or did it differ? How did it evolve from the far simpler process of visiting facilities and removing documents and equipment to the more complicated and ethically uncertain territory of detaining, interrogating and recruiting the German specialists themselves? Within this framework, to what extent did the British government rely on private firms to help facilitate extensive exploitation, especially of expert personnel? Thirdly, as it was well established that Britain was only one of four powers implementing an exploitation strategy, it was necessary to understand how these concomitant schemes related to one another. How did Britain's adjustment to becoming the junior partner in the Anglo-American relationship, its competition with France for supremacy in Europe, and, perhaps most importantly, its rapidly worsening relations with the Soviet Union shape exploitation policy? In addition, was this only a one-way flow or did exploitation have any impact on Britain's general foreign policy? Finally, it was imperative

that this study of exploitation did not exist in a vacuum – this thesis rests on the belief that exploitation influenced, and was influenced by, the context in which it operated. The occupation of Germany was a huge undertaking and a major burden on a Britain which was weak and exhausted, especially economically, after the war – how did exploitation relate to other important aspects of the occupation, such as denazification or the control of German science and industry? Did exploitation, an ultimately more prosaic and pragmatic programme, triumph over these 'noble' missions which the British felt were part of their moral duty, as occupiers, to scold, re-educate, and eventually rehabilitate post-war Germany? This also provides a chance to examine whether the sensationalism which has dominated accounts of the programme has any grounding, by assessing how secretive the scheme was, how much the public knew, and how those responsible for its oversight justified it in both moral and legal terms.

This present study examines these questions by utilising a part-chronological and part-thematic approach to the history of exploitation. The chronological angle is essential because exploitation grew and changed substantially over the time period in question and charting this evolution is a central aim of the work. However, the sheer plurality of agencies and operations tasked with exploitation which were simultaneously active during the period means it is impossible to generate a smooth and continuous timeline and thus the thematic angle is necessary to gather certain related points into a single fluent discourse. The thesis is divided into six chapters and these are then paired up in order to create three discrete parts – this trifurcated structure was chosen in order to thoroughly tackle the three key elements of the exploitation narrative: the preparation, the execution, and the context. The fact that each part comprises two chapters is not an act of contrived symmetry but a natural alignment as the two chapters in each part are intimately connected and mutually complementary and, across the three parts and six chapters, the whole story of British exploitation can be told.

The first part is entitled 'Exploitation in Wartime' and charts the origins of the exploitation programme from the earliest recognition that Germany was ahead in certain aspects of research and development, through the first deployment of scientific and technical investigators in continental Europe (mostly in France and the Low Countries), and then to the movement of these agents across the borders of the Reich and into Germany

itself in the last few months of the war. Chapter One aims to set the scene for the larger narrative, by presenting a picture of science, strategy and intelligence in Britain during the Second World War, and showing how these interests became increasingly entangled. There is also a focus on the organisations which came before the exploitation agencies proper, and whose actions served as a framework around which the exploitation programme was built. Chapter Two documents the first steps which the combined Anglo-American exploitation initiative took, leading to it adopting a form which bears a clear resemblance to the programme which was predominant during the post-war period. The story moves between policy-making committees in Whitehall, the first exploitation 'boots on the ground' in Paris less than a week after its liberation by Allied troops, and into Nazi Germany as the Second World War entered its final destructive phase.

The second part is entitled 'Exploitation under Occupation' and is a direct chronological successor to the preceding part but then moves away from chronology and instead examines two distinct, but generally simultaneous, aspects of the main exploitation programme. Chapter Three begins as the war comes to an end and the previously joint exploitation organisation is split into two unilateral elements along national lines. At this point, the British exploitation programme was able to develop its own character and its direction was placed exclusively in the hands of British policy-makers. This, and the fact that active combat had now ceased, granted greater freedom but also came with greater limitations – while it was now possible to send a much larger cohort of investigators to Germany (many of whom were civilians with no military training) and the whole territory of the Reich was now accessible to Allied operatives, Britain was also forced to rely on its own overstretched resources alone and the exploitation teams were forced into frequent interactions with the representatives of other post-war initiatives, such as war crimes investigators and bombing surveyors. This chapter also provides an appraisal of the physical material which Britain was able to secure from Germany, including in high-importance fields such as chemical warfare and rocketry. Chapter Four explores how Britain went about acquiring arguably the most desirable prizes of exploitation: the German scientists and technicians themselves. This process took many forms, beginning with the detention and interrogation of these experts in Germany and then in Britain, and then progressing to their

employment, initially only on military topics and in government research facilities, but later expanded to include civil fields and recruitment by private firms.

The third part, entitled 'Exploitation in Context' abandons the chronological approach and seeks to re-evaluate the exploitation programme, not in terms of its preparation or implementation but in terms of its relationship to external factors. Chapter Five focuses on the international dimension of exploitation and describes the coexistence of the British programme alongside those of the USA, France, and the Soviet Union. While Britain generally enjoyed an amiable relationship with its two Western allies, in terms of exploitation competition was as likely as collaboration between them, and mistrust, underhand tactics, and open disagreements were commonplace. Impressions of the Soviet Union had the most influence in shaping the British programme, however, not least because the desire to deny any German specialist of note to the Soviets quickly became the defining feature of British exploitation. As discussed, this thesis is concerned primarily with the British perspective but a broader future study could certainly utilise foreign archival sources to see how the British scheme was viewed by the other major post-war powers. Chapter Six narrows the focus and examines the contemporary domestic political landscape (in Britain and in the British zone of Germany) in which exploitation was situated. This encompasses the role which exploitation played within the occupation, where it was just one of countless competing and interrelated policies, the morality and legality which was attributed to exploitation in order to make it viable (and the use, and misuse, of the terms of reparations to this end), and the British public's reaction to exploitation, as expressed by various voices and in various media. This chapter ends by discussing how conflict with the growing need to reconstruct a healthy and self-sufficient Germany meant that exploitation ceased to be tenable, and charts the conclusion of exploitation as it was necessarily brought about in the late 1940s.

On the whole, the purpose of this present study is to provide the first complete and thorough history of the British post-war exploitation programme. In some respects, this means its role is to debunk theories which have characterised the scheme as an illicit conspiracy, while still acknowledging the controversial nature of the initiative. In others, it means dispelling the idea that the British programme was just a subsidiary of its American counterpart, while still acknowledging that the United States' scheme was both larger and

further-reaching. However, the chief contention of this thesis is that it is impossible to understand the British exploitation programme on its own merits alone and that it is therefore essential to situate it within both its domestic and, more importantly, its international context. For the former, this entails an appreciation of the policy-making process which led to exploitation, a grasp of the malleable political, legal and ethical basis in which it was rooted, and a comprehension of how it fitted into British occupation strategy as a whole. For the latter, this involves an awareness of three British priorities in this period: the desire to keep Germany militarily weak, the desire to compete successfully with the USA and France, and the desire to strengthen Britain's armouries at the direct expense of the Soviet Union, in preparation for a potential future war against this inscrutable enemy in the East. It is only through this approach that an accurate and well-rounded understanding of the British exploitation of German science and technology at the end of the Second World War can be attained.

N.B.: The sheer multiplicity of organisations and agencies which were responsible for exploitation and its related subjects, many of which were known by acronyms, abbreviations or codenames, can be daunting and all but unfathomable. Hopefully, the list which precedes this introduction and the appended glossary will serve as navigational aids through this veritable quagmire of nomenclature.

PART I

Exploitation in Wartime

CHAPTER ONE
The Scientific War

In order to fully understand the British post-war exploitation programme, it is necessary to trace its roots back into the Second World War. Certain specific conditions were evidently necessary for this policy of comprehensive scientific and technological utilisation, which often courted controversy and caused considerable division within Britain and between the Allies, to come about. The post-war period was shaped decisively by the nature of the war which preceded it, and this is abundantly clear when studying exploitation – various elements of the way the Second World War was fought, especially the rising significance of research and development, as well as changing perceptions of military capacity in comparison to one's enemies, and indeed allies, played an influential role in the development of this new initiative, which straddled the boundaries between intelligence gathering, scientific and technical development, and international relations. The war also provided an opportunity for the tactics later employed by agents of exploitation to be tried and tested – the experimental conditions of the contemporary battlefield allowed a strategy to emerge and be refined, in preparation for much broader deployment as the war came to an end. Overall, this chapter charts the first steps taken on the path towards a major programme of British post-war scientific and technical exploitation, by exploring how science and technology shaped the war in general, and military intelligence in particular, and by examining two forerunner operations, the successes and failures of which directly influenced the form which the exploitation initiative later assumed.

Science and Strategy

It has often been noted that war is a locomotive for change and nowhere is this truer than in the fields of science and technology. When so much is at stake, it really is no wonder that the belligerents in any modern war invest so much effort and so many resources into developing new forms of weaponry. The twentieth century, when human scientific endeavour was eliciting new discoveries with astounding regularity, highlighted this critical

relationship between science and conflict more clearly than ever before. It has been said that invention is a form of evolution, through which military societies can adapt to overcome new challenges.[54] The First World War, which shaped subsequent military action perhaps more than any other conflict before or since, was saturated with scientific developments which influenced the course of the war; tanks, gas warfare and aerial bombing to name but three. Victory came to be seen to depend upon a 'process of continual experimentation' but these technological advances did not only contribute heavily to deciding the outcome of many battles and campaigns, they had much further-reaching ramifications too.[55] They became indispensable on future battlefields and, in the spirit of 'swords into ploughshares', the technology could be demilitarised and absorbed into civilian industry, or into public service. By 1918, Britain had become 'a gigantic military-academic-industrial complex, co-opting and managing much of the nation's scientific workforce'.[56] In addition, technology brought the frontline much closer to home, whether in the form of attacks on civilian targets or the more extensive dissemination of information by a technologically-advanced press – it marked the true advent of total war. New weapons demanded not only new military tactics and strategy but also new politics, diplomacy and even morality.[57]

As a result, the exploitation initiative cannot be understood without first exploring the roots of the modern military's preoccupation with science and technology, and the wider influence that this has had. The First World War serves as an interesting precursor but exploitation was undeniably a product of the Second World War. This was due, in no small measure, to the sheer vast scale of this latter conflict and the enlarged role which science and technology necessarily played in it.[58] Some have even argued that the Allies' faster and more comprehensive adoption of scientific tactics was instrumental in their eventual

[54] William H. McNeill, *The Pursuit of Power: Technology, Armed Force and Society since AD1000* (Oxford: Blackwell, 1983), vii.
[55] Roger Cooter, Mark Harrison and Steve Sturdy (eds.), *War, Medicine and Modernity* (Stroud: Sutton, 1998), 77; David Edgerton, *The Shock of the Old: Technology and Global History since 1900* (Oxford: OUP, 2011).
[56] Roy MacLeod, 'Scientists', in Jay Winter (ed.), *The Cambridge History of the First World War,* vol. II (Cambridge: CUP, 2014), 451.
[57] Jonathan D. Moreno, *Undue Risk: Secret State Experiments on Humans* (New York: Routledge, 2001), 16.
[58] Ad Maas and Hans Hooijmaijers (eds.), *Scientific Research in World War II: What Scientists did in the War* (London: Routledge, 2009); Cathryn Carson, 'Knowledge Economies: Toward a New Technological Age', in Michael Geyer and Adam Tooze (eds.), *The Cambridge History of the Second World War,* vol. III (Cambridge: CUP, 2015), 196-219.

victory.[59] In his foreword to Irvin Stewart's 1948 history of the American Office of Scientific Research and Development (OSRD), its former head, Vannevar Bush, wrote that:

> World War II was the first war in history to be affected decisively by weapons unknown at the outbreak of hostilities. This is probably the most significant military fact of our decade: that upon the correct evolution of the instrumentalities of war, the strategy and tactics of war must now be conditioned.[60]

This change in strategic thinking was already taking place in the first years of the war. Once the fearsome Nazi Blitzkrieg was forced to a halt at the English Channel, and a stalemate of conventional land warfare was temporarily reached in Europe, finding a new way to tackle the enemy became an issue of the utmost importance to both sides. British recognition of this had been officially noted as early as January 1940, in a memorandum from the Air Ministry to the Joint Intelligence Committee, which noted: 'That the direct application of the results of scientific research to warfare has increased and is increasing needs no demonstration.'[61]

This was by no means all bad news for the British. Their real strength did not lie in their small ground army but rather in their navy and air force, and it is in these two domains where science flourished most impressively. In particular, the new air war was very different to that of the First World War and relied far more heavily on the technology of mass production to ensure that an air force would not be overwhelmed by the enemy's numerical superiority. Total war had now fully matured and the bombing of civilian targets became a common feature of the ongoing conflict.[62] Popular pressure to defend against these devastating raids was understandably immense and this drove a process of technical one-upmanship between the warring powers, which ended up centring quite heavily on detection and advance warning, specifically on radar. This was arguably one of the most important scientific developments of the Second World War and one that would fascinate experts and provoke fervent study and modification for the duration of the conflict and

[59] Guy Hartcup, *The Effect of Science on the Second World War* (Basingstoke: Macmillan, 2000).
[60] Vannevar Bush, foreword to Irvin Stewart, *Organising Scientific Research for War: The Administrative History of the Office of Scientific Research and Development* (Boston, MA: Little Brown, 1948).
[61] TNA, CAB 21/1421, 'Co-ordination of scientific intelligence', 23 January 1940.
[62] Richard Overy, *The Bombing War: Europe, 1939-1945* (London: Penguin, 2013); Dietmar Süss, *Death from the Skies: How the British and Germans Survived Bombing in World War Two* (Oxford: OUP, 2014).

beyond.[63] Another element of the air war was the push to make aircraft faster and thus far more effective in aerial combat as well as safer from attack from the ground. This led to the invention of the jet engine, which was largely experimental right up until the end of the war, with only small sections of any national air force occupied by jet aircraft. As such, like radar, jet research progressed beyond 1945 and soon the jet engine came to dominate not only military but also civilian aviation.[64]

These are just two examples of the myriad advances in science and technology which fed directly into the waging of the Second World War and the impact of which was felt far beyond 1945. However, no discussion of military technology in this period can be complete without mention of the atomic bomb. The product of unprecedented Anglo-American collaboration, and the result of the largest tactical military science operation of all time, the atomic bomb had the power not only to bring a swift end to war in the Pacific (though there is some debate as to how necessary its use truly was) but also, in creating the requisite conditions for the Cold War, to shape international relations for the next fifty years.[65] More than anything, it showed that the possible results of applied research in modern warfare were potentially limitless, and ensured that from then on science and warfare would be indefinitely and inextricably entwined.

The impact of science and technology on modern warfare cannot be judged on the merits of individual developments alone, no matter how significant or far-reaching they have proven to be. Instead, it is important to examine the way in which science factored into the waging of war as a whole, thus creating the necessary preconditions for the Cold War arms race and the exploitation initiative. In the traditional view of wartime Britain, despite the indispensable contributions they had made during the First World War, scientists were not always taken that seriously by the government and in many cases their expertise was not utilised to its full potential or at the best possible time.[66] It took the work of tireless and enterprising scientific experts, who were not easily deterred in their desire to

[63] R.V. Jones, *Most Secret War: British Scientific Intelligence, 1939-1945* (London: Coronet, 1978), 43.
[64] Robert Bud and Philip Gummett (eds.), *Cold War, Hot Science: Applied Research in Britain's Defence Laboratories, 1945-1990* (London: Science Museum, 2002), 5.
[65] Kai Bird and Martin J. Sherwin, *American Prometheus: The Triumph and Tragedy of J. Robert Oppenheimer* (New York: Vintage, 2006); Charles Thorpe, *Oppenheimer: The Tragic Intellect* (Chicago: University of Chicago Press, 2006).
[66] Bower, *Paperclip Conspiracy*, 4.

contribute to the war effort, to truly transform the role of science in Britain during the war. These efforts are perhaps best exemplified by both Frederick Lindemann, 1st Viscount Cherwell, and Henry Tizard, though these are only two examples from a large and esteemed cohort of influential wartime British scientists. Cherwell, nicknamed 'The Prof', has often been described as Churchill's closest advisor during the war and he used the ear of the Prime Minister (who was himself deeply sympathetic towards scientific innovation) to ensure new research played a key role in the British war effort.[67] Tizard meanwhile did much to foster improved Anglo-American collaboration on military science, even before the USA entered the war, but he was also involved in policy-making regarding the defence of Britain and attacks on Germany.[68] Strong advocates of science like Cherwell and Tizard were invaluable in ensuring that Britain did not fall behind its enemies in terms of the technical capabilities of its arsenal.

This view of Britain, particularly in the earlier part of the war, as militarily backward, largely unresponsive to innovation, yet courageously holding fast as the only active opponent to Nazi expansion, has not gone unchallenged. Most notably, David Edgerton has questioned this myth and strongly supported his argument with statistics which show that the economic and industrial potential of Britain and its Empire remained undented for much of the war and that scientific and technological development was integral to this. Edgerton discusses a 'liberal militarism' and a 'warfare state' in Britain, which displayed 'an obsession with masses of machines, specifically machines designed to destroy enemies both physically and economically' and supported, in 1939, 'the largest arms industry in the world'. In short, he argues that the British government and military, especially the navy and air force, were uniquely structured so as to fight 'a war of science and invention; the next war, not the last'.[69] Certainly, by the end of the war, the 'very scale of effort and complexity of organisation' in military science had been revolutionised; by the late 1940s, 'more than half of government-funded research and development, and something like a quarter of the national total, was funded out of defence budgets'.[70] However, what Edgerton fails to

[67] Adrian Fort, *Prof: The Life and Times of Frederick Lindemann* (London: Jonathan Cape, 2003); Frederick Smith, 2nd Earl of Birkenhead, *The Prof in Two Worlds: The Official Life of Professor F.A. Lindemann, Viscount Cherwell* (London: Collins, 1961).
[68] Ronald W. Clark, *Tizard* (London: Methuen, 1965).
[69] Edgerton, *Britain's War Machine*, esp. 7-8.
[70] Bud and Gummett (eds.), *Cold War, Hot Science*, 1.

address is the role of the myth – the public (and many politicians) at the time did not easily recognise Britain's strengths in these fields, so pressure to innovate, develop and modernise remained constant, and divorced from the reality.

This situation in Britain cannot be viewed in isolation. It was necessitated and motivated by the enthusiastic adoption of research and development in the German war effort.[71] The Nazi war machine had to rely heavily on science from the very beginning in order to expand and modernise their armed forces from the level prescribed by the Treaty of Versailles to a level adequate for waging aggressive war across Europe and beyond.[72] In Ian Kershaw's biography of Hitler, he notes that Nazi Germany was initially so successful because it combined the imperialism of the nineteenth century with the technological potential of the twentieth.[73] This fusion of battlefield technology with military planning and military-economic preparation has also been described as a 'strategic synthesis' which resulted in a devastatingly effective unit.[74] After the war, British authorities commented that Germany was the only belligerent nation which carried out this 'prostitution of science' to such an extreme.[75] Civilian industrial concerns were closely involved with supporting the regime and fighting the war, especially in the form of large corporations such as IG Farben, which were able to work towards German victory while also making a healthy profit themselves. In addition, the scale of the Final Solution meant that it could only be perpetrated with the use of modern scientific and industrial techniques. In return, the enormous reserves of slave labour offered up by the concentration camp system made available a considerable workforce to a range of mass production projects, from rubber manufacture to the construction of missiles.[76]

Away from the cold realities of the Third Reich's utilisation of science, Hitler and the Nazis also cultivated a remarkable belief in secret so-called 'wonder weapons'. These were the product of applied research too and of far more interest to the British establishment.

[71] Monika Renneberg and Mark Walker (eds.), *Science, Technology and National Socialism* (Cambridge: CUP, 2003).
[72] Mark Walker, *Nazi Science: Myth, Truth, and the German Atomic Bomb* (New York: Plenum, 1995).
[73] Ian Kershaw, *Hitler, 1889-1936: Hubris* (London: Penguin, 1998), 449.
[74] Adam Tooze, *The Wages of Destruction: The Making and Breaking of the Nazi Economy* (London: Penguin, 2008), 371.
[75] Paul Julian Weindling, *Nazi Medicine and the Nuremberg Trials: From Medical War Crimes to Informed Consent* (Basingstoke: Palgrave Macmillan, 2004), 44.
[76] Diarmuid Jeffreys, *Hell's Cartel: IG Farben and the Making of Hitler's War Machine* (London: Bloomsbury, 2008), 8.

They were threatened as early as September 1939, when Hitler gave a speech to a Nazi rally in Danzig where he boldly stated: 'The moment might very quickly come for us to use a weapon with which we could not be attacked.'[77] It is undeniable that such a statement was mostly posturing but it nonetheless created a great panic in the offices of British government, fuelled mostly by the dread of 'death rays' and other rumoured fantastical weapons.[78] When these failed to materialise, rational thought quickly returned to Whitehall and the necessarily generous pinch of salt was administered to Hitler's comments.

However, Hitler was not simply giving voice to his wildest fantasies. The Third Reich was a regime which embraced science and technology to achieve its ends, and in reality Germany did have an impressive pool of brilliant minds, including some of the world's top atomic physicists, and many of the most remarkable technologies of the Second World War had their origins in the Third Reich.[79] When Hitler gave his speech in Danzig, he was probably thinking more of technology on which research was substantially advanced – recoilless guns or rocketry, for instance – rather than absurd weapons which more accurately belonged to the realm of science fiction.[80] Later in the war, these new developments were sometimes easier to mass-produce than older technologies, on account of particular material shortages, which Germany suffered on a huge scale.[81] As a result, among the German public, the legend of the 'wonder weapons' remained potent, lasting in the popular consciousness until the very end of the war, when, as Allied armies crossed their borders, it was the German people's only faint hope for a reversal of fortunes.[82] The impact of the 'wonder weapon' threat did not evaporate immediately in Britain either. It seemed likely that Hitler's comments were not wholly groundless, and it became clear to military scientists and policy-makers alike that Britain would be incredibly vulnerable to attack by a weapon about which they knew nothing. It now became of utmost importance that nothing drastically new was added to the German arsenal without the British knowing

[77] Speech cited in Ian V. Hogg, *German Secret Weapons of the Second World War: The Missiles, Rockets, Weapons and New Technology of the Third Reich* (London: Greenhill, 1999), 9.
[78] On rumours see David Coast and Jo Fox, 'Rumour and Politics', *History Compass*, 13 (2015), 222-234; Ulf Schmidt and Jo Fox, 'Deadly Gases: Rumour, Fear, and Poison Warfare, 1925-1955' (forthcoming, 2017); Balmer, *Secrecy and Science*, 70-1.
[79] John Cornwell, *Hitler's Scientists: Science, War and the Devil's Pact* (London: Penguin, 2013).
[80] Hogg, *German Secret Weapons*, 10.
[81] Hermione Giffard, 'Engines of Desperation: Jet Engines, Production and New Weapons in the Third Reich', *Journal of Contemporary History*, 48 (2013), 822.
[82] Kershaw, *The End*, 73.

about it – not only would this help them to defend against potential secret weapons but it would also allow them to add the technology to their own armoury. From now on, the race for scientific developments would have to be run in conjunction with the race for scientific intelligence, and so a new facet of modern warfare was born.

Spying on Science

In F.H. Hinsley's expansive study of British intelligence during the Second World War, he notes that, along with order-of-battle information and operational intentions, one task of absolute priority for the intelligence agencies was 'to ensure that the enemy should not spring a surprise through some secret weapons or new type of aircraft or armament'.[83] Richard Aldrich concurs with this when he writes that rapid technological change, and the increased risk of surprise attack which this entails, essentially necessitates the contemporaneous growth of intelligence communities.[84] This gathering of details on new and future weaponry goes by the name of 'scientific and technical intelligence' and the exploitation initiative was but one chapter in its story, which has run from the Second World War and before to the present day, but featured particularly prominently during the early arms race of the Cold War – arguably the period of the greatest revolution in military technology in history.[85]

However, in wartime Britain scientific and technical intelligence was merely a nascent branch of a nebulous military intelligence network, the co-ordination of which repeatedly proved to be a massive challenge for senior figures throughout the establishment. As with Cherwell and Tizard's contributions to the marriage of science with warfare in Britain, scientific and technical intelligence too relied partly on the brilliance and determination of individuals to show its true worth, in this case Professor R.V. Jones. Reginald Victor Jones, with his recently-earned doctorate in Natural Philosophy, was the

[83] F.H. Hinsley, *British Intelligence in the Second World War,* vol. III, (London: HMSO, 1984), 329. See also: Michael S. Goodman, 'Jones' Paradigm: The How, Why, and Wherefore of Scientific Intelligence', *Intelligence and National Security*, 24 (2009), 236-256.
[84] Richard J. Aldrich, 'British intelligence and the Anglo-American 'Special Relationship' during the Cold War', *Review of International Studies*, 24 (1998), 331.
[85] Maddrell, *Spying on Science*, 7; Balmer, *Britain and Biological Warfare*, 25-27.

first civilian scientist to be attached to a military intelligence agency in Britain, when in September 1939 he joined the Secret Intelligence Service (SIS). From this position, he established himself as the head of scientific intelligence at the Air Ministry, in the form of the Assistant Directorate of Intelligence (Science), for the duration of the war – a role which, thanks to the RAF being perhaps the most technologically-competent wing of the British armed forces, placed him at the forefront of British military scientific intelligence.[86]

His appointment was perhaps characteristic of the brand of total war which the Second World War necessitated (as had the First World War before it), where many civilian experts had to be drafted in to support the military in a number of roles – a tradition which would later be integral to the exploitation initiative too. The military lacked a significant scientific establishment of its own so was forced to rely on the resources of private research institutions and universities to compensate for this potential weakness. Jones, in his highly-acclaimed memoir, *Most Secret War*, acknowledges that his initial appointment, made a mere matter of weeks before the outbreak of war, came about because the existing intelligence services admitted that they could not provide adequate information on German scientific developments.[87] It is important to note at this point that regardless of the impact of men such as Jones, and the networks and practices that they established, British gathering of scientific intelligence remained a largely piecemeal process and an effective, co-ordinated policy continued to be elusive.

A large part of the problem was a perennial reluctance among the relevant agencies and ministries to adopt a proactive strategy, instead preferring to allow Jones and his colleagues to struggle on, gleaning information from wherever they could, in a decidedly haphazard manner. There was a surprising reliance on German scientific journals from before, and sometimes during, the war as a source of intelligence on German progress in various fields.[88] Even at the Air Ministry, where there was often the greatest scope for technical innovation, intelligence-gathering methods were mostly passive and opportunistic. Downed Luftwaffe aircraft were examined as a means of keeping tabs on development in

[86] James Goodchild, 'R.V. Jones and the Birth of Scientific Intelligence', Ph.D. dissertation, University of Exeter (2013).
[87] Jones, *Most Secret War*, 25.
[88] Pamela Richards, *Scientific Information in Wartime: The Allied-German Rivalry, 1939-45* (Westport, CT: Greenwood, 1994), 54-5.

that field – this served remarkably well in the earlier part of the war, as the German air force's overconfidence in its own superiority led it to adopting a policy of modifying older, often pre-1939, models, as opposed to embracing new innovative designs. This made it very easy for the British scientific intelligence experts to build on existing knowledge and simply keep abreast of these relatively small alterations. Understandably, this did lead to shocks, such as the Luftwaffe's deployment of the Focke-Wulf FW 190 in 1941, which was both faster and carried heavier armour and armaments than its contemporaries, and was itself not fully appreciated until one force-landed in Wales in June 1942. This reactive approach was also hindered by the sheer variety of different aircraft in use by the Luftwaffe, many of which were only ever so slightly different from each other; the product of competition among aeronautical firms in Germany, all vying for the attention and favour of senior Nazis.[89]

Another source which wartime British scientific intelligence utilised was information passed on by officials in neutral countries or resistance operatives in Nazi-occupied territories – a method almost as passive as waiting for planes to crash. In many cases, even when intelligence which hinted at a major threat from new technology in the German war effort was received, it was paid no heed. In the cases of both the jet engine and long-range rocketry, because no advanced work was taking place on these topics in Britain at the time the information was assessed, it was assumed that it could not possibly be taking place in Germany either.[90] This represented a dangerous, blinkered arrogance within the British military-scientific establishment.[91] This method did have its successes though, perhaps most notably the Oslo Report, which consisted of details of current and future German weapons projects compiled by an anti-Nazi German physicist in November 1939, mailed to the British embassy in Oslo and subsequently passed on to MI6. It was picked up by R.V. Jones who vouched for its veracity and accuracy, and it did indeed prove invaluable, especially in developing effective countermeasures to be used against the Luftwaffe during the Battle of Britain.[92]

[89] Hinsley, *British Intelligence*, 329-330.
[90] Max Hastings, *The Secret War* (London: William Collins, 2016), 162.
[91] Ibid., 359.
[92] Brian Johnson, *The Secret War* (London: Pen & Sword, 2004), 9.

Despite occasional victories like the Oslo Report, the approach of waiting for intelligence to fall into their laps proved an infuriatingly slow one for the British intelligence services. Moreover it was felt that 'the evidence thus offered can rarely be complete and the deductions may be faulty.'[93] Continuing this passive process was motivated by a belief that it would be unwise, if not impossible, to infiltrate agents into Germany to obtain this information first-hand. If an agent was to be effective in collecting details about complex scientific issues, he would need to be very extensively briefed; if such a knowledgeable operative was then captured whilst on a mission in Germany, any information they might disclose could seriously jeopardise some high-priority military projects in Britain – this risk was judged to be too high.[94] This attitude did undergo some revision during the Second World War but persisted into the post-war period, and was perhaps reignited somewhat by the difficult intricacies of warming relations, and increased intellectual interaction, between the British and German peoples after 1945.

In the face of these numerous shortcomings in the British scientific intelligence system, which Henry Tizard considered to be greatly inferior to the German equivalent, the successes of Jones and his peers seem even more impressive.[95] The solving of the *Knickebein* problem is perhaps the best example, and thus warrants a brief aside here. The Luftwaffe's *Knickebein* system involved the use of radio beams to direct night-bombing raids, which were especially destructive as the RAF's night-fighter force was not adequately equipped to defend against them. Jones identified the role these beams played and, against considerable disbelief and opposition from many senior advisers, including Cherwell, was able to convince Churchill and his Cabinet of his argument. Tizard, one of those who had disputed Jones' conclusions, now saw that he had been wrong and even offered his resignation as a result.[96] Having won the necessary political support, Jones was able to initiate a procedure to jam the *Knickebein* transmitters and thus severely frustrate the subsequent German night-bombing efforts – the so-called 'Battle of the Beams'. In his memoirs, Jones comments that he considered this his greatest wartime victory, partly

[93] TNA, CAB 21/1421, 23 January 1940.
[94] Jeffrey T. Richelson, *Spying on the Bomb: American Nuclear Intelligence from Nazi Germany to Iran and North Korea* (New York: W.W. Norton, 2006), 31.
[95] TNA, CAB 21/1421, 3 February 1940.
[96] Bower, *Paperclip Conspiracy*, 37.

because of its significant contribution to Britain's air security, but also because it finally 'put scientific intelligence on the map' and made it 'an essential component of defence'.[97]

As a key achievement of wartime scientific intelligence, solving the *Knickebein* problem was crucial in making exploitation both a viable, and desirable, post-war initiative. However, it was a later operation which displayed the more proactive side of scientific intelligence-gathering and thus laid down some of the earliest foundations for the post-war exploitation programme. Once again it took place on that most important scientific battlefield of the early years of the war – radar. In early 1941, confirmation reached Jones at the Air Ministry that Germany was employing a new radar array, mentioned in the Oslo Report and known as *Würzburg*, which could assess the height of aircraft, essential to deploying an effective defensive response, either by fighter or by anti-aircraft batteries.[98] Aerial photographs were taken but little more could be ascertained about this important technological development without close examination. This need gave rise to the scientific intelligence mission known as Operation Biting or, in more common parlance, the Bruneval Raid.

On the night of 27 February 1942, 120 specially-trained British Combined Operations commandos were dropped by parachute near to the small town of Bruneval on the northern French coast. They moved to their target – a villa in the area, which housed a radar installation – which they successfully attacked, allowing them to seize *Würzburg* radar equipment and take prisoners, before evacuating by sea from a nearby beach.[99] This daring raid had numerous repercussions – it was trumpeted in the British press in order to boost morale, which was at low ebb thanks to military losses in North Africa and the Far East;[100] it ensured that parachute assault would become a major part of Britain's military capacity from then on; and it gave scientific intelligence experts a remarkable opportunity to unravel one of the most important mysteries of German air defence.

Perhaps of the greatest relevance to future exploitation were the techniques used to carry out the raid. It was the first modern example of a behind-enemy-lines incursion for

[97] Jones, *Most Secret War*, 155.
[98] Ibid., 254.
[99] George Millar, *The Bruneval Raid: Stealing Hitler's Radar* (London: Cassell, 2002); Hastings, *Secret War*, 255-260.
[100] For example see 'Parachutists in Action', *The Times*, 2 March 1942, 4-5.

which scientific and technical intelligence was the prime objective.[101] Although no civilian expert could take part on account of the strictly specialist military nature of the mission, an Air Force radar mechanic, Flight Sergeant C.W.H. Cox, a peacetime cinema projectionist who had never been in a plane or on a ship before, volunteered and, along with a team of Royal Engineers, played an essential role in dismantling the radar equipment at Bruneval and ensuring the elements of greatest value were returned to Britain for examination.[102] This inclusion of a non-combatant technician in a commando unit would later come to characterise the exploitation initiative, especially in its actions before the end of the war, which would share much DNA with operations like the Bruneval Raid. Another interesting similarity between Operation Biting and future exploitation endeavours was the capture of trained German technicians as prisoners and their subsequent interrogation by intelligence services back in Britain. In the case of Bruneval, the radar operator who was detained turned out to know very little about the equipment he worked with, though he was quite forthcoming with what he did know. This questioning, paired with thorough investigation of the device itself, elicited plenty of useful information about the *Würzburg* radar system and, like so many other scientific discoveries made by British Intelligence about the German war machine, they were shocked to discover how much more advanced German capabilities were.[103] This reaction would continue to be all too common throughout much of the early exploitation process.

This may have been Britain's first foray into proactive intelligence-gathering but it had been part of Germany's military strategy since the outbreak of war. A central element of Blitzkrieg tactics had been the involvement of the *Abwehr*'s intelligence commando units, the brainchild of Admiral Wilhelm Canaris, head of Hitler's foreign intelligence service at the outbreak of war. They travelled with, or sometimes ahead of, the first wave of ground troops, and had a remit to seize pre-ordained targets and anything else of intelligence value which they came upon.[104] Just as the Bruneval Raid commandos were representative of the new technique of airborne assault, these *Abwehrkommando* teams could only exist thanks to the advent of rapid motorised ground warfare. Made up of handpicked operatives, many

[101] Goodchild, 'R.V. Jones and the Birth of Scientific Intelligence', 262.
[102] Jones, *Most Secret War*, 307-8.
[103] Ibid., 315.
[104] Heinrich Hohne, *Canaris*, trans. J. Maxwell Brownjohn (London: Secker & Warburg, 1979), 414.

of whom had been born outside the Reich so they could bring valuable knowledge of foreign cultures and languages into their activities, the commandos were extensively trained, with a particular focus on speed and mobility – for instance, most were experienced cross-country motorcyclists.[105] Although their background was military, they were often equipped with civilian clothes to allow them to advance while attracting only minimal attention, and they were prepared for unarmed combat and the use of foreign radio sets to communicate with their superiors or mislead the enemy.[106]

When Canaris first envisaged his *Abwehrkommando*, he saw their primary role as being a preparatory one, laying down groundwork, through espionage and sabotage, for the advance of conventional ground troops. This was first employed in the invasion of Poland in 1939, where they captured numerous targets of industrial as well as military significance, including coal mines, factories and a rail junction.[107] For naval operations, they were often tasked with securing ports and harbours, as well as cyphers and top-secret documents before the defenders could destroy them.[108] They were also responsible for obtaining traditional intelligence, particularly 'political, economic and military information', which could have benefits when implementing occupation of foreign territories and opposing any resistance therein.[109] They also had some similar responsibilities to R.V. Jones' fledgling scientific intelligence department at the Air Ministry, in the gathering of information on military technology in the enemy countries which Germany invaded.[110] Unsurprisingly, it did not take too long for word of these commando units, the like of which had never before been seen in modern warfare, to reach Britain. The first details came from a British accountant, Trevor James Glanville, who was working for the Special Operations Executive (SOE, a British sabotage organisation) in Yugoslavia when it fell to the Nazis in 1941, and was subsequently taken prisoner, but who eventually returned to Britain with tales of these special German commandos. This, along with the success of Bruneval and other such raids, was enough to convince the British military intelligence establishment of the need for, and

[105] A. Cecil Hampshire, *The Secret Navies* (London: William Kimber, 1978), 175.
[106] TNA, WO 204/12455, 'Marine Einsatz Kommando (MEK) 80', 30 January 1945.
[107] Hohne, *Canaris*, 354.
[108] TNA, HW 8/104, 'History of 30 Commando – Notes on German Intelligence Assault Units', 1946.
[109] TNA, WO 204/12911, 'Abwehrkommandos: activities, staffing, accommodation etc.', February 1945.
[110] Franz Kurowski, *The Brandenburger Commandos: Germany's Elite Warrior Spies in World War II* (Mechanicsburg, PA: Stackpole Books, 2005), 4.

feasibility of, a special commando unit of their own, to be consciously modelled on the *Abwehrkommando* example.[111]

Forerunners to Exploitation: 30 Assault Unit

For a British intelligence commando unit to come into being, it once again took the work of a particularly talented individual, who by merit of education and experience, was in the right place at the right time. In this instance, that individual was Ian Fleming who, for the duration of the war, held the position of Assistant to the Director of Naval Intelligence, but who would later receive much greater acclaim for creating the most famous spy in fiction, James Bond. During his time at the Naval Intelligence Division (NID), he had proven over and again that he was a master strategist and he continuously displayed a remarkable level of operational creativity. It was he who began to take real note of the operations of the German intelligence commando units, especially those led by the infamous Otto Skorzeny during the German invasion of Crete, where they avoided much of the main fighting, instead striving to secure British military headquarters and the sensitive documents stored within, and in his mind formulated plans for a British equivalent.[112] On 20 March 1942, only three weeks after the Bruneval Raid, Fleming submitted a memo to the Joint Intelligence Chiefs (JIC) outlining the methods and successes of the German commandos and suggesting that:

> We would do well to consider organising such a Commando within the NID, for use when we reassume the offensive on the Continent, in Norway or elsewhere. The unit would be modelled on the same lines as its German counterpart and would be placed under the command of CCO [Chief of Combined Operations], perhaps a month before a specific objective is attacked.[113]

The JIC met shortly after to discuss Fleming's proposals and decided that an 'Intelligence Assault Unit', whose responsibility would be to gather 'enemy material and documents of immediate operational value and other archives, documents and equipment of importance', would be very useful.[114] Their approval ensured that this new unit was considered for use

[111] Rankin, *Ian Fleming's Commandos*, 131.
[112] John Pearson, *The Life of Ian Fleming* (London: Jonathan Cape, 1966), 161-2.
[113] TNA, ADM 223/500, '30 Assault Unit and 30 Commando: papers', 20 March 1942.
[114] Hampshire, *Secret Navies*, 175.

during the preliminary planning of Operation Sledgehammer – a proposed invasion of continental Europe which never materialised but would later be successfully reconsidered as Operation Overlord. With approval given, Fleming was free to begin assembling, training and preparing his commandos for imminent deployment. He called them his 'Red Indians', on account of their fast and light movement and aggressive raiding tactics, but they were given the official naval designation of 30 Commando, later changed to 30 Assault Unit, or 30AU.[115]

Their story has been widely and extensively told, perhaps best in David Nutting's *Attain by Surprise*, which gathers many fascinating wartime recollections from members of the unit, but their role is worth exploring here, if only briefly, as its impact on future exploitation endeavours was indelible.[116] The composition of the unit was split between two 'Wings' – one from the Royal Navy (RN) and one from the Royal Marines (RM). The RN component was made up primarily of 'specialist officers in the various branches of the intelligence and research departments of the Admiralty' while the RM element provided the bulk of the manpower, 'taking [the specialists] to their targets, protecting them and assisting them with their work at the targets and then escorting their withdrawal'. The selection of Marines, already an elite division of the military, to be part of 30 Assault Unit was still a rigorous process and the criteria were numerous – at its inception, 30AU numbered fewer than 40 men. Their officers were to be able to speak another language besides English – German, French, Dutch, Flemish, possibly Norwegian – and to have a general knowledge of the countries in which they might be operating; there should be a good number of trained parachutists in case a naval insertion was not possible; some should have specialised technical or mechanical knowledge, or a familiarity with the relevant documents and material; and all should be capable fighting men 'in order to be able to meet any eventualities'.[117] Fleming justified the slightly unorthodox dual composition thus: 'the functions of each Wing are therefore equally essential to the success of the Unit as a whole – i.e. without the RN Wing there would be no purpose in the Unit; without the RM Wing the

[115] Pearson, *Life of Ian Fleming*, 62. The name of this unit changed several times during its lifespan, and specific operational codenames added further variations. To avoid confusion, 30 Assault Unit, or 30AU, will be used throughout here.
[116] Nutting, *Attain by Surprise*.
[117] TNA, ADM 202/308, '30 Assault Unit – unit diaries'.

RN Wing would not long survive in the field.'[118] Even with all the specifications met, Ian Fleming knew that the success of these intelligence assault units would hinge on their training – even if they were able to reach key targets before the enemy could conceal or destroy them, it would be in vain if they were unable to identify items of value or to utilise them. Here once again, unconventionality was the order of the day. A veteran chief inspector at Scotland Yard was engaged to instruct the men in the theory and practice of blowing safes, picking locks and breaking and entering. They were then subject to a series of demonstrations in the use of gelignite, plastic explosive, booby traps, mines and small arms weapons. Away from these practical sessions, with which the Marines would have been far more familiar, were the sessions devoted to the recognition and capture of the so-called 'treasure trove' of modern war – ciphers, code books, intelligence reports, secret orders, new weapons, radar sets, and so on.[119]

With this training in mind, it is unsurprising that 30 Assault Unit were considered to be 'armed and expert authorised looters', even by those directly involved in their formation or deployment.[120] They were viewed with caution or hostility by many of the more narrow-minded members of the naval establishment, or were seen as foolish, even before they had been given a chance to prove themselves in action. Rear-Admiral Jan Aylen, who served with 30AU in Germany and elsewhere, recalled that the Deputy Engineer-in-Chief chided him for joining that 'hare-brained skylark on the Continent' but was soon requesting personal feedback from the operations, once they began to show their worth.[121] The level of scepticism which this new intelligence assault unit faced when it was in its infancy is simply greater testament to Fleming's faith in his idea and commitment to seeing it through.

30 Assault Unit's first action almost proved its critics right, though through no fault of its own. Fleming had insisted on involving a small cohort of his commandos in the ill-fated raid on Dieppe on 19 August 1942. They were tasked with entering the *Kriegsmarine* headquarters in the French port and seizing codebooks and cyphers; instead, their landing craft was struck by a shell before they reached shore and they were forced to swim back out

[118] TNA, DEFE 2/1107, '30 Assault Unit: mobilisation, control, disbandment, Honours and Awards', 23 September 1944.
[119] Pearson, *Life of Ian Fleming*, 166.
[120] TNA, ADM 223/500, 4 November 1942.
[121] Nutting, *Attain by Surprise,* 202.

to the ships anchored some distance from the coast.[122] It was an ignominious beginning but it taught Fleming and NID some valuable lessons which could be applied when 30AU next went into action, only three months later, in Operation Torch, the Allied invasion of French North Africa. Again, due largely to factors beyond their control, it was a slow and uncertain start and they did not achieve their primary objective, of capturing the Vichy French Admiralty building intact and securing the cyphers within.[123] However, in continued exploits in North Africa, they did acquire an unbroken Enigma machine and accompanying codebooks, which allowed the Allies to intercept and decode German radio communication in the area for the next six weeks.[124]

Undeterred by their difficulties and encouraged by their successes, their momentum picked up and despite a couple of returns to Britain to be debriefed and re-briefed, and changes in leadership and composition, they began to truly justify their existence in operations in Sicily and Italy in 1943, where they obtained 'a substantial quantity of documents and equipment of operational value'.[125] Using information they gleaned from Italian industrial concerns, which were fulfilling military contracts for the German navy, they were able to furnish the NID with specifications for new designs of torpedoes, sea mines and depth charges.[126] The shift from operational and order-of-battle intelligence to include scientific intelligence was well underway and by 1944, 30 Assault Unit, increased to a strength of 50, were concerned with the entire range of the enemy's armoury.[127]

Unsurprisingly, this newly-expanded remit necessitated much more careful planning than had been utilised before. Although some of the unit's greatest finds had been made opportunistically and on the fly, by officers who were trained to know what to look for, as all of continental Europe was set to be the next theatre, including the research establishments and arms factories of Germany itself, pre-approved target lists, and orders of priority, were going to be essential in order to derive maximum benefit from their activities. This was effected by the NID asking various other divisions of the Navy to submit requests for intelligence on, or examples of, technology which they were especially interested in.

[122] Rankin, *Ian Fleming's Commandos*, 11-15.
[123] Bower, *Paperclip Conspiracy*, 86-7.
[124] Longden, *T-Force*, 8.
[125] TNA, HW 8/104, 'History of 30 Commando', 1946.
[126] Longden, *T-Force*, 7.
[127] Pearson, *Life of Ian Fleming*, 171.

They were duly swamped by a deluge of responses – the Director of Anti-Submarine Warfare wanted information on sonar and hydrophones, the Gunnery Division wanted to know more about automatic guns and all calibres of ammunition, the Director of Torpedoes and Mining requested details of external markings on these devices and their launching mechanisms, and the Signals Division were keen to learn more about infrared and ultraviolet technologies in detection. This is just a small cross-section of the great quantity of requests which were filed, and which became known as the 'Black List'.[128]

As a result of the sheer volume of demands placed upon 30 Assault Unit and their administrative support in Room 39 at the Admiralty, it soon became apparent that the list would need to be prioritised. The top priority, A.1, was only afforded to intelligence of 'immediate operational importance in the prosecution of the war against Germany'. This included items such as codebooks, cyphers, and anything pertaining to the Enigma machines; the importance of which was 'sufficient to justify the mounting of special operations and the incurring of heavy casualties on the part of 30 Assault Unit'. It was a remarkably frank account which measured the value of intelligence in the terms of commandos' lives.[129]

Multiple 'Black Lists' would later become a central feature of the broader exploitation effort, the guiding documents for the hundreds of investigation teams which swarmed across Europe in the aftermath of D-Day. In many respects, they were based on 30AU's template, especially in terms of their flexibility, the significance of which Fleming and the NID were quick to acknowledge. As a result of 'aerial bombing or evacuation' it was decided that 'all indications of probable sources of materiel and intelligence required should be reviewed continually in the light of aerial reconnaissance photographs, the interrogation of prisoners of war and enemy civilians, and captured enemy documents.'[130] The use of foreign citizens was another testament to the part adaptability played in 30 Assault Unit's successes. French naval personnel in particular were found to be exceptionally useful and, with their co-operation, 30AU 'obtained material of high operational importance, which could not have been made available with the same readiness to a purely [British] Unit'.

[128] Hampshire, *Secret Navies*, 177-8.
[129] TNA, ADM 223/501, '30 Assault Unit: targets', 1944.
[130] TNA, ADM 223/349, 'No 30 Assault Unit: target lists for operations in Germany', 15 December 1944.

Furthermore, it was known that there were many Frenchmen working in German naval dockyards who would be far more likely to share technical knowledge if there was a French component to the unit. As a result, international composition became a common characteristic of later exploitation efforts.[131]

The degree of influence which 30 Assault Unit had on exploitation agencies which came later is often hidden because these later efforts very quickly dwarfed and eclipsed 30AU. It is important to note that 30 Assault Unit did serve very successfully in France, the Low Countries and Germany as the advancing line of Allied liberation made its way across Europe, but their remit narrowed and their greatest contributions were already behind them.[132] In part, their small number – only around 150 at the time of D-Day – meant that they were not able to handle 'so many operations over so large an area' and they worked 'sometimes under fire, during all the hours of daylight as well as keeping turns on two-hour watches at night'.[133] It is important to note, however, that this reduced role was not simply the result of a shortage of manpower, or of other larger organisations overshadowing them, but was also down to the culmination of a gradual falling out of favour which had its origins in the initial scepticism shown towards the unit since its formation.

30 Assault Unit was viewed fairly critically even by those who worked closely with them. Lieutenant-Commander Robert Harling, one of Ian Fleming's most trusted assistants, described them as 'merry, courageous, amoral, loyal, lying toughs, disinclined to take no for an answer from foe or *Fräulein*' – something of a mixed bag of praise and critique – which in turn led Fleming himself to dub them '30 Indecent Assault Unit'.[134] They could not always even justify their unorthodox methods with results, as negligence often meant that many of their prizes were lost *en route*.[135] Their officers were accused of being 'high-handed' and 'unscrupulous' in their efforts to secure vehicles and supplies for their men, and it was even suggested that the 'Assault' in their name be changed to 'Intelligence' as they apparently disliked 'being told to do a bit of assaulting'.[136]

[131] TNA, WO 219/1668, '30 Advanced Unit: supply of information', 14 March 1945.
[132] Rankin, *Ian Fleming's Commandos*.
[133] Lt-Cdr. Jim Glanville, cited in Nutting (ed), *Attain by Surprise*, 218.
[134] Pearson, *Life of Ian Fleming*, 172.
[135] Bower, *Paperclip Conspiracy*, 88.
[136] TNA, DEFE 2/1107, 11 October 1944.

Once Overlord and the main campaign in continental Europe got underway, it was considered that the already controversial tactics of 30 Assault Unit, widely regarded as a 'private army', did not fit in with the massive co-ordinated organisation structure of SHAEF. They were created to serve the need for daring smash-and-grab intelligence raids, not the meticulous and gradual accumulation of all of Germany's scientific and technical knowledge.[137] The agencies which took their place mistrusted 30AU, haranguing them constantly to make sure that they shared all the information they accrued and making it abundantly clear that they did not want to fight alongside them.[138] Nonetheless, even during this phase of relative decline, Fleming's commandos enjoyed a major victory in securing the immensely valuable *Waltherwerke* submarine plant in Kiel on 5 May 1945, and had their swansong in capturing the entire German naval archive at Tambach Castle near Coburg, Bavaria, shortly after the war had ended. There was even a lingering possibility that they might be transferred to the Far East where their experience in seizing 'targets of opportunity' could prove very useful, but the end of the war in the Pacific in August 1945 put paid to that idea.[139]

Forerunners to Exploitation: Alsos

30 Assault Unit was not the only precursor to exploitation active during the war. While Fleming's men were participating in Operation Torch in North Africa, another operation was coming together in the hot, dry desert of New Mexico where, at a secret laboratory complex at Los Alamos, American and British scientists were working enthusiastically to develop an atomic bomb. Known as the Manhattan Project, and largely subsuming the similarly-purposed 'Tube Alloys' programme in Britain, this research was yet another facet of the ongoing wartime arms race between the Allies and Axis powers. The secrecy afforded to all work on the atomic bomb was unequalled and naturally all those involved feared that parallel German efforts, similarly hidden from view, would exceed their own; certainly, German physicists who had fled from the Nazi regime and come to work in the Allied countries were convinced that 'German science was the best in the world, and that if a

[137] Longden, *T-Force*, 95.
[138] TNA, WO 219/1668, March 1945.
[139] TNA, DEFE 2/1107, 30 June 1945.

bomb could be built, the Germans could – and would – build it'.[140] Ultimately, the Allies were terrified that they would fall victim to atomic warfare before they were in a position to unleash it themselves.[141]

To try and avoid this fate, or at least to better understand similar work going on in hostile countries, the head of the Manhattan Project, Brigadier-General Leslie R. Groves, ordered the creation of a War Department Scientific Intelligence Mission, better known by its codename, Alsos (derived from the classical Greek word for a 'sacred grove'). Headed militarily by Colonel Boris T. Pash, a US Army career soldier of Russian descent, and scientifically by Samuel A. Goudsmit, a Dutch-American physicist, Alsos was inter-Allied in make-up but the bulk of its staff, and the ultimate command, lay with the Americans. This was not because the Americans were necessarily better-equipped to handle the demands of the task (in fact, British scientific intelligence was rather more advanced than that of their allies across the Atlantic), but rather that the US created a team first and it seemed better diplomacy for British operatives to ask permission to join that, than to create their own rival unit. It was in this way that the British, who were perhaps more accustomed to a senior partner role, were effectively demoted to juniors.[142]

Alsos began operation in the Mediterranean and was later deployed across western Europe and into Germany. In his memoirs, Brigadier-General Groves has stated that the mission's primary purpose was:

> … to obtain intelligence of atomic developments in Italy and Germany. Nevertheless it was logical to expect that, in the course of its work, the mission would also come upon data about other enemy projects; accordingly, it was directed to exploit to the fullest sources in a number of fields of technical interest.[143]

This mention of 'other enemy projects' extended to any other scientific and technical research taking place in Germany, or under German supervision, which had a potential military application. It included both chemical and biological warfare, as well as ordnance

[140] Alan D. Beyerchen, *Scientists under Hitler: Politics and the Physics Community in the Third Reich* (New Haven, CT: Yale University Press, 1977), 201.
[141] Leo J. Mahoney, 'A History of the War Department Scientific Intelligence Mission (Alsos), 1943-1945', Ph.D. dissertation, Kent State University (1981), 2.
[142] Jones, *Most Secret War*, 601.
[143] Groves, *Now It Can Be Told*, 191.

and aircraft technology. Atomic energy and weaponry would remain their primary concern throughout their period of operation but the additional intelligence they gathered, often just by having a keen eye for items of scientific interest, proved to be immensely valuable.

While in the upper echelons of Allied command preparation was being made for a vast operation to examine *all* aspects of German scientific and technical endeavour, as shall be explored in the next chapter, Alsos was able to get into the field much sooner. It was a more streamlined operation, with fewer men and a unilateral command structure, but more than that, it was designed to supplement existing intelligence organisations, not duplicate them, and could therefore count on shared resources and co-operation at the front, and could minimise administrative hassle or superfluous personnel.[144] In addition, so great was the fear of a German atomic attack to which the Allies would be completely vulnerable, that the objectives of Alsos always had highest priority. It is no surprise that it is now widely considered to be the first large-scale scientific intelligence mission in history,[145] but at the time it was thought to be so unprecedented as to be an experiment of sorts.[146]

The Alsos operatives, many of whom were trained scientists, were also aided in their mission by their own inherent knowledge of the state of atomic research in Germany, and elsewhere, in the years leading up to the war. They were furnished with long lists of 'targets' to investigate, many of which were in fact individual specialists, but these lists could quickly be cut down as the agents themselves knew which scientists were important and which were not. This was a level of insight which the military chiefs could not comprehend but Goudsmit has asserted that 'any reputable scientist working in the same field would have known the same thing'.[147] The involvement of these experienced and knowledgeable experts also furnished the project with the perfect interrogators to elicit maximum information from the German scientists who they detained. This was particularly relevant because Alsos agents were not only permitted to pursue and investigate civilian research, but actively encouraged to do so.[148] The realisation had already dawned on those with a vested interest in the fruits of German scientific effort during the war that the best results

[144] Ibid.
[145] James McGovern, *Crossbow and Overcast* (London: Arrow, 1968), 96.
[146] TNA, AVIA 10/70, 'Alsos mission: report', 4 March 1944.
[147] Goudsmit, *Alsos*, 25.
[148] Groves, *Now It Can Be Told*, 192.

may be gleaned from non-military institutions – this would later become a common aspect of the whole exploitation initiative.

The fears of a German atomic bomb were far from baseless. Nazi Germany was home to some of the world's most renowned nuclear physicists, including Otto Hahn, who had isolated pure uranium-235 in December 1938, and Werner Heisenberg, who had recognised its potential if weaponised.[149] The Manhattan Project's intelligence officials had discounted Japan, which they felt lacked the necessary scientific and technical prowess to develop an atomic bomb, but strongly believed that Nazi Germany, with its extensive resources and eager support for research into new ways of killing, not to mention its unrivalled cadre of physicists, could add such a weapon to its arsenal sooner rather than later. Add to this the constant misinformation spewed forth by Joseph Goebbels' Ministry of Public Enlightenment and Propaganda which spoke of secret super-weapons, and it appears unsurprising that Alsos continuously expected to find evidence of a German atomic bomb project nearing completion.

In reality, the German project was still very much in its harmless infancy, but the Alsos investigators only found this out gradually, as they moved across Europe in the immediate wake of the advancing Allied forces. Colonel Pash laid claim to being among the first column of Allied troops to enter Paris on 25 August 1944, his small jeep nestling among much larger vehicles and surrounded by crowds of the liberated French public, being showered with adulation. The high-spirited local populace were not allowed to become a distraction or hindrance, and Pash and his colleague Major Horace Calvert soon tracked down eminent French physicist Frédéric Joliot-Curie in his laboratory at the Collège de France. He was flown immediately back to London for interrogation and more investigators, including Goudsmit and British 'Tube Alloys' specialist, Michael Perrin, came over to Paris to run through all of Joliot-Curie's papers and equipment with a fine toothcomb. All they really managed to learn was that the German physicists had some solid ideas about nuclear fission but were not far along in the process of developing it into a weapon.[150]

These conclusions were based primarily on Joliot-Curie's poorly-informed suspicions and there was also a sense that the Nazis were unlikely to have conducted their most

[149] Bower, *Paperclip Conspiracy*, 80.
[150] Mahoney, 'History of the War Department Scientific Intelligence Mission', 186.

important military research in Paris – the search would have to continue. The next investigation of importance took place in Strasbourg, on the border between France and Germany, where the University had housed much recent endeavour in the field of nuclear physics. Alsos operatives entered the city and University on 25 November 1944 and pored over the wealth of the material available there. They found out much about other areas of science and technology – medicine, aircraft and naval matters, for example – and were able to detain and interrogate seven senior German physicists and chemists. The products of this further confirmed their suspicions that the German atomic bomb project was still mired in the early experimental stages.[151]

The final real prize of Alsos's atomic investigations lay only sixty miles or so across the German border, at the small town of Hechingen, just south of Stuttgart. Aerial reconnaissance and word-of-mouth from scientists in neutral countries suggested that Werner Heisenberg, by now the most desirable figure of the German atomic establishment, and many of his similarly esteemed colleagues, were based at the Kaiser Wilhelm Institute for Physics at Hechingen (relocated from Berlin after severe bombing) and were continuing their research there. By now, the Americans and the British were confident that Nazi Germany did not have the capability to launch an atomic strike, but they pressed on nonetheless. This was because Hechingen was now one of many targets in south-western Germany included in Operation Harborage – an Anglo-American effort to secure equipment, documents and individuals from sites which would later fall under French occupation. Groves feared that anything which the French seized might very soon become accessible to the Soviets, and mistrust of the USSR was growing day by day.[152] Harborage therefore marked the beginning of a policy of 'denial', wherein scientific and technical targets were seized by the British or Americans, not necessarily for their own use but simply to prevent the French or Soviets laying claim to them, which would persist in exploitation throughout the occupation and set the tone for the Cold War. In this instance, the Americans were even sufficiently suspicious of their British partners (who had thus far given more than they had

[151] Groves, *Now It Can Be Told*, 221-2.
[152] Ibid., 234.

got in scientific intelligence) to refuse to share with them the key documents found at Hechingen, and instead shipped them straight back to the United States.[153]

Perhaps the greatest prizes seized in Hechingen and its environs were ten of the most prominent of the German atomic scientists, including Heisenberg and Otto Hahn, who were then detained, incommunicado, at Farm Hall, in Godmanchester, near Cambridge, from the time of their capture in July until they were released in December 1945. This detention was highly secretive, at least at first, and the scientists' quarters were all fitted with listening devices, unbeknownst to the men themselves.[154] This eavesdropping shed some interesting light on these scientists' world-view, particularly when news broke of the bombing of Hiroshima, but was hardly legally, let alone ethically, sound, though it would come to set the tone for the detainment of numerous scientific and technical personalities of interest throughout the post-war period.[155] Alsos did some more investigative work after Hechingen, largely concerned with completing records and denying personnel and materiel to the Soviets, but ceased to exist as an organisation on 15 October 1945, despite urgings by many, particularly in the USA, that it should become a permanent scientific intelligence agency.[156] Even in its fairly short period of operation, Alsos had visited over seventy targets, including sixteen universities and four concentration camps, and had filed approximately 400 scientific reports.[157]

Though at first glance it may seem that the story of Alsos has little to contribute to the history of exploitation – it swiftly established that there was no threat from the German bomb project and was disbanded fairly promptly at the end of the war – its influence on organisations which came into being simultaneously or after it should not be understated. Firstly, the very fact that it discovered the absence of a direct wartime threat so soon and yet pressed on is significant. Those involved with Alsos, whether on the ground or in a supervisory role, understood that there were benefits to unravelling German science and technology beyond mere direct tactical utility. As early as March 1944 this was displayed in

[153] Jones, *Most Secret War*, 602.
[154] Charles Frank (ed.), *Operation Epsilon: The Farm Hall Transcripts* (Bristol: Institute of Physics Publishing, 1993), 1.
[155] See Chapter Four below.
[156] Groves, *Now It Can Be Told*, 249.
[157] John D. Hart, 'The Alsos Mission, 1943–1945: A Secret U.S. Scientific Intelligence Unit', *International Journal of Intelligence and Counter-Intelligence*, 18 (2005), 510.

a memo pertaining to Alsos's impending actions in western Europe, which included 'planning of own strategy if similar weapons or tactics are available to our own forces' and 'direction of our own war research projects' among the agency's main mission aims, alongside more immediate military objectives.[158]

Later on, as we have seen, denial policy also became part of their operating remit. This in turn transformed and expanded into something different. As the Second World War ended and the Cold War began, many Western eyes, particularly those in the United States, stopped perceiving Germany as an enemy and instead focused suspicion on the Soviet Union. The work Alsos had carried out in investigating the research undertaken in Germany during the war, and by observing which German physicists the Soviets snapped up, now allowed them to make measured estimates of the progress of similar atomic research in Russia.[159] This is just one example of how the exploitation initiative provided a smooth transition from investigating a current enemy to sizing up a future one.[160]

In this way, and in many others, the actions of Alsos played a major role in shaping the structure of future exploitation organisations. Their methodology, as outlined by Goudsmit, was as follows:

> It was the task of the scientists to obtain and analyse all pertinent information having to do with German science. From such information they had to deduce just what places, institutions, buildings, and people in enemy territory were important for giving us the information we wanted. It then became the task of Colonel Pash and his men to see that we got to these people and these places before anyone else got there. They also had to supply us with all relevant intelligence collected by other groups in the American and British armed forces.[161]

This could describe the *modus operandi* of any one of the numerous exploitation agencies which came into being in the last year or so of the war, or immediately afterward. Two elements of this were particularly crucial – the first was the combination of civilian scientist investigators with conventional military operatives on the ground, not common even in an era of total war but absolutely necessary if exploitation was to be both genuinely beneficial

[158] TNA, AVIA 10/70, 4 March 1944.
[159] Henry S. Lowenhaupt, 'On the Soviet Nuclear Scent', *Studies in Intelligence*, 11 (1967), 14.
[160] Richelson, *Spying on the Bomb*, 62.
[161] Goudsmit, *Alsos*, 18.

and logistically feasible, and the second was the interaction between the multiple organisations operating alongside one another in the field.[162] Both of these policies were sensibly adopted by the agencies which Alsos had preceded.

More than just an inheritance of ideas and methods, Alsos was also able to pass on some hugely valuable concrete intelligence to help the fledgling operations of their successors get off the ground. Their findings were, for the most part, shared and liaison officers were tasked with ensuring smooth relations between different agencies. Perhaps the most significant information that Alsos was able to bestow upon their descendants was that contained within the so-called 'Osenberg List'. Dr Werner Osenberg was the head of the *Wehrforschungsgemeinschaft* (the Nazi Military Research Association) when he was captured by Alsos operatives near Göttingen in early 1945. The information he furnished, complemented extensively by his list of 15,000 leading German scientists and technicians (found in scraps, which someone had supposedly attempted to flush down a toilet at Bonn University), allowed all future exploitation teams to identify key targets more quickly and to pursue them more accurately. Unsurprisingly, this would prove time and again to be utterly invaluable.[163]

To conclude, exploitation was very clearly a product of the conflict in which it originated. As this chapter has shown, the Second World War was characterised by the influence of science and technology, though it is worth noting that no state, even the most richly endowed, was able to achieve a truly radical transformation of military technology before 1945.[164] Nonetheless, the scene was set for the future – the course of the war had proven that appropriate application of research and development had the very real potential to bestow both tactical and strategic advantage on the state in question. In turn, this made understanding the armouries of potentially hostile nations absolutely essential and while this was first realised during the Second World War, it was the fog of suspicion and secrecy fostered by the Cold War in which scientific intelligence really came of age.[165] There is no

[162] TNA, AB 1/110, 'Investigation of nuclear physics developments in Germany', 30 August 1945.
[163] Gimbel, *Science, Technology, and Reparations*, 17.
[164] Richard Overy, *Why the Allies Won* (London: Jonathan Cape, 1995), 242.
[165] Balmer, *Secrecy and Science*, 7-14.

question that exploitation emerged from this atmosphere as both a fascination with the contents of an enemy's arsenal and as the source of a potential head-start in any future arms race.

30 Assault Unit and Alsos both played relatively small but still crucial parts in the developing story of scientific and technical exploitation. They were pioneering forces which represented the changing priorities of modern warfare and were well-suited to this new relationship between science and strategy, developed during the war and influenced by individuals like Frederick Lindemann and R.V. Jones. It is clear that the exploitation initiative would not have existed in the form that it did, if at all, without the experience of 30AU and Alsos, and it would have faced much greater difficulty had it not been able to build on the problems faced, and solutions devised, by these two agencies. It is for this reason that the issues discussed in this chapter, though perhaps initially seeming peripheral, are relevant to the wider history of exploitation and their influence will be detected throughout this study. As the war entered its final destructive stage, the operational techniques of these small, daring enterprises began to fall from favour and it became clear that the era of comprehensive exploitation on a grand scale was dawning.

CHAPTER TWO
The Origins of Exploitation

While the inchoate operations of 30 Assault Unit and Alsos were unfolding rapidly and effectively in western Europe, driven, initially at least, by pure military utility, an idea was dawning in the minds of officials in London and Washington alike that something on a much grander scale could be possible, and perhaps necessary. The aim of this broader scheme would not just be to hasten the end of the war against Germany, and bring about Japan's defeat, but also part of a larger strategy to ensure peace and security in Europe, particularly in the face of any future Soviet aggression. This new programme would be designed as an attempt to glean every last morsel of scientific or technical intelligence from Germany while it lay at its most vulnerable – invaded by foreign armies, society in disarray, ordinary people living in chaos and uncertainty, and the Nazi political system stumbling towards its complete implosion. This chapter will chart the progress of the exploitation initiative in the final chaotic year of the war; a significant and formative prelude to the comprehensive and unremittingly thorough investigation of German science and technology which would unfold after the war's destructive denouement.

As such, it will begin by exploring the original germ of the idea to exploit on a large scale, through the injection of urgency contributed by the Allied invasion of Europe, and the gradual formulation of policy which arose from this early thinking and the changing military circumstances. What this policy entailed was the establishment of a complex but effective administrative framework to handle the sizeable task of full-scale exploitation of German science and technology. Once this framework was successfully established, no time was wasted in despatching teams of expert investigators to the continent as it was liberated from Nazi occupation, racing forward just behind the advancing frontline troops and in parallel with the men of 30AU and Alsos, and seizing all the scientific and technological spoils on which they could lay their hands. In the last months of the war, these exploitation operatives followed the regular armies across the German border and, as the conflict entered its final violent throes, they began examining the technical marvels of the Third Reich's impressive war machine. This was to be the age-old notion of 'to the victor, the

spoils' reconceived for the modern age and on an unprecedented scale – it was to be methodical, systematic, and irresistible.

Ideas for Exploitation

Considering its numerous successes, it really is no surprise that the actions of Alsos quickly caught the attention of British officials, especially those who were tasked with planning for the post-war future. In September 1944, Colonel George Vickers, Director-General of the Enemy Branch of the Ministry of Economic Warfare (MEW) wrote to Major-General Kenneth Strong, the British G-2 intelligence chief for General Dwight D. Eisenhower's Supreme Headquarters Allied Expeditionary Force (SHAEF), noting the missions which Alsos had been conducting. He incorrectly described it as an exclusively American force, and one primarily concerned with chemical warfare, but nonetheless felt that 'there might be considerable advantages to all concerned if there were a similar British team which could work in the same or adjacent fields and could arrange for an exchange of ideas and information with Alsos'. He added that such a team surely could not 'fail to be of the greatest value to those Sections of the proposed Military Government which are charged with responsibility for the administration of German industry and technical research'.[166]

This was not, however, Colonel Vickers' earliest involvement with the idea of exploitation, as he was also a member of the government body which first became responsible for co-ordinating this programme – the Joint Intelligence Sub-Committee (JIC), which existed as a subsidiary of the Chiefs of Staff committee.[167] The first indication that there was a perceived demand for intelligence on Germany after the war came about through the JIC, in a meeting in January 1944, when Vickers noted that the MEW would be keen to ascertain how much impact economic measures against Germany had made during the war and suggested that 'other departments would also have much of a corresponding nature which they wished to know'. No mention of science or technology was made at this stage. Then, on 29 March, the Enemy Research and Development Sub-Committee produced a paper innocuously entitled 'Post-Hostilities Equipment Policy'. Contained within was the

[166] TNA, WO 219/1669, Col. G. Vickers to Maj-Gen. K.W.D. Strong, 7 September 1944.
[167] Michael S. Goodman, *The Official History of the JIC*, vol. I (Abingdon: Routledge, 2014), 28.

central thrust of the British exploitation initiative, elucidated here in a manner which would remain largely unchanged, outwardly anyway, until the end of the war and beyond. The first element of this was the official recognition, long after R.V. Jones and his colleagues in scientific intelligence had reached the very same conclusion, that 'much German equipment is as good, or better, than ours'.[168] In May, Vickers remarked that the Admiralty had begun putting together a list of equipment to be examined, while the JIC's chairman, Victor Cavendish-Bentinck, recommended that a representative from the Ministry of Supply be involved in any further deliberations, which suggests that technology was, by this point, very definitely under consideration.[169]

Experience from the end of the First World War also played a role in shaping future exploitation policy. In August 1944, Brigadier William van Cutsem, the former Deputy Director of Military Intelligence, who had worked closely with the Special Operations Executive during the war and was a member of a number of bodies concerned with the post-war future of Germany, filed a report on German war material, in which he recounted several tales of failure from the post-1918 period. In the case of a new 'machine-gun with a calibre of 2cm, called the TUF', he recalled that 'every effort was made to obtain a specimen or at least full technical information, but without success'. Similarly, 'attempts to secure information regarding processes in the manufacture of chemical warfare products under the relevant article in the peace treaty failed dismally. The answers provided were dubbed by an Allied expert as merely "a child's guide to knowledge" and perfectly useless.' In terms of war material factories, van Cutsem noted that incomplete information had been gathered on them and, in addition, 'by the time control had started many firms had already gone over to the manufacture of peace time commodities under different names'. To avoid repeating these mistakes, van Cutsem recommended that information should be gathered both quickly and comprehensively (arguably this was easier in 1945 than it had been in 1918-19 due to the unconditional German surrender and the total occupation by the victorious Allies).[170]

[168] TNA, FO 942/27, 'Post-Hostilities Equipment Policy', 29 March 1944.
[169] TNA, CAB 81/92, 'Minutes of 21st Meeting of JIC', 16 May 1944.
[170] TNA, FO 1032/35, 'The Investigation of Initial Stocks of War Material and War Material Factories', 5 August 1944.

The process of formulating exploitation policy was accelerated by the impending Allied invasion of Europe under Operation Overlord. Cavendish-Bentinck appointed a JIC Special Sub-Committee on Intelligence Priorities 'to draw up a list of the principal intelligence targets for the assault phase'.[171] This sub-committee met on 19 May and consisted of representatives from the War Office, MEW, Ministry of Supply and Air Ministry, as well as Ian Fleming of the Admiralty who, through his involvement with 30 Assault Unit, had already contributed indirectly to the preparations for exploitation. Noting that 'SHAEF were anxious to have a clear directive as to what was required from … an inter-Service inter-Allied body', the sub-committee resolved to draw up lists of intelligence targets – the essential first step of the exploitation programme. In fact, the main outcome of the single meeting of this special sub-committee was, in an act of all too familiar bureaucratic perpetuation, to recommend the establishment of another committee to gather information 'either of great value to the Allies for operational purposes at present, or of such a nature as to constitute a dangerous potential threat in the future'.[172] This would become, with the involvement of the Americans, the Combined Intelligence Priorities Committee (CIPC), the first true exploitation agency.

Science and technology was now a major part of this planning, as shown in a MEW memo from September 1944. This described how 'a nation at war or planning for war stimulates, to a very high degree, research and technical developments in all its major activities. This speeding-up process produces in months what would normally take years under peacetime conditions.' The memo then continued by exploring the possibilities this would open up at the end of the war:

> After the capitulation of Germany we will have before us the results of this speeding-up process. Since this has been accomplished by the organised effort and best talent of Germany exerting all its efforts in this direction, it seems logical to assume that there are available many ideas, developments and techniques military and industrial that would benefit the Allies.[173]

[171] TNA, FO 942/27, 'Post-Hostilities Equipment Policy', 29 March 1944.
[172] TNA, CAB 81/92, 'Minutes of 22nd Meeting of JIC', 23 May 1944.
[173] TNA, WO 219/1669, 'Proposed Function for Technical Sub-Division G-2 SHAEF during SCAEF Period of Occupation of Germany', 19 September 1944.

It is important that these estimations of German superiority be qualified. The Allies did not believe that Germany was ahead of them in all fields, or else their eventual defeat in the war would seem rather too improbable, but the realisation was made that, in some aspects, earlier wartime Allied arrogance had been misplaced. Vannevar Bush, the influential head of the American Office of Scientific Research and Development (OSRD) throughout the war and beyond, put it most clearly when he explained that modern industrial societies advance unevenly and variously; at any given time, each will be ahead of its rivals in some, but not all, of the countless areas of endeavour.[174]

In some cases, the desire to exploit was driven forward particularly eagerly by perceived German progress in just one of these areas. For Britain, with its understandably pronounced fear of bombing, the most prominent was almost certainly the field of rocketry, in particular the revolutionary long-range offensive power of the German V-weapons.[175] Between 12 June and 31 July 1944 some 5,200 V-1 flying bombs were launched against Britain, averaging a total of 110 a day, and 35-40% of these reached their target of London.[176] Although the destruction wreaked by these new weapons, and by their stratospheric successors, the V-2s, was significantly less than that inflicted by Luftwaffe raids during the height of the Blitz, the terror of a one-ton explosive warhead dropping to earth faster than the speed of sound was unrivalled, and shook the courage of even the hardiest of Blitz survivors.[177] The Joint Planning Staff even considered whether the V-weapons should be 'denounced as an act of indiscriminate warfare against the civilian population' before conceding that they were really just a long-range alternative to conventional bombing tactics and concluding that 'it would be hypocrisy to claim that it contravenes the rules of warfare observed by us during this war'.[178]

Despite the shock and awe inspired by these attacks, Britain was still uncertain of the value of total scientific innovation over incremental improvements to existing conventional weapons and had paid only limited attention to the development of these rockets until it

[174] Vannevar Bush, *Pieces of the Action* (New York: Morrow, 1970), 115-6.
[175] Süss, *Death from the Skies.*
[176] TNA, AIR 40/1779, 'Crossbow report', 1 August 1944.
[177] Rankin, *Ian Fleming's Commandos*, 236.
[178] TNA, CAB 79/68, 'Joint Planning Staff report', 29 November 1943.

was almost too late and they threatened British cities.[179] From mid-June 1944, the Crossbow committee, which handled all issues pertaining to rocket warfare, became increasingly prominent and views on rocketry began to change – by November, the Joint Committee on Research and Development Priorities declared that the Allies 'were now on the threshold of great changes in the sphere of ordnance. There were some who believed that the days of the heavy gun were numbered.'[180] The bold statements and predictions did not stop there. Allied technical experts believed that the V-weapons had not only changed the nature of warfare but would also leave behind a terrifying spectacle of what a future war might be like.[181] It was correctly suspected that German experts had been working on a bomb to cross the Atlantic to attack US soil and this hinted at the potential of all manner of intercontinental missiles, which, it was estimated, could replace raids by manned bombers in ten years or less. In any case, Britain, with its direct experience of attack and advanced air defence system, was widely expected to become a 'vigorous competitor' in the post-war missile race.[182]

For the time being, however, the focus still remained very much on winning the war. This, as we have seen with the deployment of 30 Assault Unit and Alsos, was the primary motivator in establishing an exploitation initiative. This applied not just to the V-weapons and long-range rocketry, though this was an area of particular importance, but to all manner of German science and technology. The 'Post-Hostilities Equipment Policy' stated that, with any confiscated material, 'it is for our consideration whether it should be used either by ourselves or our allies, either in Europe or in the Far East.'[183] In terms of the defeat of Germany, it would not be unfair to claim that this outcome was expected widely enough within the Allied establishment to justify planning extensively for it, even before Operation Overlord had been successfully mounted. The reality vindicated their predictions, with Allied progress across Europe, though often slow and sometimes beset by major difficulties, such as Operation Market Garden and the Battle of the Bulge, fairly inexorable all the way into Germany. As a result, the focus in the European theatre was merely hastening an outcome which most Allies (and many Nazis) saw as inevitable. The Pacific theatre posed a different

[179] Philip Joubert de la Ferté, *Rocket* (London: Hutchinson, 1957), 124.
[180] TNA, CAB 81/47, 'Joint Committee on Research and Development Priorities', 15 November 1944.
[181] McGovern, *Crossbow and Overcast*, 13.
[182] Basil Collier, *The Battle of the V-weapons, 1944-5* (London: Hodder & Stoughton, 1964), 150-1.
[183] TNA, FO 942/27, 29 March 1944.

problem – some feared the conflict there would last a further three years after the defeat of Germany,[184] while even the more conservative estimates did not think it would wrap up until well into 1946. Either way, it was acknowledged that specific technologies, such as carrier-borne aircraft and swimming tanks, would be very helpful in securing victory, and so any technical benefits gleaned from Germany might prove pivotal.[185]

However, bringing about a swift Allied victory in the war in both theatres was only one reason why exploitation was able to build momentum. No-one involved expected the scheme to conclude as soon as both Germany and Japan had capitulated. In fact, many assumed, correctly, that exploitation proper would not begin until the former enemy countries had been defeated and were completely open to unchallenged Allied investigation.[186] One individual who acknowledged the potential which exploitation had, beyond mere military utility, was Deputy Chief of the Imperial General Staff, Lieutenant-General Sir Ronald Weeks.[187] In March 1944, he made the following statement to the Enemy Research and Development Sub-Committee:

> It is considered that the obtaining of German research records and as much information as possible of design and development projects in hand, is one of the most vitally important of our immediate post-war aims; not only would the confiscation of this information deprive Germany of many years of painstaking work, but it would also be of the greatest value to us. It may be that this is the only form of reparation which it will be possible to exact from Germany. Everything possible to ensure that it is exacted must be carefully planned now.[188]

What is particularly interesting about Weeks' statement is that he touches on two separate driving forces behind exploitation – one of which was the seeking of reparations, an age-old process of restitution exacted by victor over vanquished foe, and the other was the punishment of Germany through the removal of its valuable science and technology, in reality a precautionary measure against any future resurgence as much as a punitive one.

---

[184] Ibid.
[185] TNA, CAB 81/47, 'Strategic Survey of the War', 24 May 1944.
[186] Gimbel, *Science, Technology, and Reparations*, 20.
[187] H.O. Hooper, 'Weeks, Ronald Morce, Baron Weeks (1890–1960)', *Oxford Dictionary of National Biography* (Oxford: OUP, 2004) [accessed online 28 April 2016, http://www.oxforddnb.com/view/article/36814].
[188] TNA, FO 942/27, 29 March 1944.

Reparations have, throughout modern history, been a notoriously problematic issue, but perhaps never more so than at the end of the Second World War. Allied statesmen and officials alike sought to avoid repeating the mistakes of the Treaty of Versailles in 1919, which had played so substantially into the hands of Hitler and the Nazis in their quest for power.[189] Stripping Germany of its scientific and technical resources, including skilled manpower, after 1945 and utilising them for the victors' own ends was one way to achieve this while still securing some recompense. In the words of Alec Cairncross, loot and slavery, the age-old traditional forms of reparations, quickly returned to favour.[190] This approach also offered some security – before the polarised mentality of the Cold War had become truly entrenched, many feared that a German resurgence was still the biggest threat to peace in Europe, and that comprehensive disarmament should therefore feature very highly in Allied post-war priorities. This was influenced initially by historical precedent, as well as by deep-seated racial stereotyping of the German people as aggressive and militaristic, and later by concerns that Germany could become a socialist satellite of the Soviet Union.[191] In the USA, meanwhile, the Morgenthau Plan (as advanced by Secretary of the Treasury, Henry Morgenthau, Jr.) proposed that Germany be totally demilitarised and deindustrialised and reduced to a simple pastoral state – Morgenthau felt that, in light of the German treatment of others, 'they should in their turn be exploited'.[192] In this way, both reparations and retribution came to feature very heavily in early discussions around the exploitation initiative – it was a policy which would continue to be inextricably linked to divisive politics for its entire lifespan.[193]

As time went on, the savvier British officials came to acknowledge that the real threat to European peace and stability was more likely to come from the Soviet Union than from Germany. The somewhat euphemistic term 'policing of Europe' began to crop up often in official memoranda and directives, referring mostly to a general defence against a

[189] Norman A. Graebner and Edward M. Bennett, *The Versailles Treaty and its Legacy: The Failure of the Wilsonian Vision* (Cambridge: CUP, 2011), esp. 107-124.
[190] Alec Cairncross, *The Price of War: British Policy on German Reparations, 1941-1949* (Oxford: Blackwell, 1986), 10.
[191] TNA, FO 1050/67, 'Intelligence Division: formation of Scientific and Technical Intelligence Branch', 9 November 1946.
[192] Ann and John Tusa, *The Nuremberg Trial* (New York: Skyhorse, 2010), 51.
[193] See Chapter Six below.

possible Soviet hegemony over the continent.[194] As we have seen, even before the war ended, and especially once the future zonal divisions of Germany had been decided upon, British and American exploitation teams scurried to seize the best scientific and technical spoils from areas which would later fall under the impenetrable blanket of Soviet control. Science and technology, and the new weapons which they could elicit, would be of particular value to the Western Allies in order to counter what they saw as the Soviets' 'overwhelming superiority on land'.[195] In short, Britain and the US were under no pretences that the Soviets would pursue exploitation, ruthlessly and on a grand scale, and they knew they could not afford to be left behind while the Soviet Union, an ally for now but almost certainly a future rival or even foe, vastly increased its war potential.[196]

The final motivation for exploitation was somewhat more prosaic than defence of the peace or preservation of the values which Western democracies held dear. It was a purely financial aim, driven less by government officials and more by industry chiefs, who felt they had contributed, at great commercial cost, to the Allied victory and now wanted to seek reimbursement from the vanquished enemy. Initially, this pressure came mostly from the military industries, and by March 1944, the Army was already stating as one of its long-term aims of exploitation, 'the establishment of a well-founded and virile British armament industry'.[197] By September, the Ministry of Economic Warfare was planning to collect 'factual intelligence' on 'German industry, economic transport, food and agriculture, fuel, labour conditions, economic administration, prices and price control, and the employment of foreign workers in Germany'.[198] The influence which civilian industry was able to exert on what was essentially a military initiative was, to some extent, inevitable – it was the product of the complete mobilisation of total war and no exploitation of any kind could conceivably go ahead without the input of civilian experts; they were the only ones knowledgeable enough to glean the details of true value from their targets of investigation.[199]

---

[194] TNA, FO 942/27, 29 March 1944.
[195] TNA, CAB 158/2, 'Joint Intelligence Sub-Committee: Memorandum', December 1947.
[196] Bower, *Paperclip Conspiracy*, 92.
[197] TNA, FO 942/27, 29 March 1944.
[198] TNA, WO 219/1669, 'Collection of economic intelligence: policy and organisation', 15 September 1944.
[199] Gimbel, *Science, Technology, and Reparations*, 4. On the British total war effort see Stephen Broadberry and Peter Howlett, 'Blood, Sweat and Tears: British Mobilisation for World War II', in Roger Chickering et al., *A World at Total War: Global Conflict and the Politics of Destruction, 1937-1945* (Cambridge: CUP, 2005), 157-176.

With so much justification for exploitation available, it is no wonder that it soon became an essential part of planning for the assault on Europe and the end of the war. One of the most important manifestations of this was in the Draft Armistice, the document which it was planned to present to the German high command to bring about an end to the conflict. As early as October 1943, G.W. Turner of the Ministry of Supply wrote to Colonel C.W.G. Walker of the Post-Hostilities Planning Sub-Committee suggesting that the terms of this Draft Armistice include an instruction to the German government to 'prepare and provide at once a detailed statement of all research and development carried out by or on behalf of the German Government since the outbreak of war'. He felt they should also ensure 'the provision of information, either in the shape of statistics or otherwise, necessary to enable the controlling powers to exercise direction over economic affairs'.[200] The Draft Armistice was later replaced by a proposed Instrument of Surrender; Article 5 of which ordered that the German authorities should hold intact, and make accessible to Allied representatives, all arms and ammunition, aircraft, naval vessels, military establishments, travel and communication facilities and, most critically:

> all factories, plants, shops, research institutions, laboratories, testing stations, technical data, patents, plans, drawings and inventions, designed or intended to produce or to facilitate the production or use of the articles, materials and facilities … to further the conduct of war.

It went on to instruct that the German authorities also furnish the labour force necessary to operate any of these facilities and to ensure that their records were 'maintained and kept up-to-date'.[201]

Of course, this rested very heavily on the uncertain premise that this directive could be successfully circulated throughout a bombed-out and dislocated Germany, and that those who received it were co-operative and obedient. Many exploitation officials had little faith in this being the case; in fact a large number felt 'almost certain that the Germans will take every possible step to prevent the United Nations from learning their technical secrets'.[202] As a result, in a memo concerning the proposed actions of the Technical Sub-

[200] TNA, AVIA 12/191, G.W. Turner to C.W.G. Walker, 20 October 1943.
[201] TNA, FO 942/8, 'Draft Armistice Terms 1: Article 21(a)', 14 July 1944.
[202] TNA, FO 935/1, 'Research and Development Centres in Germany', 1944.

Division of G-2 Military Intelligence during the SHAEF occupation of Germany, it was considered that one of their roles would be to 'ferret out' any items which the secretive enemy had tried to 'bury', and that 'this should be done aggressively with the full military and economic strength of the Allies backing it up'. In accordance with the widespread fear of an aggressive German resurgence, the memo goes on to say that 'the enemy should not be allowed to retain any advantage, whether military or industrial, resulting from his preparations for, or activities during, hostilities.'[203]

Now that the reasoning behind exploitation had been solidly accounted for, and the official policy had both acknowledged this need and put measures into place to facilitate it, all that was left to do was to prepare for it in logistical terms. Of first consideration was the form which the agency, or agencies, responsible for exploitation on the ground would take. In April 1944, the Enemy Research and Development Sub-Committee, submitted a report to its parent group, the Joint Technical Warfare Committee, entitled 'Investigation of German Research and Development', which highlighted many of the key points of a broad exploitation plan. It started by showing remarkable prescience and recognising that there were many unknown variable factors involved when concocting such a scheme – these included: the parts of Germany to which British personnel would have access, the extent of inter-Allied co-operation, the extent of inter-departmental co-operation, and the way in which Germany would become accessible to investigators, whether by formal armistice, gradual military retreat or anarchic collapse. In short, the report ran, 'the final plan of action must be sufficiently elastic to adjust itself to these various possibilities'.[204]

Nonetheless, these uncertainties did not stop the report elucidating a very clear programme for exploitation which, though in its early stages, would later come to characterise the whole initiative, in a fairly unchanged format. Firstly, it proposed, Sealing and Holding (S.H.) Parties would proceed to specified technical targets 'when Germany becomes accessible in whole or in part and *immediately* military circumstances permit'. They would then, as their name suggested, secure the targets and defend them against counter-attack and sabotage for as long as necessary. These S.H. Parties would be almost exclusively military, though would have to include at least one technical officer for guidance,

[203] TNA, WO 219/1669, 19 September 1944.
[204] TNA, CAB 81/24, 'Joint Technical Warfare Committee', 25 April 1944.

and would get first priority on travel, moving against their targets swiftly and as simultaneously as possible, 'to prevent the news of the action spreading and the enemy taking "evasive action" in unoccupied establishments'.[205] They would also be responsible for 'seeing not only that nothing in the factory is disturbed, but also that the key personnel do not abscond from the neighbourhood'.[206]

The S.H. Parties would not operate in isolation; instead, they were to work in co-ordination with Investigation of Enemy Technique (I.E.T.) Groups. These would proceed, with a military escort, directly to the facilities secured by the S.H. Parties and conduct thorough examinations there. That was only one part of their role though. In response to concerns that 'German security is good and there may be important establishments we know nothing about', I.E.T. Groups would also proceed to, and establish themselves in, 'the administrative headquarters of the German R&D organisation'. From there, they could establish targets which had not been included in the preliminary plan and ensure that S.H. Parties were dispatched with haste to seal and hold these too. In order for this to work, it was considered that these I.E.T. Groups 'would have to be composed of very highly competent scientists and technicians'.[207] Although the eventual form that the exploitation programme took was a little less neat and dichotomous than this proposal, many of the features became central to its success, most notably the complementary use of both conventional military troops and civilian scientific experts, and the allowance that some of the most important finds would be so-called 'targets of opportunity'. It was clear that the officials responsible for planning and preparing for exploitation had done their job to the very best of their ability. Now all they could do was wait for the Allied armies to make sufficient headway on the continent to allow for the creation and dispatch of their proposed investigation teams.

Initial Deployment

Within a month of the Normandy landings, it was decided that 'much valuable information might be lost during operations in occupied and enemy territory unless special measures

[205] Ibid.
[206] TNA, FO 935/1, 1944.
[207] TNA, CAB 81/24, 25 April 1944.

were adopted to secure it'.[208] This concern, raised by SHAEF, fed directly into the creation of the proposed Sealing and Holding Parties, which were given the actual designation of 'Target Forces', and more commonly referred to as T-Forces. The Director of Naval Intelligence proudly noted that 'the Admiralty had been a pioneer amongst the Allies' as SHAEF were 'thinking in terms of a force of some two divisions trained and manned on lines similar to 30 Assault Unit'.[209] Though sometimes for the wrong reasons, 30AU had obviously caught the attention of a number of senior SHAEF planners and now provided a model for the training and technique of the new T-Forces. These new units were comprised of intelligence specialists, prisoner of war interrogators, linguists, engineers, bomb disposal experts and a bulk of combat personnel, and were attached to the 6th, 12th and 21st Army Groups.[210]

The prescribed role for the T-Forces, following on from the original designs for the S.H. Parties was to be primarily a military and logistical one. It was split into four parts, thus:

a. Moving in the immediate wake of the assaulting forces.
b. Locating and securing intact the targets concerned.
c. Preserving them from destruction, loot, robbery and, if necessary, counter attack until the completion of their examination by teams of experts or until the removal of the essential installations or documents.
d. In enemy territory, providing armed escorts for the expert investigators.[211]

For many regular soldiers, the troops of the T-Forces were a welcome sight, arriving to defend properties which were often some distance from the frontline, allowing the ordinary forces to move on to their next objective or to relax at the conclusion of a particularly tough advance. This is not to suggest that the work of T-Forces was easy or inactive. In reality, 'the highly mobile T-Forces ultimately had to cover the whole area of operations in the course of a few hectic weeks.' As such, they were subject to much of the same criticism as 30 Assault Unit, no doubt largely down to the fact that they were an unusual formation which did not

[208] TNA, FO 1031/49, 'History of T-Force', July 1944.
[209] TNA, ADM 223/500, '30 Assault Unit and 30 Commando: papers', July 1944.
[210] Gimbel, *Science, Technology, and Reparations*, 4.
[211] TNA, FO 1031/49, 1946.

conform to the same norms as the majority of regular fighting men, and were often referred to as a 'private army'.[212]

With the T-Forces surging forward and seizing all manner of targets, based on a haphazard set of priorities provided by a number of different agencies, and roughly co-ordinated by their headquarters division, it was now necessary to furnish the structure and manpower to facilitate proper investigations and to ensure that nothing of scientific and technical value was missed. On 12 June 1944, less than a week after D-Day, General Eisenhower cabled the Combined Chiefs of Staff, stating that:

> Need has arisen for an Anglo-American Inter-Service Organisation to deal with Anglo-American requirements for technical intelligence … [to] include such material, personnel and information of military importance, either of great value to the Allies for operational purposes, or constituting a dangerous potential threat in the future as to justify urgent action on the part of the Allies in seizing them.[213]

This organisation, which would have responsibility for drawing up lists of targets, arranging the dispatch of troops (primarily T-Forces) to seal and hold them, and of investigators to assess them, and of the dissemination of the resulting intelligence to all concerned parties, was the Combined Intelligence Priorities Committee (CIPC).

While 30AU had directly influenced the T-Forces, CIPC looked to Alsos for guidance on their own methods. The Combined Chiefs even suggested that Alsos provide the entire US representation on this new Committee, but SHAEF responded that their 'terms of reference are too narrow'.[214] Instead, the CIPC was made up of representatives from seven British and seven American departments – for the British these were the Foreign Office, the Ministries of Economic Warfare, Supply, and Aircraft Production, and the Intelligence sections of all three Armed Services; for the Americans: the State Department, the Foreign Economic Administration, the Office of Strategic Services, the OSRD and the three Forces' Intelligence divisions.[215] As this list of constituent agencies would suggest, the intelligence with which CIPC was concerned lay 'between normal technical intelligence obtained by

[212] Ibid.
[213] TNA, WO 193/432, 'Combined Intelligence Priorities Committee', 12 June 1944.
[214] Ibid., 17 June 1944.
[215] Gimbel, *Science, Technology, and Reparations*, 4.

established means during operations and intelligence of a clearly non-military nature. It thus includes political and economic items so long as they are of military importance.'[216]

CIPC, in this role, was remarkably short-lived. On 22 August 1944, all of its members and most of its responsibilities were migrated to the Combined Intelligence Objectives Sub-Committee (CIOS), which met fortnightly from that date until the dissolution of SHAEF, after the cessation of European hostilities, on 13 July 1945. It was chaired by the American Brigadier-General Thomas J. Betts, and had British Professor Reginald Patrick (R.P.) Linstead, an esteemed organic chemist then serving as deputy director of scientific research at the Ministry of Supply (and who would later go on to become dean of the Royal College of Science, and Rector of Imperial College, London) as its Deputy Chairman.[217] Linstead's involvement was indicative of the influence of experts on policy, even at such a senior and secretive level, which had proved to be a highly successful characteristic of Britain's war effort up to this point.[218] It is important to note that CIOS was, of itself, not an investigating agency and did not have a permanent staff of exploitation personnel of its own. Rather, its role was primarily a supervisory one – it was responsible for aiding its member agencies, co-ordinating and facilitating their efforts, and settling any disputes between them. In its own official retrospective report, published just two months after it ceased to exist, CIOS was described both as 'an instrument' and as the 'means whereby intelligence and information were pooled, and the burden of investigation shared'. As such, its Secretariat, crucial to serving these purposes, which began as just one British and one American officer, had expanded by the end of the war to a total of 25 officials and 58 enlisted and civilian stenographic personnel.[219]

The separation which existed between CIOS in London and the T-Forces in the field caused some issues. Despite the diverse make-up of the T-Force units, they were widely considered, perhaps a little unfairly, to be 'merely dumb soldiery' and therefore not properly equipped to assess the worth of any particular target, especially if it was seized by

[216] TNA, WO 193/432, 17 June 1944.
[217] A.G.M. Barrett and D.H.R. Barton, 'Linstead, Sir (Reginald) Patrick (1902–1966)', *Oxford Dictionary of National Biography* (Oxford: OUP, 2004) [accessed online 21 July 2015, http://www.oxforddnb.com/view/article/34549].
[218] Balmer, *Secrecy and Science*, 73.
[219] IWM, CIOS Report, 'The Intelligence Exploitation of Germany', 15 September 1945, 9-10.

opportunity and had not featured on the initial designated lists.[220] In response to this, the idea of 'CIOS Forward Observers' was mooted – they would not be experts in any one particular area but would be located forward in the field 'to ascertain the definite existence of CIOS targets, their physical condition, to reassess priorities, and to follow up all lines of investigation'.[221] C.H. Noton, of the Ministry of Economic Warfare, was particularly eager to see these reconnaissance officers deployed, as he feared that T-Force in 21 Army Group was being overstretched in the 'near area' of operations, and would thus have no men to spare to secure targets when important cities, such as Cologne, fell to the Allies; a 'misdistribution [which] would be caused entirely by the absence of advisers' who could inform the T-Force commander 'which CIOS targets should continue to be guarded pending the despatch of an investigating team from London'.[222]

The eventual form which this forward exploitation reconnaissance took, in provision for the expected sudden expansion in the number of targets available which would come when Germany's resilient Rhine defences finally collapsed, was that of the Consolidated Advance Field Teams (CAFTs). These attached 'a limited number of qualified specialists' to the advancing spearheads, with the following remit:

> As a target was seized, the CAFT assessors quickly appraised it and advised the combat commanders whether its importance merited the assignment of guard troops. Reports covering each target assessment were sent to the Rear to CAFT leaders at each Army Group, and by them through SHAEF channels to the Operations Section of the CIOS Secretariat. Targets meriting further investigation were exploited by specially qualified investigators dispatched by CIOS.[223]

It is important to remember that, although the process described here suggests a smooth collaborative effort, shared by the different agencies and teams to ensure that comprehensive exploitation was conducted, the reality was a little different. All this had to take place not just in wartime, with all its attendant disorder, but also incredibly close to the frontlines of a land offensive on a scale never before seen – no amount of careful preparation would ever have been sufficient. One American aerospace expert who was

[220] TNA, FO 1031/49, 1946.
[221] TNA, FO 935/25, 'Minutes of a CIOS Sub-Committee Meeting', 2 February 1945.
[222] TNA, FO 935/25, C.H. Noton to R.P. Linstead, 14 February 1945.
[223] IWM, CIOS Report, 'The Intelligence Exploitation of Germany', 15 September 1945, 24.

directly involved later recalled the 'confusion, chaos and mutual distrust' which characterised the 'teams composed of scientists, engineers, soldiers and sometimes fools' as they 'dashed competitively about … impounding documents, drawings, laboratory equipment, [and even] whole laboratories'.[224] CHAOS even became a somewhat critical nickname for CIOS.[225]

All the endeavours of all the exploitation organisations were guided by lists of targets. The entire initiative would have been completely unable to function without them. Included as targets were such things as industrial firms, factories, laboratories and research facilities, scientific and technical institutes, military installations, universities, and individual scientists and technicians, all of which the T-Forces were detailed to secure.[226] The targets of top-priority, those which were valuable 'for operational purposes, or constituting a dangerous potential threat in the future', featured on the so-called 'Black List'[227]. Devising this list, and making sure it was accompanied by sufficient information about the targets it contained, was arguably the greatest challenge faced by CIOS in this period.[228] Data for the Black List was 'provided by the Service Intelligence Directorates, MEW and anyone else, e.g. scientists of the Supply Ministries, who can help'.[229] In some cases, the requests filed by the relevant ministries or departments were not even for specific items but would instead be formulated in broad terms in the hope that CIOS teams might come across pertinent material while investigating other targets.[230] As investigations progressed, and more intelligence duly became available, the Black List was altered and updated to reflect this, especially as intensified Allied bombing and the encroaching Soviet advance on the Eastern Front meant that many important German scientific and technical facilities were relocated in great haste.[231]

To give some idea of scale, the Black List in circulation in August 1944 contained a total of 1,118 targets; of which 167 were considered 'Priority One', 271 were 'Priority Two'

[224] William R. Sears, 'Project Paperclip' book review, *Bulletin of the Atomic Scientists*, 28:6 (1972), 55.
[225] Henke, *Die amerikanische Besetzung Deutschlands*, 746.
[226] Gimbel, 'US Policy and German Scientists', 437.
[227] TNA, FO 942/79, 'Combined Intelligence Objectives Sub-committee', 30 May 1944.
[228] TNA, FO 1031/49, 1946.
[229] TNA, FO 1032/470, 'Minutes of a Meeting on CIOS Field Teams', 28 December 1944.
[230] Astrid M. Eckert, *The Struggle for the Files: The Western Allies and the Return of German Archives after the Second World War* (Cambridge: CUP, 2012), 31.
[231] TNA, FO 1032/475, 'Report of the Combined Intelligence Objectives Sub-committee for 1944', January 1945.

and 680 were 'Priority Three'. The total number were spread across all of northern and western Europe, with targets mentioned in Germany, France, Belgium, the Netherlands, Norway and Denmark. Over half of the total targets listed (658) were in Germany, while for Norway there were only nine. Furthermore, every target belonged to one of twenty-eight different categories, which ranged from obvious military concerns, like 'Directed or Controlled Missiles' and 'Chemical Warfare' to more general civilian subjects, such as 'Metallurgy' and 'Physical and Optical Instruments and Devices'; there were also separate designations for more miscellaneous groupings, including 'Documents and Personnel' and 'Instruments and Equipment'. These categories, and the careful separation of targets not only by country but also by sub-national location, were essential to ensure the right experts were allocated to investigate facilities which their knowledge and experience best-equipped them to assess.[232]

Despite the three priority levels within the Black List, it still only contained targets of direct and immediate importance. A separate Grey List was created to deal with the multiplicity of less pressing subjects and CIOS described it thus:

> The difference between Black List and Grey List targets is essentially one of military urgency. The interpretation of the word 'military' in the Grey List should be very wide and would include targets of a general economic, industrial, commercial or political interest, even if their purely military value were only secondary. [233]

Practically speaking, targets of economic interest alone were not considered to be important enough 'to justify the employment of armed forces solely on their behalf', and no T-Force protection was accorded them.[234] In terms of science and technology, the rough distinction between Black and Grey Lists was that the former concentrated interest more on 'end-products, e.g. a new tank, torpedo, or jet engine plane, and the power and limitations of that instrument' while the latter 'generally focused on industrial techniques, methods, "know-how"'.[235] This interest in items of indirect utility was not purely academic, it was noted from 'past experience' that 'the control of Libraries, as well as Archives, will be of great importance in order to break up the German Military Machine.' These libraries and

[232] TNA, FO 1050/1419, 'Combined Intelligence Objectives Sub-Committee (CIOS) black list', 18 August 1944.
[233] TNA, FO 1032/470, 'Minutes of a Meeting on CIOS Field Teams', 28 December 1944.
[234] TNA, FO 935/25, 30 January 1945.
[235] IWM, CIOS Report, 'The Intelligence Exploitation of Germany', 15 September 1945, 17.

archives included those of major Nazi governmental bodies, such as the Propaganda Ministry and the German Labour Front, as well as Wehrmacht, SS and SA headquarters.[236] Certainly, the broader remit of the Grey List meant that it had a much grander scale than the Black List – a CIOS report from 28 December 1944 predicted that the eventual number of Grey List targets might be as high as 10,000.[237]

An interesting case study of the distinction between the Grey and Black Lists, and the process involved in splitting targets between the two, is that of the German Patent Office. Victor Cavendish-Bentinck, chairman of the Joint Intelligence Committee (JIC), recommended to CIOS that the Patent Office be considered a Black List target. Linstead replied that he felt it was 'a very important long range target, but not one of urgent military importance'. He conceded however that its inclusion on the Black List would hinge on 'the likelihood of it containing secret military patents', as the British Patent Office did, and he agreed to look into it.[238] Just over two weeks later, Brigadier John G. Foster, the Chief of SHAEF's Legal Branch, received word from his Special Legal Unit that the German Patent Office did indeed handle secret military patents and, furthermore, that they were considered of such high value that, in Germany, 'disclosure of secret patents constitutes an act of treason'. As a result, the German Patent Office became a Black List target, albeit of the lowest priority.[239]

While the bulk of this planning was geared towards the exploitation of Germany, CIOS was keen to have investigators at work in the occupied countries, where plenty of research ordered by the Nazis had taken place. Even if nothing of particular utility could be unearthed there, it was still hoped that it would give a clearer idea of what the assessors would find once the borders of the Reich were breached, and thus a more accurate and detailed Black List could be devised. It was believed that France, Holland, Czechoslovakia, Norway, Denmark, Belgium and Luxembourg might all have sources of 'useful technical information related to the German war effort' to examine. British officials had no qualms about ruthlessly exploiting research conducted in countries which were ostensibly their

[236] TNA, FO 1050/1421, 'Combined Intelligence Objectives Sub-Committee grey list', 9 March 1945.
[237] TNA, FO 1032/470, 28 December 1944.
[238] TNA, FO 935/25, R.P. Linstead to Lt-Col. White, 13 November 1944.
[239] TNA, FO 935/25, A. Loewy to Brig. John G. Foster, 6 December 1944.

allies, and fellow members of the United Nations, whose governments were often in exile in Britain. Their proposed policy was that:

> The examination of establishments and records in these countries on their liberation should be carried out along the same general lines as those laid out for Germany. It is considered the Allies should take a firm stand in this on the grounds that all European research has been for the Germans and is therefore a legitimate prize of war.[240]

The term 'legitimate prize of war' was burdened with a considerable degree of significance in international law, and would later form part of the major debate about the legality of Allied exploitation programmes.[241]

The first CIOS-sponsored mission on the European continent was to Paris on 28 August 1944, a mere three days after the French capital had been liberated. From the outset the mission was beset by difficulties – eight individuals who were supposed to take part did not even show up at Northolt Air Field for the flight to Chartres, near Paris, delaying it by over an hour. Of the 52 specialists who did attend, several had not been properly briefed and 'many individuals did not know why they were going to Paris'. Upon arrival, the transport provisions from Chartres Airport to Paris, and within the city itself, were described as 'inadequate'. When the investigators needed to contact their parent agencies in Britain, communication was difficult, and it took over five hours before contact was established with them all. Despite these numerous shortcomings, CIOS remained optimistic, summarising that 'on the whole it appears that the mission was successful'. After all, this was to be the first of many such missions, and not only had 'much valuable information … been obtained' but in addition, 'the lessons learned by everyone concerned in the Paris operation should go far to making subsequent operations more efficient'.[242]

The first report to emerge as a result of the Paris mission was on 'Radar and Guided Missiles', and particularly German research and development in this field. To this end, the investigators had decided to 'confer with engineers of the French Radio Companies and to inspect the work they had done for the Germans to attempt to learn the information they and their companies had gleaned from the Germans in either direct or indirect association'.

[240] TNA, CAB 81/24, 25 April 1944.
[241] See Chapter Six below.
[242] TNA, FO 935/25 'Progress Report Paris Field Teams', 6 September 1944.

This proved to be a fairly successful method although the assessors did encounter difficulties with 'companies which preferred not to reveal their own research', as, despite bold statements about seizing the 'legitimate prizes of war' from all quarters, they did not possess the authority to compel French enterprises to share their work with British or American investigators.[243]

The Paris operations were swiftly followed up by further CIOS investigations in Brussels, Eindhoven, Vlissingen and Strasbourg as soon as these target areas were occupied by Allied armies. Eindhoven was visited by a previously-selected field team within 24 hours of its occupation.[244] In the case of Strasbourg, a large city which had multiple targets of interest, CIOS formed an experimental 'Intelligence Assault Force' to carry out the most efficient exploitation, reflecting the flexibility of the scheme and the pressure the agencies were under to act effectively in a fairly small time window.[245] In addition, CIOS also made early perfunctory excursions into Germany; at Aachen, which was the first German city to come under Allied control on 21 October 1944, and at nearby Stolberg.[246] Unsurprisingly, one of the main concerns of the CIOS teams at this stage, while the terrifying V-weapons were still striking targets in Britain and elsewhere, with steadily increasing accuracy, was to stop these attacks and learn more about the advanced rocketry involved at the same time. In early November, CIOS investigator Lieutenant-Colonel Greatbatch travelled to Holland and, near Eindhoven, met with a Dutch Resistance fighter who had supposedly witnessed some V-2 launches in the area. His account suggested that the launches could be made non-vertically from ordinary roadways, but were very costly in German lives, estimating that 'on average, one man of the crew died from severe burns for each launching that took place'. He also passed on a rumour, never verified before or since, that some of the V-2 warheads were filled with anthrax.[247] This is just one example of the degree of uncertainty and conjecture on which CIOS teams had to often rely during their work.

[243] Churchill Archives Centre, Metals Society, METL.2, CIOS Report I-1, September 1944.
[244] TNA, FO 1032/470, 28 December 1944.
[245] TNA, WO 219/1987, 'Field Information Agency, Technical : reports on T Force operations and activities', 24 January 1945.
[246] IWM, CIOS Report, 'The Intelligence Exploitation of Germany', 15 September 1945, 22.
[247] Churchill Archives Centre, Metals Society, METL.2, CIOS Report X-13, 1 November 1944; see also Schmidt and Fox, 'Deadly Gases'.

This was by no means the only difficulty which the exploitation initiative faced during its early phases of operation. Despite the best intentions of the co-ordinators in London, there was still considerable distance between the straightforward soldiers of the T-Forces and the scientific and technical experts sent in by CIOS. The CAFT system meant that 'large numbers of specialists … were able virtually to remain at their desks and drawing boards until required for a specific task' which, though it was more efficient, meant that many arrived in the field 'expecting apparently not only a chain of hotels in which to live, but also unlimited supplies of transport, clerical facilities, interpreters and the like'.[248] Instead, the best they could hope for was 'rough and ready' investigators' messes and load-carrying vehicles, and even these were hardly easy to come by. The CIOS assessors' complaints about everything from comfort to cleanliness did not often sit well with the fighting men of the T-Forces, many of whom had been directly involved in D-Day and the subsequent fierce combat across western Europe.[249]

This was by no means a one-sided story though. The civilian investigators were not always simply unused to 'war at the sharp end', but genuinely did suffer in ways which not only made them very uncomfortable but also prevented them from doing their job effectively. In December 1944, Arthur R. Stella, an investigator working on mainland Europe for the Economic Advisory Branch (EAB) wrote to C.H. Noton – the Ministry of Economic Warfare's representative on CIOS – enclosing a report which he had entitled 'Comments on difficulties experienced as a civilian investigating targets in or near the battle zones'. He detailed how, as a civilian, he was given none of the appropriate battlefield clothing, none of the relevant medical inoculations, no financial aid, and no means to purchase small comforts, such as cigarettes, biscuits or sweets. In addition, his lack of rank and full military apparel meant that he was often denied access to crucial targets of interest. This resulted in him having to borrow equipment and supplies from his military companions, having to 'depend on the kindness of other members of the team for small comforts' and he even admitted to assuming 'fictitious army ranks in certain cases'. Though it is perhaps hard to feel too much sympathy for Mr Stella, who cannot truly have expected too many comforts so close to the frontline, it is worth noting that his civilian status actually hindered the

[248] TNA, FO 1031/49, 1946.
[249] Longden, *T-Force*, 88.

progress of exploitation. Stella concluded his report by recommending that no other EAB member 'be sent to the forward areas without being fully provided with all the requisites which, from the above, appear to be indispensable for the successful carrying out of duties in the conditions referred to'.[250]

The T-Forces caused their own problems too, though in a very different way. With attitudes altered by the privations of the front, and tasked with a certain degree of officially licensed 'plunder', it is unsurprising that they participated in a bit of looting of their own. The T-Force troops were not alone in this; theft on varying scales was perpetrated by soldiers in every battalion of every army in the field at some point – though unlike the vengeful criminality of the Red Army troops, whose country had suffered severely from Nazi Germany's 'war of annihilation', British soldiers did it with the childlike mischief of a school bully, taking what they wanted but rarely resorting to any serious physical violence.[251] Nonetheless, it created a slightly different problem when exploitation forces were involved as their indiscriminate personal plunder threatened to shatter the already fragile legitimacy of the initiative as a whole. A directive issued to 30AU in late 1944 showed the position the authorities were forced to take on the matter; it stated that 'anything belonging to the enemy can be taken provided that it can be utilised for the good of the unit … "Findings are keepings" but searching for something of personal value is looting.'[252]

Logistics also provided a major difficulty for the planners of exploitation. Moving such a considerable quantity of men from Britain to targets near the frontline, when transport was so direly needed by pretty much every other element of the armed forces was a particular challenge. This situation was grossly exacerbated by the actions of the agencies and investigators themselves, who all too regularly changed plans and travel details after the necessary Army Group approval had been obtained. Complaints were raised that these last-minute alterations were 'seriously jeopardising the co-operation being shown by both Air Transport Companies and CATOR [Combined Air Transport Operations Room]', especially when the inclusion of CIOS investigators often resulted in the removal of lower-priority

[250] TNA, FO 935/25, 'Comments on difficulties experienced as a civilian investigating targets in or near the battle zones', 13 December 1944.
[251] Seth A. Givens, 'Liberating the Germans: The US Army and Looting in Germany during the Second World War', *War in History*, 21 (2013), 46.
[252] TNA, ADM 223/500, December 1944.

passengers on these transports. This in turn led to fears that it would become very difficult to 'retain the co-operation of the Transport Companies in genuinely urgent cases where additional investigators must be booked'.[253] Furthermore, another set of resources which were almost in as high demand as transport were interpreters. German-speakers, ideally technically trained, were an essential part of the exploitation process, but they were few and far between and in many cases improvisation was necessary, such as drafting in the T-Force transport personnel who could often speak German.[254] However, as more and more targets needed investigation, CIOS had to start looking to the civilian population at home, where they hoped to find 'a number of older German-speaking personnel who would be unfit for any form of military service but who would be suitable for interpreting work under static conditions and could hence accompany the investigators'.[255]

One problem which the exploitation planning staff had anticipated but which did not materialise to the expected extent for the men on the ground was German efforts to impede Allied investigations. T-Force reported that 'in no place were [files] found intentionally disarranged or concealed', though there was some evidence of attempts to burn documents, or transport them to secret locations.[256] A report on T-Force activity with the 2nd British Army commented that 'the principal damage was done by displaced persons in various states of inebriation, with our own troops running a bad second' and that these proved to be 'a far greater menace to the security of targets than any attempt on the part of the enemy to destroy their contents'. In fact, the report concluded, the careless destruction of material by these groups 'was to a large extent nullified by the whole-hearted co-operation of German directors and scientists and by the skill of interrogators'.[257] These individuals could obviously see that the end of the war was coming and were shrewd and pragmatic enough to do what they could to appear co-operative to the imminent victors.

In fact, the French often threw up more obstacles to CIOS operations in France than the Germans did to those taking place in Germany. Wing-Commander T. Jackson of the Overseas Aircraft Control wrote to Air Commodore C.M. Grierson, SHAEF's Assistant Chief of

[253] TNA, WO 219/1986, Maj. E.D. Magnus to Brig. R.J. Maunsell, 10 April 1945.
[254] Ulf Schmidt, *Justice at Nuremberg: Leo Alexander and the Nazi Doctors' Trial* (Basingstoke: Palgrave Macmillan, 2004), 76.
[255] TNA, WO 219/1986, 'Field Information Agency, Technical : T Force organisation', 3 March 1945.
[256] TNA, WO 219/1630A, 'T-Force Planning', 7 April 1945.
[257] TNA, FO 1031/49, 1946.

Air Staff, recounting the story of a CIOS party which arrived in France to investigate aircraft factories. Jackson took the captain heading this party to the French Air Ministry to get clearance, and once there:

> he caused a certain amount of alarm and despondency by suddenly announcing that MAP [Ministry of Aircraft Production] had instructed him not to confine himself to the collection of intelligence concerning the enemy, but also to study French production, and interrogate personnel in French factories regarding types of aircraft now being produced by the French for the French.[258]

The French were then understandably reluctant to grant any permission for such investigations, and this was far from an isolated incident. Reports stated that many CIOS field teams had been stranded in Paris, unable to secure clearance to visit any of their targets within France. Moreover, it was believed that French manufacturers had received formal instructions to release no information to foreign military, naval or civilian personnel without specific authority from the French government. The only hope for a thawing of relations was considered to be 'if proper machinery and contacts are established and further that an element of reciprocity exists'.[259] If the French were allowed to learn from the British and Americans, then perhaps they would be more willing to share their own secrets.

French reticence was not the only cause of strained relations between exploitation personnel and the people of recently-liberated countries. CIOS operatives' often close contact with the local populace meant they were sometimes treated as reliable channels of information on Allied conduct of the war, especially when the targets under investigation were located particularly close to the frontline. In November 1944, three CIOS officers who had been investigating a V-weapon launching site near Watten, in the Pas-de-Calais, left the area and word got out to the local people that their departure was due to the fact that the USAAF was set to bomb the site imminently. The officers were chastised for creating 'alarm and despondency' in the area and were told to 'refrain from making such depressing

[258] TNA, WO 219/1987, Wg Cdr T. Jackson to Air Cdre C.M. Grierson, 21 December 1944.
[259] TNA, WO 219/1986, Flt-Lt. S.M. Harris to Brig-Gen. T.J. Betts, 26 December 1944.

forecasts' in future, thus highlighting the delicate nature of interactions between exploitation operatives and local residents.[260]

Despite not coming into existence until the end of August, and having to operate while the war was still raging, CIOS achieved a considerable amount during 1944. It dispatched 197 investigators from all fourteen of its constituent departments across Europe, to examine 115 Black List items and many more targets of opportunity. No casualties were suffered at all during this period.[261] Of course, CIOS was aided throughout by the logistical capabilities of the T-Forces, without whom it was assumed 'a great amount of invaluable information would irretrievably have been lost'.[262] The product of this first wave of exploitation was that 211 reports were filed with the CIOS Secretariat; reports which were then available to all concerned parties. In fact, dissemination of the reports had to be increased on account of greater interest 'arising from the circulation of the lists of titles'. In concluding the final report on CIOS activity in 1944, the British Deputy Chairman, R.P. Linstead, commented that exploitation was 'essential' if information was to be obtained on 'new weapons which may imperil the future security of the United Nations, and on new technical discoveries which may assist in our own developments'.[263]

Looking to the future, Linstead went on to say that 'the results of the hard work in planning and exploitation are now becoming apparent and the record to date promises well for the future investigations in Germany proper.'[264] All attention within CIOS, T-Forces and the numerous other bodies concerned with exploitation was now focused in this direction. Their investigations in the occupied countries and the few brief incursions across the crumbling borders of the Reich had been impressive in their own right, but had also most definitely whetted appetites for the spoils of Nazi science and technology which would be accessible as sizeable amounts of German territory fell into Allied hands, undoubtedly containing countless laboratories, factories, and research establishments. The exploitation officials did not have long to wait.

[260] TNA, FO 935/25, 10 November 1944.
[261] TNA, FO 1032/475, January 1945.
[262] TNA, FO 1031/49, 1946.
[263] TNA, FO 1032/475, January 1945.
[264] Ibid.

Into the Reich

In the first few months of 1945, Western Allied forces began to seriously threaten, and then broke through, the German defences along the Rhine. By late March and early April, British, American, Canadian, French and Polish troops (among others) began pouring across the border of the Reich and surging eastwards. The Germany that they encountered was a land of desolation: cities bombed to rubble, a population living without adequate access to food, power or shelter, and death in abundance.[265] The Wehrmacht, by now well aware that victory or even an agreeable stalemate were out of the question, fought on regardless, fighting a war without real strategic considerations, but simply for its own sake, obeying the orders of a crumbling but still dangerous regime.[266] While the primary consideration of the Allied forces was obviously to bring the war to a swift end, and secure a satisfactory peace in Europe, the exploitation initiative was not neglected. Rather, it too, like the war effort, was increased as the vast scientific, technological and industrial spoils of Germany became more accessible.

The T-Forces moved ahead with, and occasionally in front of, the main combat troops and seized targets on the Black List, as they had done in the campaign across France and the other occupied countries. CIOS teams were rapidly dispatched to investigate these targets, usually only a very short time after the fighting had ended. This was certainly true of Cologne, where investigators were already at work on the American-occupied left bank of the Rhine by late March 1945, while districts on the right bank remained in German hands until the middle of April. Lieutenant-Commander John N. Bradley of the Royal Naval Volunteer Reserve (RNVR), who was deployed on investigations in Cologne and the surrounding area, wrote home to his wife Margaret on 23 March, and recounted the precarious nature of his situation. He described how it had been impossible to secure a guard from the Americans for the works they were visiting, so they had had to act as guards themselves. Fortunately, he also noted how obliging the local German people were, who would 'literally do anything you want, including putting up beds for us in the works manager's office'.[267]

[265] See Bessel, *Germany 1945*; Graham-Dixon, *Allied Occupation of Germany*; Kershaw, *The End*.
[266] Bessel, *Germany 1945*, 12.
[267] IWM, 10/7/1, Lt-Cdr John Bradley to Margaret Bradley, 23 March 1945.

Bradley also described the entry into Lübeck, following a rapid advance, and noted that 'never have I seen such chaotic and fantastic scenes'. He was among the first Allied troops to enter Kiel, an accolade that has been claimed variously by 30AU, T-Force and the SAS, and it was to the latter that Bradley was attached. Despite these exciting and daring exploits, which Bradley related home with a mixture of relish and discontent, he soon found that 'my sphere of usefulness was over now that the ranking experts had arrived. I seemed to be doing the duties of a liaison officer and general runabout.' As soon as important sites were secured, as Bradley quickly learned, it was a matter of great urgency to get the appropriate experts involved.[268]

Of course during these final months and weeks of the war, one of the targets of greatest importance was Berlin. Although many of the key scientific and industrial facilities had been evacuated out of the capital, either as a result of bombing or out of fear of Soviet capture, all the Allies were convinced that the heart of the Nazi regime would still contain some of the greatest spoils of war.[269] T-Force preparations for the assault on Berlin began in the summer of 1944 when an airlift of 119 specialist officers, to arrive on the day the city fell to the Allies, was deemed adequate. This even allowed for the inclusion of three 'specialist police officers' who were to be responsible for restructuring the German *Kriminalpolizei* and gathering its intelligence on international criminals, as well as the exploitation of 'all technical and scientific aids for the prevention and detection of crime'.[270] By November, expectations had drastically increased – it was estimated that, in order to 'co-ordinate, seize and hold targets of OI [operational intelligence], CI [counter-intelligence], Censorship, Signals and CIOS within a 30 mile radius of Berlin so that they may be exploited by specialists', the Berlin T-Force would need to number 'a minimum of one infantry regiment plus two battalions, a battalion of engineers, a military police company and signal troops'.[271]

In January 1945, plans had reached an even more advanced stage of development. Conventional military personnel would not be sufficient, it was felt, and special teams were thus deemed necessary. The form that these teams would take was laid down as follows:

[268] Ibid.
[269] Tony Le Tissier, *Race for the Reichstag: The 1945 Battle for Berlin* (London: Frank Cass, 1999).
[270] TNA, WO 219/1986, 'Field Information Agency, Technical : T Force organisation', 11 September 1944.
[271] TNA, WO 219/1630A, 'T-Force Planning', 7 November 1944.

> 8 Microfilm Teams, 8 Document Teams, 5 Interpreter Teams, 4 Interrogation Teams, 1 Safe Breaker Team, 4 individual females to search females held at Detention Centre, and 30 individual guides who speak German and are familiar with the city. These Special teams and individuals will comprise approximately 40 officers and 160 other ranks.[272]

In addition to this, it was decided that some 500 'attached specialists will be provided by various interested intelligence agencies when needed. Some will accompany T-Force into the city; others will arrive later.' In all, the picture that emerges is one of a carefully-planned operation on a vast scale, and all this was borne on the assumption that T-Force troops would 'be used to seize and hold only *intelligence* targets, of which there are more than 1,300 now listed'.[273] However, the Soviet seizure of Berlin on 2 May 1945, after a period of vicious fighting, meant that these plans were made in vain and no exploitation airlift into the capital ever took place.[274]

Less than a week after Berlin had fallen, the war in Europe ended. On 8 May 1945, representatives of the four main Allies (Britain, USA, Soviet Union and France) and representatives of the three parts of the German armed forces (Army, Navy and Luftwaffe) signed a document of capitulation and brought hostilities to a conclusion.[275] At the Yalta Conference, held in Crimea in February 1945, Churchill, Stalin and Roosevelt had agreed on the division of a conquered Germany into three roughly equal zones (a fourth zone, allocated to the French, was later carved from the American zone).[276] At the end of the war, the armies of the Western Allies had advanced further east than these prearranged zonal boundaries and it was July before this territory was duly ceded to the Soviets and all the Allies took formal control of their respective zones. As such, between April/May and July, particularly high priority was often accorded to exploitation of those targets in parts of Germany which had been occupied by British or American forces but which were very soon to be handed over to Soviet control, such as Saxony and Thuringia.[277] From July onwards, when the theoretical divisions became official borders, the politics of mutual access for

[272] TNA, WO 219/1986, 14 January 1945.
[273] Ibid. Emphasis in the original.
[274] Antony Beevor, *Berlin: The Downfall 1945* (London: Penguin, 2003).
[275] Bessel, *Germany 1945*, 131.
[276] Anne Deighton, *The Impossible Peace: Britain, the Division of Germany and the Origins of the Cold War* (Oxford: Clarendon, 1990), 5.
[277] Gimbel, 'US Policy and German Scientists', 437.

foreign investigation teams to each zone added a new and complex dimension to exploitation which would persist throughout the period.[278]

Once the war had ended, it became clear that the exploitation activities conducted in the formerly Nazi-occupied territories had been a mere prelude. The German authorities had been reluctant to relocate many sites of scientific or technological significance outside of Germany so the majority of important targets remained within the borders of the Reich. Even once these borders had been crossed by the Allies, accessing these targets had not always been easy while conflict continued, but in peacetime access and investigation swiftly became more viable. In addition, once the war was over, military targets no longer had such an exclusively high priority and interest grew in industrial and economic targets. This created issues for the current system of co-ordination, handled by Special Sections Sub-Division of G-2 SHAEF, which had been in place since the first Allied landings in Europe, but which was not sufficiently equipped to handle this sharply increased demand for exploitation.

As a result, it was decided that a more powerful organization than Special Sections Sub-Division was needed, and that this new body 'should have a technical staff and include a reference library and card-index of all relevant reports and enemy documents'. On 31 May 1945, therefore, a SHAEF Directive formally established the Field Information Agency, Technical (FIAT) – a combined Anglo-American effort under the auspices of G-2 SHAEF and the command of British Brigadier R.J. Maunsell.[279] FIAT would become a central part of the exploitation machinery for almost its entire post-war duration.[280] Although it would later be split into separate, but complementary, British and American elements, it continued to serve as a guiding force throughout. Its stated purpose, in broad terms, was 'to provide for the seizure, freezing and exploitation of intelligence targets of scientific, technological and economic interest in enemy territory, to deal with which was outside the interest and beyond the competence of the troops and staffs of field formations'.[281]

[278] See Chapter Five below.
[279] TNA, FO 936/39, Lt-Gen. Ronald Weeks to HQ, 21 Army, 13 August 1945.
[280] John Gimbel, 'Science, Technology & Reparations in Postwar Germany', in Jeffrey Diefendorf, Axel Frohn and Hermann-Josef Rupieper (eds.), *American Policy and the Reconstruction of West Germany, 1945-55* (Cambridge: CUP, 1993), 178.
[281] TNA, FO 1032/1459, 'Field Information Agency, Technical', 23 August 1945.

Such a brief summary does not really reveal the true complexities of FIAT's role which serve to reflect the curiously convoluted and diverse nature of the exploitation programme, especially once it truly got off the ground. A central part of the FIAT mission statement was that 'it does not itself undertake intelligence investigations, but merely provides reference and administrative facilities for those who do undertake them.' It comprised six branches: Scientific and Technological, Industrial, Economic and Financial, Naval, Army, and Air, and there was also an Integration and Planning Branch which 'knits together the operations of the six technical branches, is responsible for the general co-ordination of technical operations and the allocation of technical priorities'. In order to fulfil these multiple functions, FIAT was outfitted with an Interpreters Pool, a Publications Branch (for printing and disseminating reports), a Records Branch (to keep records of all FIAT operations), an Enemy Documents Branch, an Administration Branch and a Control Branch (which handled transportation, movement of supplies and obtaining necessary clearances).[282]

At a meeting of CIOS in early June, deputy chairman R.P. Linstead commented that FIAT 'was designed to strengthen rather than in any way to disturb the existing CIOS machinery for obtaining intelligence'.[283] Certainly, with the FIAT structure in place, it was possible for CIOS to begin exploitation in earnest. In January 1945, during a typical fortnight, CIOS despatched fewer than a dozen investigators; by the end of May, a typical fortnight saw the despatch of more than 250. This was in addition to the 240 CAFT assessors who had been in the field continuously since late March. The 'CIOS Progress Report for 1945' noted that the investigations had borne a 'rich harvest', with results which were 'indeed better than those who planned the operations had dared to hope'. The report went on to assert that the role of CIOS had been twofold: 'to get technical experts to the most important places, and to get them there quickly'. CIOS had successfully achieved both of these aims and had they not, it was suggested, 'much priceless material would have gone underground, never to become available again'.[284]

[282] TNA, FO 1065/12, 'Proposed New Establishment of Field Information Agency Technical', 23 August 1945.
[283] TNA, FO 1031/50, 'Minutes of 21st CIOS Meeting', 6 June 1945.
[284] TNA, FO 1031/51, 'CIOS Progress Report for 1945', 4 June 1945.

However, irrespective of how successful CIOS had been in its eleven months of operation, it could not realistically be expected to last indefinitely. It was, after all, a product of the distinctly Anglo-American character of SHAEF and now that the war was over, it seemed likely that SHAEF would be dissolved and that CIOS would have to follow suit. The full programme of exploitation had barely begun so there was no doubt that some new organisation would need to take its place. Even as early as April, while the war was still being fought, the demise of SHAEF could be imagined and discussions about how exploitation would continue were conducted. The central proposal was that 'each controlling power will handle intelligence objectives in its own zone' and that they would each 'afford facilities for representatives from the other controlling powers to visit these objectives'.[285] Though this notion was couched in fairly generic terms, it did indeed form the basis for the future of exploitation in the post-war period.

Having served its purpose in co-ordinating the Allied military offensive on the western front in the European theatre, SHAEF was due to cease existence on 13 July 1945. Brigadier-General T.J. Betts, the chairman of CIOS commented that 'this would affect CIOS in the sense that CIOS had been created to work with SHAEF and would raise the question of the continuation of CIOS after SHAEF. He felt that it was most desirable that CIOS should continue in the post-SHAEF phase.' On 22 June, Field Marshal Bernard Montgomery, Commander-in-Chief of the British Army of the Rhine (BAOR; the British occupying force in Germany) received a telegram from the Combined Chiefs of Staff informing him that CIOS would be terminated along with SHAEF, and that in order 'to provide interim arrangement for continuing exploitation of intelligence targets … you authorise the US investigators to visit targets in your zone and that you exchange intelligence procured from such targets with the commander of US zone'.[286]

No such interim arrangement was ever necessary because by the time SHAEF and CIOS were terminated, new organisations were already in place and prepared to shoulder the burden of exploitation. In fact, on 18 July 1945, only five days after SHAEF had been liquidated, Squadron Leader S.M. Harris, acting secretary of the Joint Intelligence Sub-Committee wrote to all British members of CIOS and informed them that 'the functions of

[285] TNA, FO 1032/475, 'Organisation and Functions of CIOS', 13 April 1945.
[286] TNA, FO 1031/51, Chiefs of Staff to Field Marshal Montgomery, 22 June 1945.

CIOS, so far as the British interests are concerned, shall be continued by the British portion of the CIOS organisation under the title of British Intelligence Objectives Sub-Committee (BIOS).'[287] It was a remarkably smooth, and primarily administrative, changeover and marked the transition from a period of joint Anglo-American exploitation to unilateral, national programmes, the relationship between which would vary between extremes of co-operation and competition.[288] A month and a half later, having only been in existence for three months in total, FIAT also split into two components; one American and one British.

CIOS may have ceased to operate as a central body, but investigators sent out under its auspices continued their work throughout the summer of 1945. Its final report, printed in September in the form of a book entitled *The Intelligence Exploitation of Germany*, noted that CIOS had despatched a total of 2,197 personnel, of whom 1,876 were investigators and 321 were CAFT assessors.[289] In the course of their investigations, these experts visited 3,377 different individual targets and filed 58 final reports.[290] These figures are impressive in their own right, but even more so when considered in context – prior to CIOS, 'no planned and coordinated exploitation of enemy technical intelligence had ever been attempted'; in addition, CIOS only operated for eleven months and for nine of those, the war with Germany was ongoing. Brigadier-General Betts and Professor Linstead wrote in their foreword to this report that 'the value of the scientific knowledge and "know-how" thus obtained cannot now be fully measured' but 'the benefits of this knowledge to British and US industry will be measured in terms of economic progress and well-being for many years to come.'[291]

As we have seen, the roots of the exploitation initiative were firmly entrenched in the Second World War, and were nurtured both by the growing prominence of science within the strategic considerations of British military planners and by the changing nature of intelligence, which became increasingly preoccupied with the contents of foreign arsenals,

[287] TNA, FO 1032/177, S/Ldr. S.M. Harris to British members of CIOS, 18 July 1945.
[288] See Chapter Five below.
[289] IWM, CIOS Report, 'The Intelligence Exploitation of Germany', 15 September 1945.
[290] Paul Maddrell, 'British-American Scientific Intelligence Collaboration during the Occupation of Germany', *Intelligence and National Security,* 15-2 (2008), 79.
[291] IWM, CIOS Report, 'The Intelligence Exploitation of Germany', 15 September 1945.

especially those of potentially hostile nations. From these influential but initially inauspicious beginnings, and guided by the experiences of its first iterations – 30 Assault Unit and Alsos – the programme grew rapidly and underwent a remarkable transformation throughout the last year of the war. Gone was the dominance of these small agencies, operating under military authority and racing from target to target in a desperate pursuit of the next piece of valuable technical intelligence, with their main aim being to facilitate a swifter and safer end to the war against Germany. Their place had been taken by much larger and more interconnected organisations, with control and oversight in the hands of the civil service as opposed to military authorities, and thus subject to a greater number of regulations but also with access to a much larger pool of resources, including investigators drawn from very useful non-military backgrounds. Those responsible for this new phase of exploitation were not just looking towards the end of the war, but looking beyond it, and trying to find ways not to curtail their operations at the point of Germany's unconditional surrender, but to expand them.

This transitional period was also one of growth, both in terms of the scale of the endeavour and its objectives and in terms of the machinery necessary to execute it. It was during the last months of the war that T-Force began operating, and in so doing developed a skill set and strategic approach which would continue to facilitate the smooth running of exploitation missions throughout the post-war period, as well as providing an outline eagerly adopted by FIAT upon its inception in May 1945. CIOS too were able to formulate a methodology which proved effective and would also persist after the war's end – it was no accident that BIOS appeared to be almost a carbon copy of its predecessor, excepting its exclusively British membership. Valuable though the operations in the formerly Nazi-occupied territories undoubtedly were, it would be fair to surmise that the experience gained once the borders of the Reich were breached was especially instructive. Once the officials and investigators were able to visit facilities on German soil and speak to German staff, they were not only able to ascertain quite how rich and tantalising the scientific and technical spoils on offer were, but they were also able to refine the strategy to best exploit them. Overall, while exploitation was indubitably a product of the Second World War as a whole, counting the Bruneval Raid of 1942 and Alsos actions in Italy in 1943 among its antecedents, it was during the final year of the war, from D-Day to VE-Day, that it really

came of age and showed its true potential – had it failed to do this by May 1945, there is a good chance that post-war exploitation proper would have failed to materialise. In short, the successes of the exploitation initiative during this crucial period, as evidenced by the CIOS statistics mentioned above, augured well for the next phase, which could take place with the benefit of experience, on a grander scale, and in the immensely preferable conditions of peacetime.

PART II

Exploitation under Occupation

CHAPTER THREE
Exploitation in Earnest

With the war over, the character of exploitation changed substantially. Speed was no longer of the essence to the extent which it had been before. The risk of targets being damaged by fighting or bombing, or sabotaged by Nazis, was greatly diminished, and even the potential for valuable material to be destroyed or removed by displaced persons or over-zealous Allied troops was gradually being lessened. Some semblance of order was being imposed by the occupying powers on Germany and this allowed exploitation to expand and become more thorough.[292] With no risk of stumbling into open combat, the investigators could now be selected from a much wider pool – they did not need to have any military connection, and civilian experts were now drawn wholesale from private industry and elsewhere. This of course necessitated a change in the exploitation machinery too: 30 Assault Unit, for instance, had been well suited to daring raids and frontline activity, but their gung-ho *modus operandi* was deemed 'hardly suitable for taking a team of middle-aged metallurgists across the plains of northern Germany'.[293] The same was true of T-Force, which had been the forward combat echelon of the exploitation initiative during the war, but now began evolving into a logistics provider for the increasing numbers of investigators who were travelling from Britain to Germany.[294]

This greater volume of exploitation agents raised its own set of problems. It was not feasible that all these operatives, many of whom had different but overlapping remits, would be able to work in harmony. The sheer value of the scientific and technical spoils which were on offer in Germany at the end of the war meant that fierce competition was to be expected. In addition, exploitation was not the only mission for British and Allied occupation forces; the exploitation teams were joined in the field by a plethora of other investigators – those looking into Nazi war crimes, the extent of bombing damage, or the salvage of Europe's cultural and documentary treasures, to name just three. To fully understand exploitation, and particularly to appreciate the importance afforded it, viewing

[292] Bessel, *Germany 1945*, 169-70.
[293] Longden, *T-Force*, 95.
[294] TNA, FO 1032/177, 'Notes for Investigators in the British Zone', 5 September 1945.

its internal and external relationships is essential. In addition, it is also of great value to study the spoils which the exploitation teams were able to secure: what forms these took and which subjects they pertained to. Two of these subjects – chemical warfare and rocketry – were considered especially significant by the agents in the field, and thus warrant particular examination here. It is, therefore, the purpose of this chapter to study how exploitation was conducted in its most comprehensive phase; the months and years immediately following the capitulation, when Germany lay at the mercy of its Allied occupiers.

The British Programme

One of the first concerted exploitation efforts launched by the British after the end of the war was the Fedden Mission. Named for its leader, the eminent aircraft engineer Roy Fedden, this enterprise was established by the Ministry of Aircraft Production (MAP) and travelled to Germany on 12 June 1945 for three weeks. It was tasked with investigating various aeronautical topics, including fuel injection, ignition for aero-engines, gas turbines, jet engines, and variable pitch propellers, as well as scouring 'universities, research departments and engineering works in Germany … to earmark plant, equipment, books, instruments etc., suitable for the new College of Aeronautics which is now being set up in England'. Travelling through the ruins of Germany, the members of the Mission often found themselves without accommodation, telephone connections, or proper food, coming to rely very heavily on American K-rations, but they were impressed by the whole-hearted co-operation of most of the German scientists and technicians whom they interviewed and by the 'superabundance and extravagance of the instruments and subsidiary tools and checking equipment to be found at every factory and laboratory'.[295] The conclusion of the Fedden Mission's final report stated that its members were 'greatly interested with what they saw in Germany' and that they felt 'British industry will be well advised to learn all the lessons possible from German experience and research work', recommending both further

[295] TNA, AVIA 9/83, 'The Fedden Mission to Germany', 4 July 1945.

interrogation of the relevant experts (though in Germany, alongside their materials, and not in Britain) and the evacuation of the more elaborate research equipment.[296]

Despite its substantial successes, in many ways the Fedden Mission represented the last vestige of the opportunist, cavalier approach to exploitation, as the emphasis shifted from enterprising field-based units to the more considered work of committees back in Britain. Foremost among these in the post-war era was the newly-formed British Intelligence Objectives Sub-Committee, based in the same office in Bryanston Square, London, as its predecessor CIOS, and initially chaired by CIOS deputy chairman, Professor R.P. Linstead. In addition, it retained the same basic composition as the British half of CIOS, but also expanded it somewhat, so that it was made up of representatives from 'the Admiralty, the War Office, the Air Ministry, the Foreign Office, the Ministry of Supply, the Ministry of Aircraft Production, the Board of Trade, the Ministry of Fuel and Power, the Department for Scientific and Industrial Research and the Government of the Dominion of Canada'.[297]

The primary remit of BIOS was to handle 'all requests of British Government departments for intelligence of military, political, industrial or economic significance which may be available in Germany and in European Countries lately under German occupation', compile target lists, liaise with organisations responsible for logistics, and, upon completion of the mission, 'to arrange for the appropriate dissemination of the resulting information to the British departments concerned'. In this way, BIOS largely mirrored the actions of CIOS, but now the approach was unilateral – British investigators, working to British target lists, and preparing reports for British circulation. Nonetheless, careful liaison, and arrangements for mutual information exchange, with the Americans became another central function of BIOS.[298] Crucially, there was already an awareness among those involved in Britain's exploitation planning that other nations were pressing ahead and that, through delay or poor execution, 'we should damage our own interests while the other Allies were helping themselves'.[299]

[296] Ibid. See also: John Christopher, *The Race for Hitler's X-Planes* (Stroud: The History Press, 2012).
[297] TNA, FO 1032/177, 'BIOS: Organisation', 18 July 1945.
[298] TNA, FO 1032/177, 'Draft Terms of Reference for BIOS', 18 July 1945.
[299] TNA, CAB 122/342, 'Exploitation of German Science and Technology', 12 December 1945.

In order to enact a successful exploitation policy, which not only gathered the best information and material for the country as a whole but also ensured that it was fairly distributed among the various interested parties within Britain, perhaps the most important step was to establish a solid set of procedural guidelines for the investigators on the ground. Some of this was almost exclusively bureaucratic, including the three different officials (the BIOS Administrative Officer, Technical Liaison Officer and a member of the Economic Division of the CCG) that investigators had to report to upon arrival in Germany, but this was necessary on account of the sheer volume of visitors who arrived in, and travelled through, the British zone every day in the year or so after the war's end. Furthermore, there was a perceived risk of unofficial individuals visiting German factories and obtaining technical intelligence for the exclusive benefit of themselves or their employers, which necessitated the repeated statement of the importance of possessing the right credentials and always obtaining permission to visit targets from the local Military Government detachment.[300] Indeed, the issue was significant enough to warrant Lieutenant-General Brian Robertson, the Deputy Military Governor of the British zone, sending a memo to the Trade and Industry Division (the agency responsible for the control and revival of German industry) warning that 'unauthorised visits are most undesirable, may lead to severe abuses and in any case waste the time of the Factory Manager or his staff', and instructing that a Visitors Book be made compulsory at all factories and similar sites.[301]

In general, although many of the investigators were sourced from private industry, during their time on BIOS trips they were considered to be official representatives of the British government. Once they had signed the Official Secrets Act, they were told 'you become a temporary Government Servant and remain one until your final report is published'. What this entailed was made abundantly clear to all involved:

a) All information that you obtain, even if it is outside the actual scope of your investigation, is the property of HM Government and is a Government secret. You are bound to report it fully and accurately to the proper authority. Until your final report is published, you must not discuss this information with anyone who is not a Government Servant.

[300] TNA, FO 1032/177, 'Notes for Investigators in the British Zone', 5 September 1945.
[301] TNA, FO 1031/7, Deputy Military Governor to T&I Division, 25 November 1946.

b) You are an official representative of Great Britain, wearing British Armed Forces uniform and you are regarded as such by our Allies and by the Germans. Consider carefully in this light everything you do and say.
c) You are NOT permitted to conduct business of a private nature whilst you are in Germany.

They were also cautioned on matters of security, not just their own, which was largely guaranteed by the significant British military presence anyway, but also that of the German citizens they encountered, who could possibly be at risk of reprisals by a handful of diehard Nazi fanatics who saw them as treacherous collaborators.[302] Investigators were sternly reminded of 'the necessity for withholding from the Press and any other unauthorised persons the names of German individuals or organisations which have co-operated with you or assisted you in any way'.[303]

Another safeguard which was put in place came in the form of the limited scope of operations. Investigators were strictly informed that 'BIOS terms of reference limit your investigations to scientific and technical developments and do NOT cover current and future production and commercial practices.' In short, technical exploitation was allowed but economic exploitation was not. However, other elements of the programme were far less restricted, for instance BIOS teams were also told that 'by inter-Allied agreement any plant situated in Germany and in operation during the war is a legitimate target. It does not make any difference if it is partly or wholly owned by a member of the United Nations.'[304] This is indicative of the difficulty which BIOS faced throughout the period, of wanting to ensure that no stone was left unturned and the maximum benefit was gleaned from their examinations of German science and industry, so that they were not left behind by their Allied rivals, while still ensuring that Germany did not suffer disproportionately as a result.

Although the Black Lists were used as comprehensive guides of the targets which investigators should look into, the members of BIOS were aware that, as a result of the secrecy which characterised the Nazi regime, there would be many targets which they were not previously aware of which might be of immense value. As such, experts who had

[302] Perry Biddiscombe, *Werwolf! The History of the National Socialist Guerrilla Movement, 1944-6* (Toronto: University of Toronto Press, 1998), 50.
[303] TNA, FO 1031/7, 'Advance Notes for Investigators', 2 September 45.
[304] Ibid.

travelled to Germany were allowed to rely on their own knowledge and instincts and make their way to additional 'targets of opportunity' for their examination. This was an essential part of the programme but it did generate its own set of problems, particularly in terms of opportunity targets in Berlin. Major Baukham of FIAT complained to T-Force in July 1946 that 'quite a lot of these investigators, on receiving clearance to Berlin, do a thorough job of sight-seeing and then return to carry on with their other targets'.[305] His complaints fell on deaf ears however; T-Force acknowledged the issue, saying that sight-seeing occurred not only in Berlin but in many other major cities and famous locations, but then was dismissive of any action to curtail it: 'It is felt that any attempt to completely control all investigators' movements would not only raise great administrative difficulties but would also cause widespread resentment amongst all concerned.'[306]

This exchange of correspondence, though somewhat petty in its subject matter, is actually indicative of another crucial facet of the exploitation initiative. While the experts were marshalled and prepared for their missions by BIOS in Britain, once they got to Germany, their interactions with the machinery for exploitation would have been primarily with FIAT and with T-Forces. These organisations were the workhorses of the project and there is no doubt that without them it could never have gone ahead, and certainly not on the scale which was eventually achieved.[307] Exploring the relationships between BIOS investigators and the agencies which were responsible for facilitating their efforts reveals two interesting elements of the initiative as a whole: the first is the sheer enormity, complexity and diversity of the programme, which utilised a great multitude of committees, teams and special units, each with their own identity and terms of reference, and with their various interrelationships governed by careful and strict administration; and the second is the continuation of that fusion of the civilian and military spheres which had proved so essential during the war, and now allowed for the specialist knowledge of civil industry and science to be effectively paired with the unique logistical capabilities of the armed forces.[308]

T-Force, initially the true spearhead of the exploitation programme, had numbered some 5,000 personnel at the time of the crossing of the Rhine, but was reduced to 3,000 in

[305] TNA, FO 1031/7, 'Opportunity Targets – Berlin', 31 July 1946.
[306] Ibid., 10 August 1947.
[307] Longden, *T-Force*, 277.
[308] Edgerton, *Britain's War Machine*, 273ff.

November 1945. At this time, it also took on responsibility for handling reparations teams and British business owners visiting their properties in Germany, alongside its exploitation commitments, and by June 1946, oversight for its activities was switched from HQ, British Army of the Rhine, to the Control Commission for Germany (British Element).[309] This was clearly representative of its shift from a direct military purpose to a more general logistical one, as was the unheeded suggestion by the Chief Administrative Officer that the name T-Force be changed to Technical Travel Agency.[310] Its duties ranged from provision of accommodation to facilitating 'evacuation of equipment, documents and personnel', whether specified as 'Booty' or as 'Reparations'.[311] In information provided to BIOS investigators before they arrived in Germany, they were advised 'to contact T-Force for all their requirements while out at their targets', while the general responsibilities of T-Force were elucidated as follows:

> T-Force arrange your clearance into the British zone, supply transport to your targets from limited resources, run a chain of messes from the Ruhr to Kiel, provide interpreters, escorts, fuel supplies *en route*, valuable intelligence re: targets, and arrange the evacuation of documents and equipment.[312]

To give some sense of scope, T-Force operated 15 Transit Messes throughout the British zone and, in the period June 1945 to October 1946, they handled the visits of 6,084 BIOS investigators, as well as 1,400 Reparations/Restitution Teams, and facilitated visits to 7,300 separate targets in total.[313]

As the situation in Germany became more stable and the multiple threats which had abounded immediately after the end of the war subsided, the military nature of T-Force was called into question. The majority of targets which were being examined were peaceful industrial concerns and demobilisation across the British armed forces was the order of the day. It was confidently considered 'that all T-Force functions could efficiently be carried out by civilians' but those assessing the organisation's future felt it was 'doubtful if wholesale civilianisation would be in the interests of efficiency or economy'. There was even discussion

[309] TNA, FO 1031/4, 'Statement from the Administrative Staff of the Deputy Military Governor regarding T-Force', 10 October 1947.
[310] TNA, FO 1065/12, 'Organisation and Future of T-Force', 5 December 1946.
[311] TNA, FO 1031/4, 10 October 1947. For more on this distinction, see Chapter Six below.
[312] TNA, FO 1032/177, 'Notes for Investigators in the British Zone', 5 September 1945.
[313] TNA, FO 1065/12, 'Investigation of T-Force: Report No. 47', 12 December 1946.

surrounding the possibility of allowing British personnel to return home by replacing them with German citizens. Though this may have offered many benefits to the operation of T-Force, security concerns, among other things, precluded it from going ahead.[314] This distinguishes exploitation from other spheres of the occupation, where the British were quite content to hand over the day-to-day administration to German officials; a form of indirect control adopted wholesale from Britain's colonial experience. Interestingly, when implementing this 'imperial' mode of administration, British occupation officials were reminded that the German people were 'highly developed in most spheres' and should therefore be treated with 'patience and tact' – presumably a different approach to that employed in Britain's other, less-developed colonies.[315] In addition, for the British personnel working for T-Force, there was a certain sense of pride in the nature of their task. Michael Howard, who served as an Intelligence Officer with No. 1 T-Force in 1946-7, wrote home to his parents that 'this is the only unit in Germany which is not a liability to the taxpayer in that the consequences of the work have a considerable and direct bearing on our economic recovery. This does help one feel that one is doing a good job of work.'[316]

Alongside T-Force, FIAT was the other element which helped to bear the burden of the exploitation programme's logistical requirements. With the split of the combined FIAT into its separate British and American components at the end of August 1945, FIAT (Br.) was placed under the administration of the British Control Commission, and its costs were to be borne on the Commission's establishment. Its purpose was formally stated thus:

> The Field Information Agency, Technical (British) will coordinate, integrate and direct the activities of the various missions and agencies interested in examining, appraising and exploiting all information pertaining to German economy other than direct military intelligence. It will provide centralised information services and facilities covering this technical intelligence field. It will not, however, be responsible for final collation of such information or its exploitation.[317]

[314] Ibid.
[315] Graham-Dixon, *Allied Occupation of Germany*, 84.
[316] Howard, *Otherwise Occupied*, 90.
[317] TNA, FO 1065/12, 'Establishment of Field Information Agency, Technical (FIAT), British Component', 23 August 1945.

Although this set-up was adopted so as to provide the greatest possible assistance to BIOS investigators when navigating the difficulties of carrying out their work in the chaos of post-war Germany, it did, as complicated bureaucratic structures so often do, generate almost as many problems as it solved. Linstead complained that 'the clearing of British investigators for the British zone which had to be done through FIAT' was causing considerable delays and that, in some cases, 'FIAT did not pass on the clearance for several days and then they cleared so many trips that RAF Transport Command could not cope with the requests for air bookings', therefore exacerbating the problem.[318]

Perhaps the greatest attribute which FIAT possessed was its role as an Anglo-American co-ordinating body, the result of a hangover from its origins as a combined unit. Even after the two national elements were split, both retained their headquarters in the same building in Frankfurt, and continued working in the spirit of 'closest co-operation'. Moreover, FIAT was 'the only British unit in the American zone of Germany' and the goodwill which it had built up with the Americans (and French) was 'of immense value to the Control Commission, and to Ministries and Departments in the UK'.[319] This was important as FIAT (US) was responsible for granting passes and permits for British investigators to visit targets in the American zone, where many sites of interest were located, and the arrangement was duly reciprocal. FIAT (Br.) was also the agency to which all British investigators had to report upon entering, and before leaving, the American zone. It helped to provide the facilities which T-Force offered in the British zone – transport, accommodation, library access and the evacuation of documents or material, as long as clearance could be obtained from the Americans. In order to allow this positive relationship to continue, British experts visiting the American zone were sternly instructed to be on their best behaviour. In terms which some would have undoubtedly found condescending, they were told: 'you will find patience, good temper and tolerance the most important assets.'[320]

Nonetheless, as well as creating an administrative network to enable exploitation to run as smoothly as was possible for an operation with practically no established precedent, it was also the responsibility of the agencies involved to effect some degree of influence on

[318] TNA, FO 1031/50, 'Minutes of 2nd BIOS Meeting (1945)', 29 August 1945.
[319] TNA, FO 1032/1459, 'Field Information Agency Technical (FIAT)', 10 December 1946.
[320] TNA, FO 1031/7, 'Notes for Investigators in US & French Zones', 12 June 1946.

the general activities of the investigators on the ground. Many of these were civilians who had not seen active service during the war and were therefore unused to any form of military culture and who would find the British forces of occupation as unfamiliar to them as Germany itself. There were also a great number of them, travelling across the British zone and beyond, with very little central co-ordination, so rules were needed to maintain some semblance of general order. Furthermore, this was a period of relative diplomatic uncertainty, with Britain, the USA, the Soviet Union and Germany, among many others, all trying to find their place in the new world order. This added great fragility to the peace and there was always a risk that exploitation, a contentious issue from inception to termination, could jeopardise that peace. As a result, the restrictions that were imposed on the investigators, who could be considered the personification of this controversial enterprise, were often strict but in many cases were much the same as the general controls which applied to all British personnel in Germany during this period.

To start with, it was not a time of plenty and with such high numbers of British personnel heading over to Germany, the authorities could not be responsible for providing them with all the essentials during their trip. They were instructed to take with them sheets and a pillowcase (but not a blanket or bedroll), knife, fork and spoon, a water bottle, a torch, a towel and soap, as well as 'sufficient supplies of cigarettes, razor blades, shoe-cleaning material, soap (including laundry soap), toothpaste, chocolate etc. to last you for the whole trip'. They were advised that canteen facilities would be limited in the British zone and non-existent elsewhere.[321] It became even more restrictive if they travelled to the FIAT mess at Höchst, near Frankfurt, in the American zone, where the standing orders dictated that visitors should provide their own blanket; they could be loaned one but if they were to 'purloin' it, they were to be charged 'through the normal Army Accounting Channels'.[322] These rules seemed to be 'rather brusque' even to those at T-Force HQ, and Major Hughes of that headquarters wrote to his counterpart at FIAT, to comment that 'life seems very Spartan at Höchst', before adding 'I am surprised that you find Standing Orders

[321] TNA, FO 1031/7, 'Advance Notes for Investigators', 2 September 1946.
[322] TNA, FO 1031/7, 'British Investigators Billets Standing Orders', 22 July 1946.

necessary. We used to have similar instructions to investigators in all our bedrooms and we found that they merely annoyed people unnecessarily and did very little good.'[323]

Although the restrictions on supplies available to investigators in Germany were necessary, they were open to a certain degree of interpretation on both sides. Another issue which proved very difficult to navigate for all concerned was that of non-fraternisation. The standard orders given to regular servicemen on this matter were clear; in the information booklet issued to all members of the British armed forces as they prepared to cross the Rhine in 1944, they were told, in no uncertain terms, to 'keep Germans at a distance, even those with whom you have official dealings'.[324] This was something that British troops found easier than the Americans, who had suffered no direct German attack on their homeland, but either way it was found to be unworkable in the long-term.[325] By the end of September 1945, all the official British non-fraternisation measures had been abolished, with the exception of marriage to German citizens and the billeting of troops in German homes. This marked a shift in favour of common sense policy as key occupation initiatives such as reconstruction and re-education could hardly go ahead if no civil contact was permitted between the British officials and the German people.[326] This was particularly true in exploitation, where experts could often only elicit the best information through lengthy and in-depth conversations with their German counterparts, many of whom they knew on a personal level from before the war, having mixed in the same professional circles and even collaborated on some projects.[327]

Although with hindsight these numerous restrictions may appear to be cumbersome and inflexible, the programme of exploitation was a mammoth one and it was only through this meticulous preparation and careful governance that it was able to proceed at all. Studying the top-down policy is, therefore, essential to understanding exploitation but it does not present the complete picture; for that, it is important to examine how the process was viewed by those directly involved – the men and women who served as investigators in

[323] TNA, FO 1031/7, Maj. Hughes, HQ T-Force to Maj. Baukham, FIAT, 1 August 1946.
[324] Foreign Office, *Instructions for British Servicemen in Germany 1944* (London: Foreign Office, 1944), 51.
[325] Noel Annan, *Changing Enemies: The Defeat and Regeneration of Germany* (London: Harper Collins, 1995), 148.
[326] Atina Grossmann, *Jews, Germans and Allies: Close Encounters in Occupied Germany* (Princeton, NJ: Princeton University Press, 2009), 33.
[327] Eckert, *Struggle for the Files*, 32; Schmidt, *Justice at Nuremberg*, 99.

the field. Gilbert Hunter, of the coking firm Stewarts and Lloyds of Corby, travelled to Germany in January 1946 as a member of BIOS Trip 1539, tasked with investigating the German coking industry. He recognised from the outset that 'one cannot defeat the system, so a wise man should learn it and adopt it with as good a grace as possible.' He did not consider this to be a problem though; he marvelled that after a mere half an hour in the office of Major Peterson at T-Force HQ, 'we'd virtually got the freedom of the country', and commended the whole arrangement: 'Hats off to the British Army for a very fine job of organisation.'[328]

Monica Maurice, of the family-run Wolf Safety Lamp Company of Sheffield, who travelled to Germany on a BIOS trip in April-May 1947 to investigate German lamp manufacturers, was not quite as enamoured with the military organisational style and complained that 'the Army is unable to move, think or decide anything unless it has been written down on a piece of paper.' One area where such comprehensive administration proved helpful was in terms of transport, which Ms Maurice noted was essential as without it 'one cannot move at all as messes are sometimes or mostly several miles away from HQ or map-room or whatever else one wants.'[329] Both Hunter and Maurice commended the transport and drivers which they were given – Hunter described his team's Humber cars as 'comfortable and cosy' and the drivers as 'quiet, reliable fellows',[330] while Maurice and her companion formed such a bond with the driver of their brand new Austin 12 that they took it in turns to drive from Berlin to Hanover to let him rest up after drinking rather too much the night before.[331] Eddie Aspden, however, who visited Germany to investigate engine factories in autumn 1945, described covering some 2,500 miles in five weeks, and how they were spent mostly in 'acute discomfort'.[332]

To a certain extent, these differences in experience can be explained by the timing of the trips. Those who travelled to Germany in 1945, whether during the war or immediately after it, found resources short and comfort lacking but, by mid-1946, conditions had improved considerably and visiting experts tended to have a less miserable time of it, and

[328] IWM, 09/21/1, Private Papers of Mr Gilbert A. Hunter, January 1946.
[329] IWM, 99/76/1, Private Papers of Monica Maurice, 16-17 April 1947.
[330] IWM, 09/21/1.
[331] IWM, 99/76/1, 25 May 1947.
[332] IWM, 05/48/1, Private Papers of Edward C. Aspden, September-October 1945.

nowhere was this more clearly reflected than in comments on accommodation and provisions. When Lieutenant-Commander John Bradley was making his way through northern Germany in the last weeks of the war, he and his colleagues mostly slept in barns or out in the open, or would on occasion 'calmly dispossess' a farmer of his house, during their stay in which 'we may drink his schnapps and use his utensils but we do not do useless smashing'.[333] Matters were little improved five months later when Aspden and his team visited Nuremberg; accommodation was hard to come by 'because the city had been almost completely destroyed' and they were only able to obtain meals 'in a transient mess … [which] in quality were nothing more than mediocre'.[334]

Within a further four months though, in February 1946, Gilbert Hunter felt it only fair to 'accord T-Force a very hearty vote of thanks for their hospitality', especially on account of 'the seriousness of housing conditions in Germany'. Perhaps his perceptions were improved by his team's experience of dining at Villa Hügel, the 269-room mansion near Essen, formerly the home of the Krupp family of industrialists and requisitioned after the war by the Allied North German Coal Control agency, of which he wrote this glowing review:

> Dinner was something to be remembered for many, many days to come and should be written down in capital letters … The dinner was good, the wines excellent, the silver, the china, the glass, the napery, the room, the service, etc., etc. were all as nearly perfect as makes no matter, but the real attraction was the atmosphere which was so perfectly natural that one felt it might have been rehearsed many times.[335]

In April 1947, Monica Maurice recorded visiting the Landeshaus Club in Düsseldorf which was exclusively for the use of Control Commission personnel, and which she described as 'a marvellous and beautifully furnished club with dining room, games room, lounge, and dance floor, on a corner overlooking the river'.[336] This image of sophisticated socialising seems unrecognisable when placed alongside such earlier accounts of shortage, discomfort and

[333] IWM, 10/7/1, Lt-Cdr John Bradley to Margaret Bradley, May 1945.
[334] IWM, 05/48/1.
[335] IWM, 09/21/1.
[336] IWM, 99/76/1, 21 April 1947.

extreme improvisation, or against the privations and hardships suffered by most ordinary German citizens in this period.[337]

One element which all accounts seem to agree on, though one which contradicts wartime expectations for the experience of investigators on the ground, was the nature of their interactions with German citizens. Lieutenant-Commander Bradley dealt frequently with German naval personnel and admitted to his wife that 'I admire the discipline and bearing of the great majority of them and I should find it difficult to hate them.' As such, he accurately predicted that non-fraternisation measures would prove futile and difficult to enforce.[338] Maurice described the German individuals she encountered as 'willing and anxious to talk and apparently to show us everything' and those who were not could be easily coerced, as with one engineering expert who was 'obviously pleased to be presented with 1/2lb coffee'.[339] There were understandably some German people who resented the outcome of the war and the imposition of having investigators visit and root out their industrial secrets, but Hunter noted that even those who were 'far from happy' still 'received us with dignity and as naturally as present circumstances (for them) could permit'.[340] There were, of course, exceptions. Brigadier W.P.T. Roberts, who led a team to investigate a cartridge case factory in Karlsruhe in May 1945, described a Major-General he met as having 'the courage still to maintain his Nazi sympathies'.[341] Gilbert Hunter, meanwhile, looked upon lingering political loyalties with less sympathy, writing of a visit to a hydrogenation plant that 'our guide was a typical Nazi and every one of us would have enjoyed kicking him in the slats!'[342]

Eddie Aspden had a generally negative impression of his time as an agent of exploitation, describing his tour as 'nerve-wracking', 'arduous and exacting' and requiring 'great patience', and in an effort to save time and improve 'the personal comfort of the party', he did make some insightful comments on how exploitation could be better conducted in the future, most notably that 'it is more profitable for one small team or a number of small teams to make a series of concentrated investigations, each of not more

[337] Bessel, Germany 1945, 333-337; Hoffmann, 'Germany is No More', 604-605.
[338] IWM, 10/7/1.
[339] IWM, 99/76/1, 25 April 1947.
[340] IWM, 09/21/1.
[341] IWM, 99/36/1, Private Papers of Brigadier W.P.T. Roberts CBE, May 1945.
[342] IWM, 09/21/1.

than three weeks or a month's duration, than for one team to be expected to make a prolonged investigation extending over many months.'[343] Such issues and suggestions were not just advanced by dissatisfied experts in the field, but also by the BIOS committee itself, which met fortnightly and expended a great deal of time trying to find ways to streamline and boost the efficiency of British exploitation.

Certainly, issues on proper briefing received frequent attention. Brigadier Pennycook, of T-Force HQ, who regularly attended BIOS meetings, gave a scathing assessment of the serious shortcomings in the system: 'in many cases teams arrived without having seen the reports available in London and totally unfamiliar with the targets they were scheduled to visit or even why they had come out at all.'[344] This in turn fed into another problem which was the saturation of teams and the increased pressure which this put on the limited resources available. Although Monica Maurice and Gilbert Hunter only had praise for the transport they used while in Germany, the bigger picture was one of considerable scarcity, which was only exacerbated in bad weather, when 'trips were taking an average of three weeks instead of ten days' and 20% of vehicles were off the road at any one time for maintenance.[345] In addition, some of the trips which were contributing to this congestion were 'obviously not of a serious nature', as a result of the sponsoring ministries 'not showing the sense of responsibility that they showed during the CIOS period'. Often these teams were larger than they needed to be (thus claiming unnecessary extra transport) and were revisiting targets which had already been completely exploited, causing a state of affairs which 'created a lack of enthusiasm on the part of the staff working in London and in the field'.[346]

It is worth noting here that the Whitehall administrative structure to which BIOS was answerable did little to simplify matters. As has been shown, the origins of exploitation lay within the realms of espionage, and the initial responsibility for its co-ordination lay with the Joint Intelligence Sub-Committee.[347] This arrangement was able to operate, without much imposed change, until the end of the war in Europe. However, during this immediate post-

[343] IWM, 05/48/1.
[344] TNA, FO 1031/50, 'Minutes of 10th BIOS Meeting', 20 December 1945.
[345] Ibid.
[346] Ibid., 'Minutes of 7th BIOS Meeting', 7 November 1945.
[347] See Chapter Two above.

war period, it was monitored closely not only by the JIC but also by the Deputy Chiefs of Staff (DCOS), who were responsible for co-ordinating scientific and military co-operation, and for whom exploitation became one of the most frequently discussed subjects at their fortnightly meetings. In the summer of 1945, questions began to be asked as to whether the JIC was still the body which should have main control over exploitation activities. In July, it was suggested that BIOS was no longer a conventional intelligence operation and should therefore 'transfer [its] whole allegiance' from JIC to DCOS, while still maintaining some input from the former.[348] In September, responding to the belief that future BIOS work would likely be 'of greater value to industry than to defence', Norman Bottomley, the Deputy Chief of Air Staff, suggested that BIOS be responsible to the DCOS committee on technical military matters, the JIC on intelligence matters, and the Board of Trade on industrial matters.[349] One year later, responsibility for BIOS was fully transferred to the Board of Trade, with the exception of a few issues in which the DCOS committee would have a particular interest.[350] As this shows, exploitation was not closeted away in some obscure corner of Whitehall bureaucracy, but was rather open to observation and interference by numerous governmental parties.

The picture that official documents, personal accounts and the minutes of BIOS meetings present is undeniably a mixed one. While a huge amount of preparation and administration was entailed in executing the exploitation initiative, it was not always necessary; on some occasions, it was not sufficient to overcome difficulties incurred by paucity of resources or poor conduct by the ministries and departments involved, and on others, it created problems of its own by being inflexible and unrealistic. One thing that is certainly clear is that British exploitation was not a linear process under the jurisdiction of a single organisation, but rather the product of myriad agencies and departments working in varying degrees of co-operation and competition, both on the ground and in London. Even though all these elements were striving towards roughly the same aim – to attain the greatest spoils of German science and technology for the betterment of Great Britain – their relationships were not always smooth. To fully understand the process of exploitation, therefore, it is necessary to examine the interactions which the various representatives of

[348] TNA, CAB 81/93, 'Minutes of 49th Meeting of JIC', 24 July 1945.
[349] TNA, CAB 82/3, 'Minutes of 11th Meeting of DCOS', 6 September 1945.
[350] TNA, CAB 82/8, 'Minutes of 26th Meeting of DCOS', 4 September 1946.

the exploitation initiative had with each other and with agencies pursuing different aims, whether they were of British or foreign origin, in the field in Germany.

Competition and Co-operation

As has been discussed, the situation in post-war Germany was chaotic, with numerous military and civilian organisations all striving to contribute towards creating the best possible post-war world – some were concerned with gathering evidence of war crimes, others wished to assess the merits of the Allied strategic bombing campaign, while others were interested in securing Germany's documents and archives. How these other operations related to the exploitation programme is critical to understanding the context within which exploitation took place where, on the ground in Germany, there were countless occasions of logistical limitation and shortage of resources, prompting either competition or co-operation among the agents in the field. In many cases, the actions taken by these units and individuals had to be carried out with great speed in response to rapidly changing circumstances and thus had very little recourse to official policy as dictated from above. In short, the departmental line was often incompatible with the pragmatism necessary on the ground.

The first example of true competition emerged in the dying months of the war when the earliest exploitation teams were racing across Europe, trying to keep up with the advancing Allied armies, desperate to be the first to seize the most valuable scientific and technical targets. One CIOS assessor complained about other services running 'semi-piratical expeditions', the operatives of which became known as 'witches', because 'they flew over our heads on broomsticks'.[351] Elsewhere, the Economic Sections of SHAEF complained that Ministry of Supply parties were causing confusion by gathering economic intelligence which did not fall under their remit, and this then had to be referred to CIOS for adjudication.[352] The confusion worsened once individual countries began sending their own unilateral expeditions to Europe too – in February 1945, Colonel Geoffrey Vickers of the Ministry of Economic Warfare warned his colleague C.H. Noton that 'a new mission called "The US

[351] TNA, FO 1031/49, 'History of T-Force', 1945.
[352] TNA, FO 935/25, C.H. Noton to Lt-Col. E. Ewart-Williams, 30 January 1945.

Technical Mission for Europe" had been formed which looked as if it would be another knight errant in the CIOS field'. Vickers hoped that there would be some way that this new mission could somehow be absorbed into the existing CIOS machinery.[353] In fact, Vickers may well have been referring to the US Technical Oil Mission which was already active in Germany and was responsible to both CIOS and the American Technical Industrial Intelligence Committee (TIIC).[354]

In many cases, it seemed that the exploitation agencies active in late 1944 and early 1945 were more concerned with keeping their activities secret from one another than they were with securing the best spoils of Nazi Germany.[355] As time passed, the number of different organisations involved increased exponentially and by 1946, British FIAT recorded that there were 52 other agencies with which they had to liaise in the course of their regular operations.[356] However, many of these other units were tasked, at least in part, with rendering assistance to the larger organs of the exploitation machinery. The Scientific Intelligence Advisory Service (SIAS), for instance, was established under G-2 SHAEF to 'find out, or to create opportunities for others to find out, what scientific discoveries of fundamental importance have been made in Germany since 1939'. They believed that they could offer the greatest assistance by being granted the opportunity to handle 'that part of the procurement of German scientific intelligence which necessitates lengthy contact between German and Allied persons of extreme intellectual distinction'.[357]

However, in some cases, bureaucratic clutter meant that the utilisation of these supplementary services did not run at maximum efficiency. For example, the German Economic Department, part of the Ministry of Economic Warfare, which was in possession of 'a considerable body of information regarding German industry, its location, rate of production and technical developments', and which had knowledgeable staff available for consultation,[358] complained that there were 'far too many agencies making demands upon them' and requested that a uniform procedure be adopted to allow them to 'deal more

[353] Ibid., Col. C.G. Vickers to C.H. Noton, 19 February 1945.
[354] Arnold Krammer, 'Technology Transfer as War Booty: The US Technical Oil Mission to Germany, 1945', *Technology and Culture*, 22 (1981), 68-103.
[355] Hogg, *German Secret Weapons*, 11.
[356] TNA, FO 1031/68, 'List of British and American Agencies', 11 September 1946.
[357] TNA, FO 1031/51, 'Scientific Intelligence Advisory Section of G-2 SHAEF', 7 April 1945.
[358] TNA, FO 1031/51, 'Facilities Offered to BIOS by German Economic Department', 4 October 1945.

satisfactorily and expeditiously' with these demands.[359] Similarly, the Inter-Services Topographical Department (ISTD), which, as its name suggests, supplied topographical intelligence to all branches of the British armed forces and which felt it had much of value to offer to CIOS and others, complained of being:

> insulated from all knowledge of, or contact with, the working parties and their chairmen. This insulation was carried to the degree that, not only were we forbidden all contact except via SHAEF (and this channel did not work), but we knew none of the personnel who, it was suggested, were all 'greybeards'.[360]

Here, though the will for co-operation was present, the lack of adequate means by which to facilitate it meant that much progress was hindered. Lessons were certainly learnt from this chaotic arrangement and led, in many ways, to the formation of the Joint Intelligence Bureau in 1948 – this office, part of the Ministry of Defence, was responsible for co-ordinating economic, scientific, industrial and atomic intelligence throughout the early Cold War, and even incorporated some existing agencies, such as the ISTD, to ensure smooth, well-informed operations.[361]

Once the war ended, so too did the most urgent phase of the race for the spoils. Now, with all of Germany open to exploitation, it was no longer a case of which agency could reach a certain target first, but rather which could cover the most targets at any one time; the most valuable attribute was no longer speed, but rather scale. This in turn meant that logistical concerns now came to the fore and opened up new fertile territory for both competition and co-operation. CIOS and its successor agencies, with their ability to command the support of troops, transport and storage facilities, became the gatekeepers for any civilian agency wishing to conduct exploitation in Germany, even for entities as powerful as the Foreign Office or the US State Department.[362] On the ground itself, similar roles were fulfilled by FIAT and the T-Forces.

As the post-war period wore on and the number of agencies active in Germany grew to unprecedented levels, the scope for competition increased exponentially. One group

[359] TNA, BT 211/116, R.G. Somervell to Sqn. Ldr. Harris, 14 November 1945.
[360] TNA, FO 935/25, Maj. G.W.H. Andrews to C.H. Noton, 30 January 1945.
[361] Huw Dylan, *Defence Intelligence and the Cold War: Britain's Joint Intelligence Bureau, 1945-64* (Oxford: OUP, 2014), 1-3.
[362] Eckert, *Struggle for the Files*, 33.

which proved especially problematic was the Monuments, Fine Art and Archives (MFAA) initiative. Nicknamed the 'Monuments Men', this organisation was one of the more unusual operating in this period; led by a motley band of archaeologists, art historians and museum curators, they were tasked with protecting the cultural and architectural treasures of Europe from damage during the fighting, as well as being responsible for the restitution of works or art or other precious possessions which had been stolen by the Nazis or hidden for safekeeping.[363] As their remit included archives, those exploitation investigators who were seeking valuable documents on German science and technology were often brought into contact with MFAA officials. No top-down policy as to how the two operations should interact was enacted here, rather it was declared that the 'precise limits of responsibility between the two will be decided by … officers [from both sides] in conference at the appropriate level'.[364] This was a clear example of how a pragmatic approach by the men on the ground was considered to be the best way to ensure healthy relations between concurrent programmes. In fact, it could even lead to positive collaboration, as the specialist MFAA agents offered 'advice and assistance on all technical matters concerning German archives' which could be of great use to the uninitiated exploitation investigators who were seeking specific documents.[365]

More significant problems arose when departments in Britain dispatched teams to Germany outside of the proper BIOS channels. Here there was a great risk of duplication or redundancy of effort as well as competition for certain targets. The Air Ministry's Assistant Directorate for Intelligence (Science), under the leadership of R.V. Jones, sent its own investigators to continental Europe two days after D-Day. Jones proudly recalled how these men were enthusiastic enough to often be ahead of the frontline troops, and were soon sending back a steady stream of information, documents and equipment. He notes that there were indeed 'other overseas parties besides ours' but does not record any clashes or conflicts of interest.[366] What does become apparent, however, is that the left hand did not always know what the right was doing. In an Air Ministry report from October 1945, it notes that many prominent German atomic scientists, including Professors Hain (misspelt – Hahn)

[363] Michael J. Kurtz, *America and the Return of Nazi Contraband: The Recovery of Europe's Cultural Treasures* (Cambridge: CUP, 2006).
[364] TNA, FO 1032/179, 'The Handling of German Documents and Archives', 6 September 1945.
[365] Ibid.
[366] Jones, *Most Secret War*, 608-10.

and von Lane (again misspelt – von Laue) are 'reported to be in America', when in fact they were being held at Farm Hall, just outside Cambridge, a fact which was known by ordinary members of the public but that had apparently eluded the Air Ministry. In the same report, they also assert that the Soviet Union is 'by no means a bad fourth' in the race for the spoils of Germany which, even by this stage, was a gross miscalculation.[367]

Similarly, the Department of Scientific and Industrial Research (DSIR) also dispatched its own experts to Germany at this time in order to procure laboratory equipment, such as microscopes, centrifuges and x-ray sets, for research establishments and private industry in Britain, despite the Board of Trade and Research Branch both insisting that such removals could only be carried out legitimately through the existing BIOS channels.[368] These two examples barely scratch the surface of the true range of different exploitation programmes which coexisted in this period. By late 1947, often in conjunction with British authorities, the US Army was operating six different projects, through military intelligence channels, to tap the talents of German specialists, and the focus was not just on scientific and technical expertise. Operation 'Pajamas' was concerned with European political trends, 'Birchwood' with economics, 'Dwindle' with cryptography and codebreaking and 'Panhandle' with operational military expertise.[369] Countless agencies roamed through Germany, determined to exploit the most useful aspects of the defeated nation's human resources for their own benefit.

Teams working on utilisation of other aspects of Germany's expertise were not the only other investigators that scientific and technical exploitation units encountered in the field. Another major operation which was undertaken at this time was designed to uncover the impact of Allied bombing on Germany, and to try and ascertain which techniques were the most successful in order to prepare the air forces of Britain and America for any future war. After all, the Second World War was the first conflict to employ strategic bombing on this enormous scale and both the RAF and USAAF were convinced that the next war would do much the same, but to an even greater extent.[370] In order to conduct effective

[367] TNA, AIR 20/1715, 'German Scientists', 18 October 1945.
[368] TNA, FO 942/425, C.F.C. Spedding to C.A. Spencer, 29 March 1946.
[369] Simpson, *Blowback*, 73.
[370] Overy, *Bombing War*. See also Süss, *Death from the Skies*; Mark Connelly, *Reaching for the Stars: A History of Bomber Command* (London: I.B. Tauris, 2014).

assessments of their bombing efforts, both Britain and America created investigative agencies, which were tasked with sending teams to Germany and compiling reports of their findings; respectively, these were the British Bombing Research Mission (BBRM; later also the BBSU – British Bombing Survey Unit) and the United States Strategic Bombing Survey (USSBS).[371]

Both these enterprises soon discovered how important it was to be the first on the scene, in order to secure valuable documents before they were seized by another party; an endeavour in which they actually benefited from their small size, as they went unnoticed while they bent rules and succeeded in 'slipping through the net of restrictive regulations' which was in place as the war ended.[372] The British especially lacked the manpower to send multiple teams out into the field so instead hoped that collaboration would offset the problems of other agencies reaching key sites first. They hoped to work closely with CIOS, perhaps even to the extent where they would be able to attach an operative of their own to a CIOS team, thus facilitating a sharing of expertise.[373] They also liaised with FIAT to ensure that relevant German individuals would be relocated from the Dustbin detention centre at Schloss Kransberg to the Combined Services Detailed Interrogation Centre at Bad Nenndorf when only the BBRM retained an interest in them.[374] There was also international co-operation, with the BBRM utilising a lot of the data collected by the USSBS, which had the downside of leading to the British drawing many of the same conclusions as the Americans, despite the fact that the strategies of the RAF and USAAF had differed notably during the war.[375] It is also worth noting that Britain was largely disinterested in the results of their bombing survey and swiftly swept it under the carpet after publication, fearing that it might harm their 'hearts and minds' campaign in Germany and draw unfavourable comparisons with the very war crimes which they were planning to prosecute senior Nazis for.[376]

In short, the relationship between the scientific and technical exploitation programmes and the bombing research missions was competitive in the gathering of data

[371] British Bombing Survey Unit, *The Strategic Air War against Germany* (London: Frank Cass, 1988); David MacIsaac, *Strategic Bombing in World War Two: The Story of the USSBS* (New York: Garland, 1976).
[372] TNA, AIR 19/434, Air Cdre C.B.N. Pelly to N.H. Bottomley, 23 April 1945.
[373] TNA, AIR 20/4818, 'Minutes of 1st BBSU Advisory Committee Meeting', 6 June 1945.
[374] TNA, FO 935/140, 'British Bombing Survey Unit', 30 July 1945.
[375] Sebastian Cox, introduction to BBSU, *The Strategic Air War against Germany,* xix.
[376] Connelly, *Reaching for the Stars*, 158-159.

but far more co-operative in sharing the results. In many ways, the two operations were complementary – in March 1945, the Chief of the Air Staff Sir Charles Portal wrote about the links between evaluation of bombing campaigns and the evolution of future strategy, noting that 'scientific research and new weapons must be guided and developed along the lines of such doctrine; they do not in themselves create it.'[377] In a way, the bombing assessments can be seen as a form of 'strategic exploitation' which could take place alongside, and feed into, the scientific and technical exploitation which was occurring simultaneously. Certainly, their methods were not altogether different. In June and July 1945, while British weapons technology experts were test-firing V-2 rockets off the North Sea coast of Germany under the auspices of Operation Backfire, bombing specialists were conducting Operation Post Mortem which was designed to observe how the German authorities responded to an incoming bomber raid, partly to observe the German techniques and partly to judge how effective the RAF's radio countermeasures were.[378]

An area where a clash, or even a conflict of interests, was more likely was between exploitation and the quest for post-war justice, specifically the prosecution of war crimes or the newly-designated crimes against humanity. During the war, as word of the atrocities committed by the Nazis filtered back to Britain, it became clear that bringing the perpetrators to justice would have to be a main priority of the post-war period and in October 1942, Churchill stated that 'retribution for these crimes must henceforth take its place among the major purposes of the war'.[379] This was in itself a British commitment to an earlier declaration, signed in January by representatives of nine European governments-in-exile in London, which both condemned Nazi atrocities and asserted that justice would be sought with determination at war's end.[380] The best-known manifestation of this was the International Military Tribunal, held in Nuremberg, which began in November 1945 and tried 24 members of the Third Reich's leadership, and which was conducted jointly by all

[377] TNA, PREM 3/21/3, Charles Portal to COS Committee, 30 March 1945.
[378] TNA, AIR 20/1722, 'Report on an Investigation of a Portion of the German Raid Reporting and Control System', 15 December 1945.
[379] Tom Bower, *Blind Eye to Murder* (London: Andre Deutsch, 1981), 37; see also Richard Breitman, *Official Secrets: What the Nazis Planned, What the British and Americans Knew* (New York: Hill & Wang, 1998).
[380] Jay Winter, 'From War Talk to Rights Talk: War Aims and Human Rights in the Second World War', in David Welch and Jo Fox (eds.), *Justifying War: Propaganda, Politics and the Modern Age* (Basingstoke: Palgrave Macmillan, 2012), 242.

four occupying powers.[381] After this, the Americans conducted further war crimes trials at Nuremberg, dealing with senior figures from various sections of Nazi society, such as doctors, lawyers and industrialists.[382] Meanwhile, the bulk of the other trials were held on a unilateral basis, usually confined to each nation's own zone of occupation (and often to specific concentration camps, such as Bergen-Belsen or Ravensbrück), and Britain's policy in this respect was inconsistent and beset by numerous difficulties throughout the immediate post-war period.[383]

Perhaps foremost among these difficulties were problems in gathering evidence and detaining the accused individuals, and this presented fertile ground for a conflict of interests with the concomitant exploitation initiative. This was particularly true in the field of medicine, where the Nazis had often relied on brutal human experimentation in the pursuit of progress – means which were rarely, if ever, justified by the ends.[384] Some historians have claimed that the Allies faced a stark choice in this matter, between exploiting German know-how and prosecuting its criminality, and there is some evidence to that effect.[385] At a meeting of the Joint Intelligence Sub-Committee in September 1945, it was stated that 'War Crimes trials had priority over Intelligence investigations … and that the loss of Intelligence from this source would have to be accepted'. R.A. Clyde, of the British War Crimes Executive, responded to this with surprise, commenting that his organisation had 'always considered the preparation of cases against war criminals to be of secondary importance to our intelligence requirements'.[386] Indeed, certain German individuals attempted to take advantage of these potentially contradictory aims – for instance, Albert Speer, Nazi Minister of Armaments and War Production, bombarded his interrogators with scientific details and industrial statistics, which he knew were of immediate interest to them, in order to divert

[381] Tusa and Tusa, *Nuremberg Trial*.
[382] Kim C. Priemel and Alexa Stiller (eds.), *Reassessing the Nuremberg Military Tribunals: Transitional Justice, Trial Narratives, and Historiography* (Oxford: Berghahn, 2012).
[383] Donald Bloxham, 'British War Crimes Policy in Germany, 1945-1959: Implementation and Collapse', *Journal of British Studies*, 42 (2003), 91-118; Anthony Glees, 'The Making of British Policy on War Crimes: History as Politics in the UK', *Contemporary European History*, 1 (1992), 171-197.
[384] Ulf Schmidt, *Karl Brandt, the Nazi Doctor: Medicine and Power in the Third Reich* (London: Continuum, 2007), 255-296; Ulf Schmidt, 'Scars of Ravensbrück: Medical Experiments and British War Crimes Policy, 1945-1950', *German History*, 23 (2005), 20-49; Robert Proctor, 'Nazi Doctors, Racial Medicine, and Human Experimentation', in George J. Annas and Michael A. Grodin (eds.), *The Nazi Doctors and the Nuremberg Code: Human Rights in Human Experimentation* (Oxford: OUP, 1992), 17-31.
[385] Weindling, *Nazi Medicine and the Nuremberg Trials*, 3.
[386] TNA, CAB 81/93, 'Minutes of 64th Meeting of JIC', 18 September 1945.

them away from more troublesome topics, such as his culpability in cases of slave labour and concentration camp atrocities.[387] On the whole, however, the situation was somewhat more nuanced. Any notion of a conflict of interest is only really apparent in retrospective analysis and would not have appeared as such to the agents on the ground.[388] The two initiatives coexisted but co-operation was more likely than competition in most cases.

This was mostly a result of the individuals involved in exploitation who, being moral human beings first and foremost, were incensed by the horrors of which they found evidence during their investigations. Leo Alexander, an Austrian-Jewish doctor who emigrated to the USA in 1933 and would later become a senior medical adviser to the Nazi Doctors' Trial at Nuremberg in 1946, began his post-war career as a CIOS investigator, tasked with examining German aviation medicine.[389] In several of his official CIOS reports, which were always supposed to be objective and factual, Alexander criticises the inhumanity of the experiments, describing one set as 'a callous waste of unnecessarily large numbers of human lives'.[390] In another, he unequivocally recommended that the German doctors involved 'should definitely be tried as war criminals for these forced experiments on human beings', citing not only the 'unnecessary infliction of pain, suffering and death' on the subjects but also the fact that the results added nothing new to what had been learnt from previous animal experiments.[391] Elsewhere, when Ministry of Supply investigators encountered Otto Ambros, the IG Farben nerve agent specialist who was accused of authorising cruel human experiments and overseeing slave labour at Auschwitz, they 'commented adversely on the friendly treatment being given to this man who is suspected of war criminality'.[392]

It was not just morally indignant individuals who created the links between exploitation and war crimes investigation; there were also connections made via unofficial networks operating through official channels. For example, on 15 May 1946, Brigadier R.J. Maunsell, the chief of FIAT, chaired a meeting, consisting of nine Brits, four Americans and

[387] Gitta Sereny, *Albert Speer: His Battle with Truth* (London: Picador, 1996), 552.
[388] Schmidt, *Justice at Nuremberg*, 111.
[389] On Leo Alexander, see Schmidt, *Justice at Nuremberg*.
[390] IWM, CIOS Report XXVI-37, 'The Treatment of Shock from Prolonged Exposure to Cold, Especially in Water'.
[391] IWM, CIOS Report XXIX-21, 'Miscellaneous Aviation Medical Matters', 22 August 1945; Proctor, 'Nazi Doctors', 36.
[392] TNA, FO 1031/86, 'Poison gas: interrogation and reports', 4 September 1945.

two Frenchmen, the purpose of which was to establish a policy for exploitation staff to handle any material pertaining to war crimes.[393] In his opening statement, Maunsell explained that, in the course of their regular work, FIAT officials 'had accumulated some material which bore on the commission of war crimes by German scientists' but that FIAT 'could not deal with this question since it was not within their terms of reference and no investigational organisation of this character was available within FIAT'. Instead, he pledged that all possible assistance would be rendered by FIAT to the war crimes agencies, including the loaning of scientific experts to aid legal investigators and interrogators.[394] This was especially essential as the organisations created to investigate war crimes were often short-staffed and under-resourced, particularly when compared to the well-equipped behemoth of exploitation, and is yet another example of co-operation and collaboration trumping any competitive urge.[395]

In all, the relations which the exploitation agencies had with other organisations operating in Germany at the same time were mixed. Initially they followed an instinct of competition, which was reflected on an international scale too, driven by the desperation to secure the best parts of Germany's finite human resources (as well as documents and other material) for themselves. As time passed however, it became clear that their interests were best served by co-operation, not least because they shared a common purpose – ensuring Germany never again posed a threat to world peace – and later, a common enemy – the Soviet Union. This co-operation was, in many ways, the key to the exploitation programme's procedural successes as it allowed for a sharing of scarce resources and access to expertise in a very broad range of fields. Nonetheless, it is neither appropriate nor effective to judge exploitation on the merit of its procedure and implementation alone; a much more relevant assessment can only be achieved by considering the fruits of its labours, in the various forms which these took.

[393] Schmidt, *Justice at Nuremberg*, 124-5; Weindling, *Nazi Medicine and the Nuremberg Trials*, 111-5.
[394] TNA, FO 1031/74 'Scientific and Technological Branch policy on unethical medicine and medical war crimes', 15 May 1946.
[395] For more on this, see Charlie Hall, 'A Conflict of Interests? British Efforts in the Pursuit of Post-War Justice and Technical Intelligence in Occupied Germany', M.A. dissertation, University of Kent (2013).

The Spoils of War

Alongside the German scientists and technicians who were detained, interrogated and in some cases recruited by the British during this period,[396] the scientific and technological spoils of war came in several different manifestations. Firstly, there were documents and archives which, once discovered in their often secretive locations in Germany, were shipped to Britain for comprehensive analysis and assessment. Secondly, equipment and materiel were also transported back, either to fill shortages from which post-war Britain was suffering, as in the case of machine tools, or to be deconstructed and studied to reveal their technological secrets, as in the case of V-2 rockets or nerve gas shells. Thirdly, the final reports which every CIOS and BIOS team was told was 'the real object of your trip' to Germany, were compiled upon their return and all those on non-military topics were then mass-produced, thus becoming widely available to the public and to private industry across the country.[397] Those concerning more sensitive topics, especially new methods of warfare and the science and technology involved therein, were, in line with official Anglo-American policy automatically classified as 'Top Secret'.[398] Finally, there was something of a reverse in flow in the exploitation process. For a number of reasons, the focus changed from bringing materials and intelligence back to Britain, and instead, with the increased stability which had been achieved in occupied Germany, it became more common to facilitate the visits of all manner of private individuals to German factories, laboratories and other sites of interest, and to transform this process from one of intensive government oversight to a more widely-accessible form of scientific, industrial and commercial 'tourism'.

Arguably, documents and archives were some of the most important prizes of exploitation. The bulk of those brought over to Britain were handled at the Halstead Exploiting Centre, near Sevenoaks in Kent, where a number of German POWs and civilians were engaged in translation.[399] Once translated, these documents could provide clear and comprehensive information on anything from industrial processes to records of development and experimentation and, especially if accompanied by blueprints or technical drawings, could allow British laboratories or businesses to very quickly replicate German

[396] This is the subject of Chapter Four below.
[397] TNA, FO 1031/7, 'Advance Notes for Investigators', 2 September 1946.
[398] Balmer, *Secrecy and Science*, 59.
[399] TNA, AVIA 54/1404, 'Halstead Exploiting Centre: review of activities'.

practices after the war. They were described as having 'a considerable intrinsic value. At the least this may be the cost of raw materials and man hours, but in actual value the cost would be much higher.'[400] As such, it was considered desirable to implement a clear policy on them as soon as post-war exploitation got underway. In September 1945, the British Element of the Control Council issued Intelligence Directive No. 7, entitled 'The Handling of German Documents and Archives', which intended to:

> … ensure the opportunity of access by all exploiting agencies to such German documents as are essential to their researches and to prevent the researches of one agency from impeding those of another; and to provide means for the collection and dissemination of information concerning the location, movement and content of German documents and archives.

What this meant in practice was the establishment of Documents Centres at the headquarters of the British Army of the Rhine and in each of its Corps Districts, which were to be responsible for the protection of the files, the maintenance of a register of information on all of the files and the circulation of this register to all interested bodies.[401] Unfortunately, as the staffing of these Documents Centres was mostly provided by ordinary T-Force personnel, proper archival procedure was not always followed and archivists often had to explain in exasperation that if finding aids were lost or destroyed, a professional organised archive lost the great majority of its value.[402]

There was another major problem with this scheme; arising, as was so prevalent in all facets of exploitation, as a result of the multitude of agencies co-existing and thus competing for access to the most valuable documents. As well as the Documents Centres operating under the aegis of BAOR, there were also Enemy Documents Units, which were co-ordinated by the JIC. Furthermore, in August 1945, BIOS established the 'Enemy Wartime Publications (Requirements) Committee', which drew its membership from organisations such as the Association of Special Libraries and Information Bureaux, the Royal Society, and the Committee of University Vice-Chancellors, and was tasked with managing all

[400] TNA, FO 1032/179, Maj. D.E. Evans to Brig. Spedding, 14 January 1946.
[401] TNA, FO 1032/179, 'Intelligence Directive No. 7: The Handling of German Documents and Archives', 6 September 1945.
[402] Eckert, *Struggle for the Files*, 16.

requirements for 'enemy wartime publications on scientific, technical and arts subjects', and then co-ordinating their procurement and distribution, as appropriate.[403]

Evacuation of documents from the British zone back to Britain itself also became a highly contentious issue. In December 1945, the Economic Division released a memo which stated that 'sufficient emphasis is not given to the commercial value of technical drawings and specifications', especially when compared to that given to prototype machines and similar items, and that as a result they were being removed without regard to 'proper safeguards'.[404] There were also considerable delays in making documents accessible to interested parties in Britain, as a result of a number of factors, including investigators not following instructions, the necessity of relying on sea transport to evacuate files and the lack of any kind of reproduction service operated by the British (there was a German service but it was perpetually short on supplies).[405] All of this was being discussed and debated at the same time as pressure was mounting to destroy large numbers of documents and drawings as the teams involved had 'not the time nor the staff' to assess them all, even though there were warnings that 'by so doing we may miss something useful'.[406]

The procedure for seizure and evacuation of equipment was equally beset by problems. Demand was high, whether for 'the purpose of equipping defence establishments' or for 'research and intelligence purposes', but was also restricted, most notably by the fact that it had to be accounted for in terms of the total reparations which Britain was allowed to claim.[407] Moreover, if equipment was removed from a target by one team, it could substantially prejudice the investigations of another team, if they were to visit that same target subsequently.[408] This of course took on an additional degree of complexity if the desired equipment was located in the American zone where, unless it was considered 'reparationable', the only way of obtaining it was by way of a 'straight purchase'.[409] It is worth noting also that this was not a small-scale issue – by the end of 1946, T-Force reported that '6,590 tons of equipment have been shipped to the UK since June 1945 and a

[403] TNA, FO 1031/51, 'Enemy Wartime Publications (Requirements) Committee', 7 September 1945.
[404] TNA, FO 1032/179, 'Evacuation of Documents from British Zone', 11 December 1945.
[405] TNA, FO 1031/50, 'Minutes of 9th BIOS Meeting', 19 June 1946.
[406] TNA, FO 1032/179, 'Disposal of Drawings', November 1945.
[407] Reparations are covered in Chapter Six below.
[408] TNA, FO 1031/50, 'Minutes of 4th BIOS Meeting', 26 September 1945.
[409] Ibid., 'Minutes of 8th BIOS Meeting', 29 May 1946.

further 11,182 tons have been earmarked and are awaiting shipment'. The type of equipment this included varied from tanks and major machine tools to delicate scientific apparatus and optical instruments.[410]

Even in the light of these figures, it is still fair to surmise that the main product of exploitation was always expected to be a sizeable catalogue of Final Reports covering every topic of scientific, technological or industrial interest in Germany which would allow Britain to ensure it was as up to date as possible on these subjects. Investigators were told in no uncertain terms that 'the information you gain is valueless unless it is fully and clearly set out in this report', and they were notified that it would 'have a wide distribution which includes UK, USA, France and other Allied countries'.[411] Certainly the dissemination was ample but the quality and value of the reports themselves did not always meet high standards. While there was inevitably a moderate probability that some reports would contain information of nothing novel, they were also criticised, including by senior trade association figures, for being poorly written, very limited on detail and impossible to follow up; ultimately a very poor testament to the huge effort expended on such comprehensive exploitation.[412]

If this was indeed the prevailing opinion among Britain's business community, it is really no wonder that the form which exploitation took shifted so as to represent a reversed flow. As well as general dissatisfaction with the quality of the Final Reports, there are several other reasons why facilitating the travel to Germany of private individuals became the most viable way for exploitation to continue after the initial post-war rush. As mentioned above, documents and blueprints were far too numerous and labour-intensive to be effectively utilised, and all equipment which was shipped to Britain had to be deducted from the national reparations allowance, which was obviously both finite and highly dependent on problematic assessments of value. Moreover the removals of any form of physical material began to be wound down from mid-1947, as part of multilateral international agreements, though the British found loopholes to continue this to some extent, in contradiction of announced policy.[413] In November 1947, the BIOS Secretariat was

[410] TNA, FO 1065/12, 'Investigation of T-Force: Report No. 47', 12 December 1946.
[411] TNA, FO 1031/7, 'Advance Notes for Investigators', 2 September 1946.
[412] Bower, *Paperclip Conspiracy*, 215. The reports are discussed further in Chapter Six.
[413] Gimbel, *Science, Technology, and Reparations*, 132.

absorbed into the new Technical Intelligence and Documents Unit (TIDU), but T-Force continued to exist almost a year beyond this point.[414]

The role of T-Force however was changing dramatically in this period. The number of BIOS teams they handled was expected to drop to a nominal figure, while the number of commercial buyers was expected to reach an average of some 200 a month, visiting businessmen to stay at roughly 60 a month, and official Reparations and Restitution Teams were expected to rise from 150 to 600 a month.[415] This shifting onus of exploitation from official ministry-sponsored teams to private individuals and groups was, to a certain degree, an inevitable outcome of the close involvement which business and industry had had in the programme from the start. This was itself an extension of the innumerable contributions British firms had made to the war effort, and which had proved so invaluable to Britain's capacity to fight in such a technologically-advanced conflict.[416] Initially, as we have seen, this post-war collaboration was characterised by industrial concerns supplying the experts to participate in BIOS missions to Germany, and working closely with the various branches on any matters relating to the procurement of information from Germany.[417] This was a productive relationship because, as BIOS investigator Monica Maurice remarked, there were many important pieces of information which 'you can only detect by knowing the job'.[418]

As time moved on though, it became clear that it would perhaps be more mutually beneficial if representatives of industry were able to conduct investigations unrestrained by the regulation and administration of government. It was acknowledged as early as the summer of 1945 that 'the question of British industrial and commercial visitors who are now on private rather than official business' would be subject to 'very great … political pressure in favour of permitting such visits'. However, no such allowance could be made at the time as resources were so scarce that 'no [German] industry can be started that is not vital either to the needs of the occupying forces, or for maintaining the standard of the civil population at the minimum necessary to prevent disease and unrest'.[419] There were, of course, loopholes to be exploited. In October 1946, Margarete Steiff GmbH, a stuffed toy

[414] TNA, FO 1031/9, 'BIOS papers: general', 22 October 1947.
[415] TNA, FO 1065/12, 12 December 1946.
[416] Edgerton, *Britain's War Machine*, 244.
[417] TNA, FO 1032/177, 'Relations between Industry and Econ. Div. Branches', 27 July 1945.
[418] IWM, 99/76/1, Private Papers of Mrs Monica Maurice, 26 April 1947.
[419] TNA, FO 1031/10, 'Civilian Travel to Germany', 8 September 1945.

manufacturer based near Heidenheim, famed for its invention of the teddy bear, complained to US occupation authorities that representatives of rival British toy firms had visited their factory, taken photographs of special machinery and demanded samples. The company argued, justifiably, that the manufacture of toys was the most peaceful of industries and the actions of the British amounted to no less than unrestricted commercial espionage.[420] However, by early 1948, these cases ceased to be unsavoury exceptions, as policy changed to facilitate this private exploitation on a larger scale.

One crucial organisation in this period was the Joint Export Import Agency (JEIA), an Anglo-American body tasked with certain aspects of Germany's post-war economic recovery, including facilitating trips of Western businessmen to Germany, and German businessmen abroad.[421] In February 1948, at a meeting of the JEIA, it was asserted as essential that 'the facilities afforded to businessmen [in Germany] be as nearly as possible equivalent to those in other European countries today'. The first step in the process towards achieving this end was the reactivation of the German hotel industry which, by this stage, had been successfully carried out in nine hotels in the American zone but not at all in the British zone. The idea was that these hotels, usually de-requisitioned T-Force messes, would 'lead an entirely normal life; bars would be provided and stocked, prices would be on a commercial basis and visitors would not have to conform to the Military Government regulations normally to be found in Transit Hotels'. However, they would also be helped with the initial set-up by JEIA, who would, for instance, help source furniture and buy food in bulk.[422] This co-existed alongside a remarkable desire among the German population to revitalise their own domestic tourism industry, as a method of returning to pre-war 'normality'.[423]

An attempt to replicate this American success in the British zone was made on a purely experimental basis, where a hotel was handed over to German ownership but provisioned by the British Army. The verdict was not wholly promising:

[420] Gimbel, *Science, Technology, and Reparations*, 165-6.
[421] John Backer, *Priming the German Economy: American Occupational Policies, 1945-8* (Durham, N.C.: Duke University Press, 1971), 143.
[422] TNA, FO 1031/2, 'Minutes of JEIA Meeting', 24 February 1948.
[423] Alon Confino, 'Dissonance, Normality, and the Historical Method: Why did some Germans Think of Tourism after May 8, 1945?' in Bessel and Schumann, *Life after Death*, 323-348.

> The experiment had not been a complete success owing to the extreme demands of the employees, suspected black market activities in food and a reluctance on the part of a German manager to continue under these conditions. It had also been found necessary to employ a British supervisor to deal with complaints and to supervise the general running of the hotel.[424]

Discouraged, the British authorities began to consider alternative options, such as the outsourcing of all private and civilian travel to the commercial travel agent, Thomas Cook, but not only did the company 'refuse to undertake such a commitment, it was also established that it would be uneconomical to outsource this task anyway'. In the end, as the disbandment of T-Force loomed ever closer, the chosen course of action was to hand over responsibility for these hotels from T-Force to the Regional Administrative Offices of the Control Council.[425] By 23 May 1949, the issue had become moot as the occupation zones of Britain, the USA, and France ceased to exist and were replaced by the Federal Republic of Germany, an essentially sovereign nation.

It is worth noting as an aside that, after the war, Germany was not the only nation which was subject to exploitation. BIOS was also responsible for co-ordinating a similar programme in Japan, although the bulk of the investigations there were conducted by American personnel, as they constituted the majority of the occupying force.[426] In August 1945, the BIOS Committee was informed that although Japanese research had been fairly advanced, they had generally failed to apply science to war on a substantial scale and that, as a result, any investigations in Japan should focus on research rather than development, and on laboratories rather than plants.[427] By November, BIOS had been instructed to liaise with the British Staff Office in Tokyo and perhaps create a similar Black List as the one used in Europe, albeit smaller.[428] The initial steps which BIOS took were uncertain and poorly-governed, while the US was pressing ahead and flooding Japan with scientific intelligence missions.[429] In the end it was decided that 'BIOS had no mandate for securing Japanese

[424] Ibid.
[425] TNA, FO 1031/4, 'Termination and transfer of T-Force commitments', May 1948.
[426] Michael Schaller, *The American Occupation of Japan: The Origins of the Cold War in Asia* (Oxford: OUP, 1985).
[427] TNA, FO 1031/50, 'Minutes of 2nd BIOS Meeting', 29 August 1945.
[428] Ibid., 'Minutes of 8th BIOS Meeting (1945)', 21 November 1945.
[429] R.W. Home and Morris F. Low, 'Postwar Scientific Intelligence Missions to Japan', *Isis*, 84 (1993), 528.

intelligence, only of receiving reports' and their role would only be to help in the translation of documents and the 'channelling' of reports into Britain.[430]

In Germany, the story which the exploited materials tell is one of an effort to obtain the best results for British science and industry by amassing a vast quantity of documents, equipment and Final Reports compiled by expert investigators. Certainly these spoils of war had their benefits but they could not unravel the whole, or even the greater part, of the secrets of German science and technology. Within a month of the war's end, CIOS had recognised that 'some of the most spectacular results have tended to be associated with information obtained from men rather than from places' and that 'optimum results will be obtained when men, equipment and records bearing on a single problem are examined concurrently at the same place'.[431] It was not long before British policy changed to reflect these realisations and the greater emphasis of exploitation was placed on German scientists, technicians and other knowledgeable personnel, who not only had the potential for longer-term benefit to Britain but were also less subject to the strict regulations surrounding reparations allocations. Two examples of this 'concurrent examination' are below, while the next chapter will cover the detainment, interrogation and eventual recruitment of German individuals which formed arguably the most significant and certainly the most lasting element of British exploitation.

Chemical Warfare and Rocketry

Both chemical weapons and rockets are examples of scientific advances which occurred due to the increased military research and development which was a common feature of all the belligerent nations during the Second World War. They are also the most striking instances where the scientific capabilities of Nazi Germany exceeded that of Britain and its allies. That, however, is where the similarities end. Rocketry, particularly in the form of the V-2 ballistic missile, was used extensively by the German military against Britain, and against targets in Belgium, the Netherlands and France, while chemical warfare was never actively employed on any scale during the war. Accordingly, while rocketry was an area of high priority for

[430] TNA, FO 1031/50, 'Minutes of 7th BIOS Meeting', 8 May 1946.
[431] TNA, FO 1031/51, 'CIOS Progress Report for 1945', 4 June 1945.

exploitation planners, sites relating to chemical warfare research and development proved to be the very definition of 'targets of opportunity', as unsuspecting British soldiers uncovered a whole new class of war gases – the nerve agents – by chance. Therefore, studying the way in which these two topics were investigated by exploitation teams sheds light on the variety and flexibility which was integral to the programme as a whole.

Despite the ubiquitous wartime imagery of men, women and children in Britain carrying gas masks as they went about their daily lives, no belligerent decided to employ chemical weapons during the conflict and the prevailing opinion on why they remained unused is that a mutual fear of retaliation existed, and no country wished to be the first to unleash weapons of such horror, lest they be visited on their own civilian population in return. Germany, however, was in a stronger position than its military leaders or scientific experts realised. In 1936, scientists at Anorgana, a subsidiary of industrial giant IG Farben, which focused on chemical products, had, while researching new insecticides, developed an agent which could inflict great harm on the human nervous system, sometimes resulting in death, which gave it great potentiality as a chemical weapon. It was given the designation Tabun and, through further research, two even more potent derivatives were developed, named Sarin and Soman. These have been described as being as great an advance over the chemical weapons of the First World War as the machine gun was over the musket.[432] Neither Britain nor any of its allies had a chemical weapon that even came close to the destructive power of these new agents but, due to the endemic secrecy of wartime research, Germany remained as oblivious of the Allies' vulnerability as the Allies did of Germany's superiority.[433]

As such, it is unsurprising that the exploitation programme did not at first count chemical warfare as a category of any particular importance in their preparation for entry into Germany. The first indication that it was an area of any interest at all came on 6 April 1945, when British troops came across truckloads of strangely-marked shells at a rail-yard in

[432] Robert Harris and Jeremy Paxman, *A Higher Form of Killing: The Secret History of Chemical and Biological Warfare* (London: Arrow, 2002), 54.
[433] Florian Schmaltz, *Kampfstoff-Forschung im Nationalsozialismus: zur Kooperation von Kaiser-Wilhelm-Instituten, Militär und Industrie* (Göttingen: Wallstein, 2005); Jonathan B. Tucker, *War of Nerves: Chemical Warfare from World War I to Al-Qaeda* (New York: Anchor, 2006), 31-40.

Espelkamp, seven miles north of Lübbecke.[434] In addition, the discovery of a wealth of information, including documents and manufacturing equipment, at a chemical warfare experimental station at Raubkammer and munitions storage facilities at nearby Munster-East and Oerrel proved that this topic warranted further investigation.[435] Fortunately, procedures for the discovery of enemy possession of new chemical weapons had been in place during the war and samples were immediately sent to the British Chemical Defence Experimental Establishment (CDEE) at Porton Down, Wiltshire, where their contents could be examined by experts.[436] So alien to these experts were the chemicals contained within that they all but dismissed them, reporting that 'apart from novelty, [it is] not clear that this charging has any advantage over other well-known chargings.'[437] In short, the initial reaction was that this chemical agent was roughly equivalent in potency to Britain's own obsolescent agent, PF-3; in reality, it was up to ten times more dangerous.[438]

This illusion of relative impotency did not last long and within days, scientists at Porton had realised that, if deployed on the battlefield, these new nerve agents could have an absolutely devastating effect.[439] Just over two weeks after the nerve gas shells had been discovered, a 19-man CIOS team, including nine experts from Porton Down, plus five other British members, four Americans and a Canadian, travelled to Raubkammer and the surrounding sites to conduct their investigations. On arrival they discovered that a great deal of equipment and documents had been transferred there from the main German chemical warfare establishment at Spandau Citadel, near Berlin, during the war, to avoid it being captured by the advancing Red Army. The CIOS team was on site for six weeks, at the end of which they filed a 482-page report 'based upon an examination of the range, laboratories, plant and equipment, upon a preliminary examination of a mass of documents and samples, and upon a thorough questioning of all available witnesses'.[440] This was an early example of the type of 'concurrent examination' which was quickly being recognised as the most effective method of exploitation.

---

[434] Schmidt, *Secret Science*, 158.
[435] Tucker, *War of Nerves*, 85.
[436] Schmidt, *Secret Science*, 157.
[437] TNA, WO 208/2183, 'Reports on phosphorus and nitrogen compounds Tabun and Sarin', April 1945. In this context, charging means the active contents inside a chemical weapon, i.e. payload.
[438] Schmidt, *Secret Science*, 159.
[439] Rob Evans, *Gassed: British Chemical Warfare Experiments on Humans at Porton Down* (London: Stratus, 2000), 115.
[440] IWM, CIOS Report XXXI-86, 'Chemical Warfare Installations in the Munsterlager Area', 3 June 1945.

Even this extensive assessment was not considered to be sufficient so in the summer of 1945, Britain despatched a unilateral investigation team, known as Porton Group No. 1, to Raubkammer to conduct a three-month study of German chemical warfare.[441] One of the core elements of this examination was the use of field trials – there were 26 in total, many of which were carried out by German technicians, with members of the Porton group simply acting as observers, in order to understand German technique as well as the nature of the weapons themselves.[442] This observation-led method would later be replicated in Operation Backfire, for the study of V-2 launching procedure. All in all, the comprehensive investigation into German chemical weapons allowed Britain, and the United States, to add nerve agents to their arsenals within a few months of their discovery and it also ensured that the CDEE at Porton Down survived and that chemical warfare retained its place in British military doctrine.[443]

Porton Down was also responsible for Britain's biological warfare programme, and the energetic wartime work in this field, both defensive and offensive, carried out there was driven by the need to be able to protect the country from, and retaliate in kind against, any form of German bacteriological attack which might occur.[444] This policy was based on a widely-held assumption, which predated the war, that Nazi Germany was actively developing biological weapons and possessed an arsenal which far outstripped that of the Allies.[445] In reality, though, this assumption was almost completely false. Though the Third Reich had possessed a biological warfare programme, it had been rendered wholly dysfunctional by the bureaucratic quagmires and departmental infighting which typified so much of the Nazi regime's activity, and had not enjoyed any support from the leadership, with Hitler himself expressly forbidding any offensive research.[446] In addition, Kurt Blome, the civilian director of Germany's biological warfare research, revealed in a post-war interrogation that 'all the leading bacteriologists in Germany consider B[iological] W[arfare]

[441] Schmidt, *Secret Science*, 165-175.
[442] TNA, WO 208/2174, 'Field technical assessments by Porton group', 2 November 1945.
[443] Gradon P. Carter, *Porton Down: 75 Years of Chemical & Biological Research* (London: HMSO, 1992), 55.
[444] Balmer, *Britain and Biological Warfare*, 19.
[445] Erhard Giessler, 'Biological warfare activities in Germany, 1923-45', in Erhard Giessler and John Ellis van Courtland Moon (eds.), *Biological and Toxin Weapons: Research, Development and Use from the Middle Ages to 1945* (Oxford: OUP, 2009), 91.
[446] Ibid.

to be impracticable and not worthy of any serious study'.[447] Alsos investigators, who counted chemical and biological warfare as part of their remit along with atomic research, recognised, before the war was even over, the truth of the matter and, in March 1945, the War Office decreed that the amount of work entailed in the biological warfare aspect of German disarmament would not even 'justify the services of a full time Technical Officer'.[448]

Nonetheless, exploitation officials still conducted a relatively thorough examination of facilities, documents and personnel with any link to biological warfare in Germany, and Alsos produced several reports on their investigations into this field. They also encountered many of the same issues as did their counterparts working on other topics, such as problems in locating senior German experts – even the wife of the Wehrmacht biological warfare expert, Heinrich Kliewe, did not know where he was when interrogated in April 1945 (he later turned up in a temporary German hospital)[449] – and difficulty in securing the relevant files – in late May, Alsos operatives reported locating 50-60 large chests, containing 'Top Secret' German biological warfare information which had been evacuated from the Surgeon-General of the Army's office in Berlin, hidden in the cellar of a monastery in the village of Niederviehbach, near Landshut in Bavaria.[450]

It is also worth noting that, despite the overwhelming evidence that Germany posed no biological warfare threat whatsoever, the genuine fear of biological warfare among the Allied officials made them unwilling to ignore any possible lead on the subject, which in turn made them susceptible to being misled, as happened in the series of incidents collectively codenamed as 'Mayfly'. This essentially comprised a plot by a small group of low-ranking German officials and ordinary citizens to influence the occupation policies of the Western Allies by offering the British authorities exclusive access to the details of a German 'BW weapon capable of destroying the Anglo-Saxon states quickly', which might otherwise end up in Russian hands, if the British did not comply. When the British displayed their clear scepticism, the German plotters switched to bare-faced extortion, threatening to leak documents which 'proved' that Britain was negotiating unilaterally for access to this new biological weapon to Britain's allies, with the aim, presumably, of destabilising the already

[447] TNA, WO 208/3974, 'Interrogation of Blome', 30 July 1945.
[448] TNA, FO 1032/247, Lt.Col. Wansbrough-Jones to Brig. Spedding, 11 March 1945.
[449] TNA, WO 208/4280, 'Report on potential BW targets visited between 11-14 April 1945', 26 April 1945.
[450] TNA, FO 1031/83, 'Official German Documents and Records on BW', 24 May 1945.

tense relations between the occupying powers. In return for not disclosing this 'evidence' to the Americans and Soviets, the plotters demanded, among other things, 'the immediate release of POWs and internees, the limiting of denazification and the cessation of the dismantling of German industry', as well as the empowerment of a German cabinet to be headed, almost certainly without his knowledge or consent, by future West German chancellor, Konrad Adenauer. Despite the fact that the British seemed at no point to fall for this almost farcical attempt at blackmail, the 'Mayfly' case rumbled on for six months, from September 1946 to March 1947.[451] Exceptional incidents such as this aside, biological warfare only formed a very minor part of the exploitation scheme, for obvious reasons. Despite this, the British biological warfare programme did not disappear after 1945, with the threat of the Soviet Union simply supplanting that of Nazi Germany as a *raison d'être*.[452] However, as with chemical weapons, though to a far greater degree, any strategic advantages conferred by biological weapons were, by this stage, becoming largely eclipsed by the atomic bomb.[453]

By contrast, the potential future use of atomic weapons was one of the many reasons why a good understanding of rocketry was considered so important in the aftermath of the Second World War. Wernher von Braun, German pioneer of rocket technology and one of the most widely-desired prizes of exploitation, wrote a report for CIOS when in Allied custody after the war in which he saw 'possibilities in the combination of … the harnessing of atomic energy together with the development of rockets, the consequence of which cannot yet be fully predicted'.[454] Major-General A.M. Cameron, of the Allied Special Projectile Operations Group (SPOG), shared von Braun's vision of the future, noting that if a V-2 could be fitted with an atomic warhead, 'its destructive ability will be colossal'. Cameron also hypothesised optimistically about a piloted rocket which could be used as a mail service and would be able to cross the Atlantic in forty minutes, something he felt 'might be of more value than a weapon of war'.[455] More peaceful applications aside, it was commonly believed that rockets would change the face of warfare

[451] TNA, FO 1032/247, 'Mayfly – Situation as at 5 March 1947', 6 March 1947.
[452] Brian Balmer, 'The UK Biological Weapons Program', in Mark Wheelis, Lajos Rosza and Malcolm Dando (eds.), *Deadly Cultures: Biological Weapons since 1945* (Cambridge, MA: Harvard University Press, 2006), 83.
[453] Gradon P. Carter and Graham S. Pearson, 'British biological warfare and biological defence, 1925-45', in Giessler and Moon, *Biological and Toxin Weapons,* 188.
[454] IWM, CIOS Report XXVIII-56, 'Rockets and Guided Missiles'.
[455] IWM, Misc. 21/382, 'Report on Operation Backfire', 7 November 1945.

in the future, with all manner of long-range, and potentially intercontinental, ballistic missiles possible.[456] For Britain, this was an especially acute fear, knowing that the traditional defensive value of the English Channel had been eroded by the development of long-range weapons, particularly in the form of guided missiles.[457]

Whatever its eventual uses were to be, there was no doubt that a good understanding of rocket technology was essential for any nation which desired to exist as a world power after the war. The key to unlocking this was undoubtedly the V-2, also known as the A.4, the results of research into which were largely considered to be 'applicable to all jet and rocket propulsion problems'.[458] Here it was felt that Britain had a certain advantage, partly because its cities had been the primary target for these new weapons and partly because of the efforts of Duncan Sandys, Financial Secretary to the War Office and later Minister of Works, sometime son-in-law of Prime Minister Winston Churchill, and a staunch advocate of investigation into the German long-range rocket programme, even before the first V-weapons fell on London. Not only had Sandys instigated a major bombing raid on the German rocket development site at Peenemünde in August 1943 but he also chaired the wartime Crossbow committee – a subsidiary of the War Cabinet which handled all matters relating to defence against flying bombs and rockets.[459] As a result, by the end of the war, Britain had unilaterally amassed a great quantity of intelligence on German rocketry – Major Robert Staver, Chief of the Jet Propulsion Section of the Research and Intelligence Branch of the U.S. Army Ordnance Corps, admitted that British rocket experts had given him 90 per cent of his target intelligence, including all the information they had gathered on Peenemünde during the Crossbow investigations.[460]

As soon as the war ended, exploitation teams rushed to sites of interest across Germany – not only to Peenemünde, which had been captured by the Red Army in May 1945, but also to storage dumps under British and American control and to the *Mittelwerk*, an enormous underground missile factory, located near Nordhausen in the Harz Mountains, which was occupied and stripped of everything of value by the Americans before being

[456] Collier, *Battle of the V-weapons, 1944-5*, 150.
[457] Robert Hathaway, *Great Britain and the United States: Special Relations since World War II* (Boston, MA: Twayne's, 1990), 11.
[458] IWM, CIOS Report XXXII-125, 'German Guided Missile Research'.
[459] McGovern, *Crossbow and Overcast*, 13.
[460] Ibid., 98.

handed over to the Soviets as part of their zone of occupation. CIOS filed several reports on the subject, including one based on the interrogation of key figures who were held at Garmisch-Partenkirchen in southern Bavaria and were led by both Professor von Braun, and the military head of the V-weapon programme, General Walter Dornberger. Both these men had 'the attitude that if they can convince the British and Americans of the value of their work, there is a chance that facilities may be offered in England or America for continuing it'.[461] For the British though, these investigations were mere preludes to what would prove to be the most comprehensive evaluation of German guided missile technology conducted in the post-war period – Operation Backfire.

On 22 June 1945, General Eisenhower instructed Major-General A.M. Cameron, head of Special Projectile Operations Group, to conduct an operation, the primary object of which was to ascertain the German technique of launching long-range rockets. This was to conclude by actually conducting a launch, in order to prove this method, as well as offering 'opportunities to study certain subsidiary matters such as the preparation of the rocket and ancillary equipment, the handling of fuels, and control in flight'. Three weeks later SHAEF was disbanded, but the operation, now known as Backfire, continued regardless, with the British shouldering the majority of the burden and command for it assumed by the War Office. The chosen site for this operation was Cuxhaven on the North Sea coast, fifty miles north of Bremen, within the British zone. As no 'complete, undamaged and serviceable' rockets had been found, the idea was to assemble them from various parts which had been acquired 'from fields, from ditches, from railway yards, from canals, from factories' during the initial rush of exploitation activity in Germany, and the assembly, preparation and firing was to all be conducted by German personnel, with the British experts acting simply as technical officers and observers.[462]

The operation was afforded 'overriding priority' by the British authorities so that it 'should not be handicapped through non-availability of the necessary technical personnel'.[463] Certainly, the most valuable component of Backfire was the assembled group of German technical experts, who brought with them the benefit not only of their

[461] IWM, CIOS Report XXVIII-56, 'Rockets and Guided Missiles'.
[462] IWM, Misc. 21/382.
[463] TNA, CAB 82/6, 'Minutes of DCOS Meeting', 16 July 1945.

accomplishments but also of their mistakes – 'the real ingredient of experience'. One of the experts, Dieter Huzel, pithily described the project as the British effort 'to become familiar with the other end of a trajectory', but felt it was well-conducted and considered the British treatment of the German personnel to have been 'generous'.[464] On the whole, Operation Backfire was a success. Despite initial expectations that it would require 30 rockets,[465] in the end only three were launched. The first took place on 2 October and 'the behaviour of the rocket from the moment of take-off to the point of fall was perfect'; the second was far less successful and crashed into the sea almost immediately after take-off; and the third, taking place on 15 October, was simply 'a demonstration to representatives from the United States, Russia, France, the Dominions, Whitehall, and the Press'. Major-General Cameron was suitably impressed by the conduct of his operation, noting in the conclusion to his official report that, in relation to German rocket technology, 'it is believed that all is known and that it now remains for others to make use of that knowledge'.[466]

The success was widely celebrated, at least in Britain. A *Daily Telegraph* correspondent who had been present at the third launching wrote an article which conveyed his awe at the rocket, which he described as 'a pencil on a spear of flame as long as itself'.[467] Members of the British technical team who had supervised the operation were awarded with a trophy in the shape of a V-2, and were invited to attend lectures on the subject, screenings of the official Backfire film, and a celebratory dinner which included, for dessert, the mysterious 'A.4 Special'.[468] The far-reaching importance of Backfire was not lost on those involved either and Cameron added a grave warning to the end of his report that, 'for the sake of their very existence, Britain and the United States must be masters of this weapon of the future'.[469] Certainly it can be argued that the most significant weapons technology of the Cold War, after the atomic bomb, was the rocketry which would most likely be used to deliver it – as a result, ballistic missile defence became both a technically challenging and politically controversial field.[470] This was already becoming clear on the international stage, as noted by American Major Robert Staver, who had admitted how

[464] Dieter K. Huzel, *From Peenemünde to Canaveral* (Westport: Greenwood, 1962), 200.
[465] TNA, WO 219/2165, 'Operation Backfire', 6 June 1945.
[466] IWM, Misc. 21/382.
[467] 'German Fires V2 under British Control', *Daily Telegraph*, 16 October 1945.
[468] IWM, 06/27/1, Private Papers of Major P.A. Chittenden, 23 October 1945.
[469] IWM, Misc. 21/382.
[470] Jeremy Stocker, *Britain and Ballistic Missile Defence, 1942-2002* (London: Frank Cass, 2004), 33.

much his country had relied on British V-weapon intelligence during the war, and who now recognised the irony that in the post-war missile race between the world powers, it was the British who would finish last.[471]

Without doubt, the exploitation process was at its most extensive and comprehensive in the period immediately following the collapse of the Third Reich and the end of the war in Europe. This chaotic situation provided the ideal circumstances for all the victorious powers to pursue their policies of exploitation with maximum vigour and enthusiasm. Documents, samples of machinery and other valuable material were all purloined wholesale, often in conditions of dubious legality.[472] This scientific and technological material was supplemented by the expertise gained by government-sponsored investigators who conducted thorough examinations of facilities and processes and compiled equally thorough reports on their findings. Combined, these various fruits of exploitation allowed the Allies to learn much about German military science and technology, and improve their own armouries as a result, especially in areas in which they had genuinely lagged behind, such as chemical warfare and rocketry. For the British, the process of exploitation was no longer the preserve of the clandestine secret intelligence agencies, but was instead under the auspices of the civil service bureaucracy, in the form, primarily, of the British Intelligence Objectives Sub-committee. This organisation was able to exert its will on the ground in Germany due to the impressive logistical framework of the T-Forces and, to a lesser extent, the Field Information Agency Technical.

Naturally, there were significant problems which faced the British exploitation programme, and the operatives which were charged with conducting it. One of these was the sheer plurality of organisations active in Germany at the time, and their varying and often conflicting aims, though their interactions in the field gave rise to collaboration at least as often as competition, if not more so. The great number of these other agencies is indicative of the fact that the exploitation initiative did not exist in a vacuum but instead was part of a broad and complex network which represented the early days of the British occupation administration, and the success which exploitation enjoyed despite this is

[471] McGovern, *Crossbow and Overcast*, 98.
[472] See Chapter Six.

testament to the powers and priority conferred on the mission to strip Germany of its scientific and technological spoils. Nonetheless, this comprehensive exploitation of files, factories and facilities was just one, arguably quite minor, part of the process as a whole and a key belief which was reinforced during this phase was that the greatest benefits would be derived where the subjects of study were not documents or machines, but the men who had created and operated them.

CHAPTER FOUR
The Brain Drain

The exploitation of German personnel by the victorious Allies is arguably the best-known element of the post-war exploitation programme, largely because of the controversy which it often created. While cases such as that of Wernher von Braun have attained more prominent positions in the public consciousness, largely on account of his subsequent fame and the moral ambiguity of his Nazi past, his story was not unique; he was just one of hundreds of German scientists and technicians who were treated as targets of exploitation by the Allies after the war, and his experience of detainment, interrogation and then employment was a familiar one.[473] In intelligence circles, the use of enemy personnel as assets was not a new approach, a fact which can be seen by the way in which senior German prisoners of war, held in the UK, were secretly wiretapped during their imprisonment in the hope that they would reveal important military secrets which Britain and its Allies could utilise.[474] However, as we have seen, continuing a trend from the First World War, science and scientists became even more influential during the Second World War and began to act as advisors to their military colleagues.[475] This, coupled with the fact that scientific intelligence as a field had truly come into its own during the war, ensured that at its conclusion much attention was focused on the wartime efforts of formerly enemy scientists and technicians.

While some histories of the post-war period suggest that Britain was a junior partner to the US in the exploitation of German experts,[476] or that they 'preferred the inventions to the inventors' on account of lacking the financial resources to support personnel in detention and interrogation,[477] others present Britain as the leading power in exploiting individuals and one which proved to be far less scrupulous in the process too.[478] However,

[473] On von Braun, see Biddle, *Dark Side of the Moon*; Neufeld, *Von Braun*.
[474] Sönke Neitzel (ed.), *Tapping Hitler's Generals: Transcripts of Secret Conversations, 1942-45,* trans. Geoffrey Brooks (London: Frontline Books, 2013).
[475] Bud and Gummett (eds.), *Cold War, Hot Science*, 6.
[476] Bar-Zohar, *Hunt for the German Scientists.*
[477] Giles MacDonogh, *After the Reich: From the Liberation of Vienna to the Berlin Airlift* (London: John Murray, 2007), 390.
[478] Gimbel, *Science, Technology, and Reparations*; Lasby, *Project Paperclip*, 110.

as is often the case, the truth is something of a combination of the two and there is little doubt that Britain was at least as enthusiastic about the opportunity of exploiting German scientists and technicians as its wartime allies, if not more so, and that it formed a major part of its post-war exploitation efforts on the whole. The importance of utilising personnel, as well as documents, equipment and on-site investigations by specialist teams (as discussed in the previous chapter), was clearly recognised by policy-makers at the time. A July 1947 Board of Trade circular, sent to numerous British trade associations, described active exploitation of German experts as 'the climax of the whole operation', and went on to say:

> In some cases it is being found that without the services of the key Germans concerned with either the development or application of the novel processes in Germany these processes cannot be reproduced or developed in industry here or, alternatively, that their exploitation is unnecessarily protracted or costly.[479]

As revealing as these comments are, they were made more than two years after the initial decision to exploit German scientific and technical personnel, and the origins of such a decision were far less certain and confident than this memo would suggest.

This chapter will first briefly examine these origins and how British policy on the exploitation of German expert personnel, which had enormous potential for risk and controversy, was first approached, challenged, and then accepted. The rest of the chapter will then consider the number of forms which personnel exploitation took on the British side, roughly in chronological order – firstly, the short-term approaches, beginning with detention and interrogation in Germany, followed by the same process in Britain; and secondly, the long-term tactics, most notably the employment of German specialists in British defence research and development, and the subsequent extension of this to the civil-industrial sphere. This chapter will examine all of these elements in order to present a holistic view of what was arguably the most significant component of the British exploitation programme.

[479] TNA, AVIA 54/1403, 'Recruitment of German Scientists and Technicians', 29 July 1947.

Formulating Policy

On 5 June 1945, the British Chiefs of Staff received a telegram from the Joint Staff Mission in Washington, D.C., which informed them that the US Chiefs of Staff had informally decided 'to bring German civilian scientists and technicians to the United States for the purpose of exploiting their knowledge by the military in the development of weapons which can be used against the Japanese'.[480] Nine days later, after some American prompting, the British Chiefs of Staff signalled their assent, but with the inclusion of several key provisos. Firstly, that the intelligence gained by such investigations be shared between the Americans and British; secondly, that the security risks of letting exploited German experts return to Germany armed with knowledge of British or American research needed to be addressed; and thirdly, that a system of allocation of such human resources between the two powers be devised. They also added, for British eyes only, that they were 'sceptical if German scientists could really contribute to weapon development in time for the Japanese war'.[481]

During considerations of the American proposals, the Deputy Chiefs of Staff committee suggested 'that some German scientists would be of considerable value to our own research'.[482] This acknowledgement, though appearing somewhat self-evident in hindsight, shows the original germ of the British plan to exploit specialist personnel. The idea quickly gathered momentum and, six weeks later, the DCOS committee considered a report by the Directors of Scientific Research at the Admiralty, Ministry of Aircraft Production and Ministry of Supply, 'advocating that general agreement should now be sought to the limited employment of a number of German scientists in this country under suitable conditions of security'.[483] Extensive discussion ensued and concerns were raised about security risks and potentially problematic public reaction. The Joint Intelligence Sub-Committee registered their particular anxiety on the former issue, utilising a Security Service report which argued that the proposals for personnel exploitation were 'based on dangerous assumptions and that the security risks had been under-estimated'.[484] The Home Office too resisted the plan, worrying that it would be too difficult to keep tabs on the

[480] TNA, CAB 122/343, British Joint Staff Mission to Chiefs of Staff, 5 June 1945.
[481] Ibid., Chiefs of Staff to British Joint Staff Mission, 14 June 1945.
[482] TNA, CAB 82/3, 'Minutes of 4th Meeting of DCOS', 6 June 1945.
[483] Ibid., 'Minutes of 7th Meeting of DCOS', 18 July 1945.
[484] TNA, CAB 81/93, 'Minutes of 53rd Meeting of JIC', 8 August 1945.

German experts brought over, and practically impossible to prevent them from learning valuable British defence secrets.[485] Ultimately, however, the fear of being left behind proved the deciding factor – at a meeting on 15 August, Professor Charles Ellis, scientific advisor to the War Office, remarked that he was sure the Americans would press ahead with importing a certain number of German experts, and asked 'could we afford not to adopt the same policy?'[486]

The DCOS were not in a position to make the final decision, however, and it had to be referred up the chain to their superiors on the Chiefs of Staff committee. The reactions at that level were somewhat mixed: First Sea Lord Andrew Cunningham and Chief of the Air Staff Charles Portal felt that 'on the whole, we stood to gain more than we might lose by bringing these scientists to this country', while Alan Brooke, Chief of the Imperial General Staff, thought that 'the pros and cons were very evenly balanced'.[487] Nonetheless, on 24 August 1945, the Chiefs of Staff 'agreed in principle to the employment of German scientists and technicians in this country, notwithstanding the security risks involved'. At the end of August, the Chiefs of Staff sent a paper outlining the policy to the highest body of military decision-making in Britain, the Defence Committee of the Cabinet, for their consideration. The Committee, chaired by the Prime Minister (the recently-elected Clement Attlee), discussed this paper thoroughly and then approved it on 31 August.[488]

Short-Term: In Germany

As explored in the previous chapter, the apparatus in place to enact exploitation was large and multi-faceted, and a considerable portion of its efforts were directed towards the tracking down and safe detainment of key German personnel. Not only were these roles considered to be part of the remit of T-Forces and FIAT, there was also established a separate sub-division of the latter to focus exclusively on this element of the programme. The Enemy Personnel Exploitation Section (EPES) was formed on 1 May 1945 and, as with FIAT, was split into national components shortly after. The main objective of EPES was to

[485] Ibid., 'Minutes of 55th Meeting of JIC', 14 August 1945.
[486] TNA, CAB 82/3, 'Minutes of 10th Meeting of DCOS', 15 August 1945.
[487] TNA, CAB 79/37, 'Minutes of 202nd Meeting of COS', 21 August 1945.
[488] TNA, CAB 69/7, 'Minutes of 4th Meeting of Defence Committee', 31 August 1945.

build up and maintain a comprehensive set of records on all German scientists and technicians of note, and then to provide the information therein to interested agencies on request, and to facilitate exploitation by establishing appropriate contact between the target and relevant agency. Within a year of operation, EPES had compiled an index of 18,000 personality cards and 400 persona dossiers, and was considered to be 'the only place where a general picture of exploitation of German scientists and technicians can be obtained'. By December 1946, EPES was handling 'approximately 130 requests every month on behalf of British Ministries and Agencies who wish to trace and locate German scientists and technicians with a view to exploiting them'.[489]

Such extensive record-keeping was only possible because of the quality of the staff employed by EPES, who were 'well trained in intelligence duties' and therefore adequately prepared to handle the 'very considerable number of difficult and delicate problems [which] arise in the course of the work'.[490] Before being despatched to conduct their activities with FIAT Forward in Berlin, EPES operatives were sternly instructed to adhere to a number of security regulations, including not entering the Soviet zone, not talking to 'any person except those with whom it is necessary for you to converse', and always employing 'German agents to contact unknown persons at addresses which are not known to you outside the office'.[491] EPES was, however, only a fairly small organisation and the bulk of its workload was administrative, so the legwork involved was usually delegated to the greater manpower of T-Force and FIAT, as well as support being rendered by the other intelligence agencies of the occupying powers.[492]

As with the removal and transportation of documents and equipment, and the facilitation of investigative trips to Germany, T-Force acted primarily in the British zone while FIAT was largely responsible for parallel work in the US and, less often, French zones. Perhaps the most critical part played by T-Force in the execution of personnel exploitation was the locating of the scientist or technician in question, 'often on the scantiest of information'. This sometimes involved obtaining the address from the Regional Research

[489] TNA, FO 1031/75, 'EPES: policy', 10 August 1946.
[490] Ibid.
[491] TNA, FO 1031/59, 'Attachment of personnel of Enemy Personnel Exploitation Section to FIAT Forward (British)', 14 August 1946.
[492] Aldrich, *Hidden Hand*, 188.

Officer, or the Education Branch at Regional level, or any number of other administrative bodies operating at this time.[493] Once the German expert was located, it was necessary to secure clearance from the relevant Military Government officials before moving him to the desired location, either elsewhere in Germany or over to Britain for interrogation or employment.

Such a sensitive issue as this unsurprisingly entailed a certain amount of bureaucratic excess as shown by the number of agencies which EPES and FIAT were in regular contact with – a staggering 52, including 20 British, 13 American, 14 Combined, and one French.[494] This can, to some extent, be accounted for by the international character of FIAT, which was responsible for 'the location of German scientists and technical personnel in the US and French zones of Germany and Austria'.[495] The other major contribution which FIAT made towards the exploitation of German personnel was its involvement in the operation of the largest scientific and technical detention centre in the western zones of Germany, codenamed Dustbin. This had initially been established at Versailles but once the war ended, it was relocated to Schloss Kransberg, a medieval castle in the Taunus Mountains, about 25 miles north of Frankfurt, and a former residence of Hermann Göring, among other senior Nazis. Here, senior German scientists and technicians were detained and interrogated, and also instructed to compile comprehensive reports on their wartime work.[496]

One of Dustbin's most notable residents was Albert Speer – architect, Nazi Minister of Armaments and War Production, and close confidant of Hitler – who, in a twist of not uncommon post-war irony, had overseen the construction of the very servants' annex at Kransberg where he himself was interned for a short time in the summer of 1945. In his memoirs, Speer recalls his time at Dustbin relatively favourably: the excellent views from the unbarred windows of his top-floor room, the sizeable US Army rations, and the entertainment organised by the other internees, including comic cabaret scenes on account of which, in Speer's own words, 'tears of laughter ran down our faces at the tumble we had

[493] TNA, FO 1031/22, 'Employment of German Scientists outside Germany', 11 August 1947.
[494] TNA, FO 1031/68, 'List of British and American Agencies', 11 September 1946.
[495] TNA, FO 1032/1459, 'Field Information Agency Technical (FIAT)', 10 December 1946.
[496] Gimbel, *Science, Technology, and Reparations*, 82; Tusa and Tusa, *Nuremberg Trial*, 42; Schmidt, *Justice at Nuremberg*, 131.

taken.'[497] As with many of Speer's recollections, Gitta Sereny takes issue with this particular account – her interviews with some of Speer's fellow detainees reveal that he largely isolated himself while at Kransberg, interacting only with his secretary, Annemarie Kempf, and not participating in any of the musical or sports events which the others used to pass the time. Sereny also describes how Speer became quite despondent while at Dustbin, and how the Allied authorities encouraged him to write reports on various technical and political topics in order to lift his mood and thus make him more amenable to their purposes. This was most successful when he worked with a British intelligence officer, Captain Hoeffding, to prepare profiles of other senior Nazis, a process which he evidently found cathartic.[498] In September 1945, Speer was taken to Nuremberg to stand trial before the International Military Tribunal – the scientific informant became a war criminal.[499]

As the main site for detaining and interrogating the Third Reich's scientific and technical elite, Dustbin's value was undeniably high, which often made it a contentious subject between the British and Americans. When SHAEF was disbanded in July 1945, General Walter Bedell Smith, Eisenhower's Chief of Staff, issued a policy memo which stated that 'the appropriate US and British agencies will have equal facilities and responsibilities for the intelligence exploitation of Dustbin, and each will receive copies of all reports resulting from this exploitation.'[500] Dustbin was operated on this combined Anglo-American basis until August 1946, when it was replaced with an informal system of mutual co-operation between the two national components of EPES, which in turn was removed in the following November, when the Americans assumed complete control and excluded the British officers from any and all policy decisions. At the end of 1946, the Americans closed Dustbin, an outcome which the British considered deeply unsatisfactory.[501]

The source of this British dissatisfaction lay in the unique nature of Dustbin, as it featured, in the opinion of Air Commodore Victor Bennett, the chief of British FIAT, 'certain facilities which cannot be obtained in other detention centres'. First and foremost, it had 'an atmosphere most likely to induce [the detainees'] maximum cooperation and hence

[497] Albert Speer, *Inside the Third Reich* (London: Sphere, 1971), 673-4.
[498] Sereny, *Albert Speer*, 559-561.
[499] Weindling, *Nazi Medicine and the Nuremberg Trials*, 43.
[500] TNA, FO 1031/69, Walter Bedell Smith to Head, CCG(BE), July 1945.
[501] Ibid., P.M. Wilson to Chief, FIAT (Br), 9 November 1946.

facilitate their exploitation by US and British agencies'. The usual atmosphere of an ordinary detention centre, Bennett continued, was not suitable for dealing with these German experts 'who are often temperamental and who only respond favourably to gentle and careful treatment'. In addition, Dustbin had ample space to accommodate new internees at short notice, which was important as speed was often of the essence in ensuring desirable German targets were not snapped up by rival powers.[502] Furthermore, the security at Dustbin was high; all the guards, and even the drivers, were armed, and no members of the press were to be admitted, as they could end up 'seriously prejudicing interrogations' being conducted there.[503]

Dustbin possessed many unique qualities but it was not the only scientific and technical detention centre established after the war. In the late summer of 1945, the British occupation authorities established an all-German 'Works Centre' in the buildings owned by Rheinmetall Borsig, considered to be 'the most advanced technically of the German armament firms', at Unterlüß, near Celle.[504] At its peak, 150 German specialists in a range of fields, especially munitions and ballistics, were billeted and administered at the Unterlüß Works Centre, 'under good conditions in order to counteract any tendency on their part to migrate to other zones' and tasked with compiling reports on their wartime work.[505] Information provided by the Unterlüß internees also enabled the Technical and Personnel Administration (TPA) of the Ministry of Supply to produce a comprehensive report in October 1948, entitled *German Organisation and Personalities Engaged in Research and Development of Armaments during the Second World War*.[506] When the Works Centre was closed on 20 August 1948, the German scientists and technicians who had worked with limited compensation for the British for up to three years were not guaranteed employment in Britain but were simply moved to other secure facilities in Germany so that they would not be 'made liable to consider offers from the East or be made to suffer undue hardship'.[507]

[502] Ibid., V.B. Bennett to HQ, T-Force, 2 December 1946.
[503] TNA, FO 1031/75, 8 October 1946.
[504] TNA, FO 371/71038, 'Unterlüß Works Centre', 31 May 1948.
[505] TNA, FO 1031/75, 1946.
[506] IWM, 'German Organisation and Personalities Engaged in Research and Development of Armaments during the Second World War', October 1948.
[507] TNA, FO 371/71038.

This fate of uncertainty was a common experience shared by many, if not most, of the German scientists and technicians who were targeted by the British. Unwilling to let them slip away to take up employment in the Soviet zone or the USSR, but unable to offer them any serious prospects themselves, the British preferred to keep their German detainees in a state of limbo, preparing reports or subject to interrogation, with only a limited hope of future remuneration. This process began almost immediately after the war ended, as a result of a policy which was euphemistically known as 'freezing'. Following roughly the divisions of zonal boundaries, the British and American occupying forces kept close tabs on all German individuals of interest, preventing them from relocating or even travelling too far from their homes, so that should they be required for any further investigation they could swiftly be rounded up and delivered. By September 1945, T-Force reported that there were 5,000 German scientists and technicians who had been 'frozen', the vast majority of which remained 'in both British and US zones without any employment'. They urged the British departments to find work for these specialists soon, as it was untenable to sustain this 'freezing' process for much longer.[508] However, in January 1946, as attention moved from exclusively military personnel to those in civil industry, the British informed the Americans that they 'welcomed' the current 'freezing' and would like for it to continue.[509]

Obviously, such a policy was not at all favourable in terms of the treatment of the German specialists – in March 1947, the Scientific and Technical Research Board (STRB) reported that a group of 100 German aeronautical experts who had been tasked with writing monographs with little chance of future British employment were 'intensely dissatisfied with their lot'.[510] Some German specialists even founded protest groups to register their discontent with the occupation authorities.[511] This issue of mistreatment was highlighted especially clearly in the case of Bad Gandersheim, a small town, approximately 40 miles south of Hannover, which, in June 1945, became the temporary home of around 90 German scientists, technicians, and their families, when SHAEF ordered that they be

[508] TNA, FO 1031/20, 'Exploitation of German scientists and technicians: policy', 12 September 1945.
[509] TNA, CAB 122/357, Cabinet Offices to BJSM, 19 January 1946.
[510] TNA, AVIA 54/1403, 'Denial of German Aeronautical Scientists to the Russians', 19 March 1947.
[511] Henke, *Die amerikanische Besetzung Deutschlands*, 766.

evacuated there from Magdeburg, before the British handed it over to the Soviets.[512] However, this hasty evacuation was not swiftly followed by a multitude of job offers. Rather, the German specialists remained somewhat stranded at Gandersheim, being fed and housed by the British Army, accumulating considerable debts and with practically no prospects of the future.

Major Evans, of Research Branch, CCG(BE), complained that the 'Gandersheim Germans' were 'one of the major headaches left us by SHAEF', yet it was acknowledged that the British were 'to some extent morally responsible' as these people had been moved 'forcedly' at their behest.[513] The issue was raised at a BIOS meeting on 3 March 1946, where it was stated that the 'position regarding the dependents of these scientists was not satisfactory', as well as concerns that if word of such poor treatment got out, it could seriously hinder British recruitment attempts in Germany.[514] The decision made was that the Control Commission were 'to make every effort to find suitable employment in the British zone for those scientists who are not offered contracts in Britain', and to provide assistance for the scientists' families when they had to move.[515] In reality though, this did not materialise quite as promised, and by October, many of the men were still at Gandersheim and Military Government continued to gripe about the costs of maintaining them there.[516]

Other British personnel exploitation schemes were more successful. Operation Surgeon was an Air Ministry initiative to utilise the brightest minds of German aeronautical science, jointly conducted by the Ministry of Aircraft Production and Ministry of Supply, and begun in July 1945.[517] It took place at a number of 'Surgeon stations' across the British zone of Germany, which included the Kaiser Wilhelm Institute at Göttingen, AVA (*Aerodynamische Versuchsanstalt* – Aerodynamic Research Institute) Reyershausen, and the Focke-Wulf facility at Detmold, but by far the most significant was LFA (*Luftfahrtforschungsanstalt* – Aeronautical Research Institute) Völkenrode, located near

[512] Longden, *T-Force*, 292.
[513] TNA, FO 1032/297, 'Interrogation and Detention Policy', 26 June 1946.
[514] TNA, FO 1031/50, 'Minutes of 4th BIOS Meeting', 6 March 1946.
[515] TNA, FO 1032/164, Brig. Spedding to G(T)&CW, 8 March 1946.
[516] TNA, FO 1032/297, 28 October 1946.
[517] Matthew Uttley, 'Operation Surgeon and Britain's post-war exploitation of Nazi German aeronautics', *Intelligence and National Security*, 17 (2002), 1-26.

Braunschweig. British investigators described Völkenrode as having 'magnificence in layout, structure and furnishing that beggars the imagination of anyone who has seen similar institutions in the UK'. As well as the examination of prototype aircraft, and the evacuation of equipment and machinery to Britain, one of the main aims of Operation Surgeon was 'to pick the brains of German aeronautical scientists by setting them to write monographs of their research work in recent years'.[518]

This work entailed the use of 180 German experts and by November 1946 it appeared that LFA Völkenrode alone would produce 252 separate monographs, each of which would be reproduced, with a print run of six in German and 200 in English.[519] In order to circumvent the restrictions on warlike research laid out in Allied Control Council Law No. 22, the writing of monographs was considered as interrogation and not research.[520] As shall be seen later in this chapter, when this 'interrogation' came to a close, there were numerous employment offers made to many of the German specialists involved. The desirability of these men can perhaps be explained by post-war perceptions of the significance of aeronautics and the associated fear that Soviet utilisation of this particular German expertise would 'allow them to achieve a long-range bomber force superior to any other in the world in numbers and speed'.[521] In reality though, the jet engines developed by Britain during the war were greatly superior to their German equivalents, though far fewer in number, and both the USA and the Soviet Union actually copied British, rather than German, designs in their post-war jet engine programmes.[522]

Small-scale personnel exploitation operations, such as Surgeon, the Unterlüß Works Centre and many others of a similar type which were conducted by a range of agencies and government departments throughout the British zone and beyond, played a key role in supplementing Dustbin but could not replace it as the central focus of the exploitation of German scientists and technicians on the ground in Germany. When Dustbin closed at the end of 1946, Air Commodore Bennett, the Chief of British FIAT, considered that the establishment of an exclusively British camp along similar lines to be a matter of utmost

[518] TNA, AVIA 12/82, 'Operation Surgeon: memorandum', 23 November 1946.
[519] Ibid.
[520] TNA, FO 942/426, 'MAP and Ministry of Supply participation in RAF Operation Surgeon', 15 February 1946.
[521] TNA, AVIA 54/1403, 19 March 1947.
[522] Giffard, 'Engines of Desperation', 843.

urgency, due to the steadily increasing number of individuals 'whom it is desired to house in conditions of security because they have been threatened with kidnapping … by potentially hostile powers'.[523] Moreover, German experts who had been interrogated, often in Britain, but were now back in Germany awaiting a contract for long-term employment, would be dispersed, and the Ministry of Supply complained that the 'problem of contacting personnel when required was considerable'; an issue which could be largely offset by the use of a central detention camp.[524]

A partial solution came in the form of a transit hotel, operated by T-Force, which went by the designation Operation Matchbox. It was opened on 16 January 1947 and two days later it already had 40 Germans in residence; by April, that number was 191, and by August, it was 280 (of which 119 were scientists or technicians, and the remainder were family members).[525] Very often, the demand for Matchbox exceeded its capacity, which EPES considered deeply regrettable 'since it means that many useful subjects will be irretrievably lost to us, and when the news of their fate goes round on the grapevine it will be yet another blow to British prestige'.[526] All those who stayed at the hotel were afforded considerable luxuries, including the heavy worker's ration allowance, additional fuel and 'all amenities normally enjoyed by families of scientists and technicians'.[527] In addition, the scientists received a salary of RM 200, though this compared very unfavourably with the amounts offered by the Soviets, which ranged from RM 800 to 8,000.[528] This is salient because the main purpose of Matchbox was not really to hold German experts for British exploitation, but rather to prevent them from going over to the Soviets, either willingly or otherwise.[529]

This represented the 'denial policy' of Britain and the USA, which was a strategy designed to withhold valuable German specialists from the Soviet Union through a variety of

[523] TNA, FO 1031/69, V.B. Bennett to Intelligence Division, 3 December 1946.
[524] TNA, FO 1031/50, 'Minutes of 4th BIOS Meeting', 6 March 1946.
[525] TNA, FO 1032/1231A, Lt-Col. W.H.A. Bishop to Control Office, 12 April 1947.
[526] TNA, FO 1031/25, 'EPES Special Intelligence Report No. 4', 28 February 1947.
[527] TNA, FO 1013/373, 'Operation Matchbox', 1947.
[528] TNA, FO 1032/1231B, 'Intelligence Operation: Matchbox', 15 April 1948.
[529] Paul Maddrell, 'Operation Matchbox and the Scientific Containment of the USSR', in Peter Jackson and Jennifer Siegel (eds.), *Intelligence and Statecraft: The Use and Limits of Intelligence in International Society* (Westport: Greenwood, 2005), 187.

means, and was reflected in the criteria which German experts had to meet before they were considered for inclusion in Matchbox. The three categories fit for inclusion were:

a) Scientists and Technicians whom it is desired to deny to the Russians on account of their scientific or technical eminence in certain warlike subjects.
b) Scientists and Technicians who, while not to be classed in Category (a), would nevertheless have a serious effect on Russian sponsored development and research should they be removed from, or denied to, the Russians.
c) Scientists and Technicians who are valuable, not for their professional competence, but because they can give intelligence of value to us about Russian sponsored research and development.[530]

Unfortunately, the fact that these guidelines did not focus very heavily on actual scientific or technical worth, meant that they were very open to interpretation by ambitious and enterprising German individuals of dubious exploitation value. For instance, EPES were bombarded by appeals from characters such as Ernst Schnubel, who claimed he had invented a 'Death Ray Transmission Apparatus', which could be used as a battlefield weapon, a defence against bombs (including atom bombs), and in peacetime against garden pests, vermin, lice and, in the inventor's own words, 'gangsters, terrorists, demonstrationists, rebels, etc.!'[531]

Schnubel was obviously too eccentric to ever be taken seriously, but several others did slip through the net and were able to take advantage of the amenities at Matchbox which were often so hard to come by elsewhere in post-war Germany. This formed the basis of much of the criticism directed at Matchbox, such as that of Dr Bertie Blount, the Director of Research Branch and one of its harshest critics, who considered that it had become 'a place of permanent residence' rather than 'a place of transit', especially for individuals such as a certain Dr von Studnitz 'who pretends to be a physiologist but is universally regarded as a quack both by physiologists in other countries and by German scientists'.[532] Blount also felt that Matchbox was 'one of those unfortunate projects which are thoughtlessly entered into and leave a trail of difficulties behind them'.[533] Though much of the denigration of

[530] TNA, FO 1032/1231A.
[531] TNA, FO 1031/25, 'EPES Special Intelligence Report No. 5', 31 March 1947.
[532] TNA, AVIA 54/1403, 'German Section, FO, to Berlin', 2 December 1948.
[533] TNA, FO 371/71038, Bertie Blount to Ivor Worsfold, 5 March 1948.

Matchbox was well-founded and valid, it acted as an essential component of British personnel exploitation in Germany, and would later prove very useful in facilitating the British employment of German experts. In the meantime however, the phase of short-term detention and interrogation was still firmly underway in Britain.

Short-Term: In Britain

As mentioned at the beginning of this chapter, the exploitation of German personnel on British soil had numerous antecedents through the interrogation and covert observation of senior prisoners-of-war who were interned in Britain, most notably at Trent Park in north London, where internees included some 59 Wehrmacht generals.[534] This process was eagerly adopted for the purposes of scientific intelligence within two months of the end of the war in Europe. In the same way that the actions of Alsos did much to shape the future activity of exploitation teams on the ground in Germany, it was investigations into the Nazi atomic bomb project which laid the template for a wider programme of exploitation of scientific and technical personnel on the whole. From July until December 1945, Operation Epsilon was conducted, in which ten senior German atomic physicists who had been detained as part of the Alsos operations across Europe, including Werner Heisenberg, Otto Hahn and Max von Laue, were interned at Farm Hall, Godmanchester, fifteen miles north-west of Cambridge.[535]

Here they were secretly wire-tapped in the hope that something of significance about the German bomb project, which the scientists would not reveal in interrogation, would be overheard, although by this stage Britain and the US were fairly confident that their own bomb project had been considerably further advanced than the German equivalent. The German physicists did not necessarily share this view and were quite shocked when news reached them of the atomic bombing of Hiroshima and Nagasaki in August. The internees were also completely oblivious of the eavesdropping going on, with Heisenberg recorded brazenly laughing off the concerns of his colleagues and saying 'Oh no,

[534] Helen Fry, *The M Room: Secret Listeners Who Bugged the Nazis in World War 2* (London: Marranos Press, 2012).
[535] Frank, *Operation Epsilon*. See also: Mary A. McPartland, 'The Farm Hall Scientists: The United States, Britain and Germany in the New Atomic Age, 1945-6', Ph.D. dissertation, George Washington University (2013).

they're not as cute as all that. I don't think they know the real Gestapo methods; they're a bit old-fashioned in that respect.'[536] In many ways, the most important purpose of the Farm Hall detention was to keep these valuable human assets out of the hands of the Soviets and thus contribute towards the retarding of the USSR's atomic bomb project.[537]

In this respect, Operation Epsilon can be seen as both a precursor but also a microcosm of the personnel exploitation programme as a whole. It was conducted with the same general aims in mind, and also suffered from some of the same problems which beset the larger initiative. For instance, in September 1945, the internees started to become restive and Heisenberg even made suggestions that he would escape from Farm Hall and 'try to get in touch with some of his British scientific friends in order to ask them to make public the fact that these German scientists are being kept in this country'.[538] In his biography of Heisenberg, David Cassidy noted that the major effort which the Allies expended to secure Heisenberg reinforced his greatly inflated sense of self-worth (though this was dealt quite a blow by the news of the atomic bombs dropped on Japan) and encouraged him to complain often about what he considered to be poor treatment.[539] This situation was exacerbated when Otto Hahn was awarded the Nobel Prize for Chemistry in December but could not attend the ceremony due to his secret internment (he only learnt of his award by reading about it in the *Daily Telegraph*), which prompted the British authorities to release a statement on the premise that 'if the secrecy, and therefore the sensationalism, is whittled away before the matter leaks out, it will be less embarrassing if the German scientists turn nasty'.[540] In reality, by the time MPs began receiving letters from their constituents, mostly scientists, complaining about poor treatment of these esteemed German physicists, they had already been returned to Germany, often at the behest of the men themselves, including Hahn, who became the founding president of the Max Planck Society, and Heisenberg, who became Director of the Max Planck Institute for Physics.[541]

[536] Ibid., 33.
[537] Richelson, *Spying on the Bomb*, 62.
[538] TNA, CAB 126/333, W.A. Akers to P.M. Blackett, 5 September 1945.
[539] David Cassidy, *Uncertainty: The Life and Science of Werner Heisenberg* (New York: W.H. Freeman, 1991), 502.
[540] TNA, PREM 8/373, 'Interrogation of German Scientists in United Kingdom', 20 December 1945; on press releases and controlling secrecy, see also Balmer, *Secrecy and Science*, 67.
[541] Ibid., 18 February 1946.

Operation Epsilon may be representative of certain elements of the wider programme as a whole but its use in this respect is limited by its small scale and by the eminence of the men targeted. The experience of other German experts who were brought to Britain to be detained and questioned did not always mirror that of the Farm Hall group. While Heisenberg had dismissed the very thought of the British using so-called 'Gestapo tactics', others were less convinced. In August 1946, Ernest Bearder, the Controller General of the Chemical Industries Branch, wrote to the Secretariat of his branch's parent organisation, the Trade & Industry Division (part of the British Control Commission) complaining about the process for the removal of German specialists from Germany, which he outlined thus:

> Usually an NCO arrives without notice at the house or office of the German and warns him that he will be required. He does not give him any details of the reasons, nor does he present his own credentials. Some time later the German is 'seized' (often in the middle of the night) and removed under guard.

Bearder felt that this procedure 'savours very much of the Gestapo methods and … is bound to create feelings of alarm and insecurity', which he did not think it was the intention to foster.[542]

Just over two weeks later, Bearder received a reply from Brigadier W.E.H. Grylls, the chief of T-Force, which curtly noted that, other than from Bearder himself, 'only one complaint has been received, although over 1,000 Germans have been evacuated through T-Force', and added that Bearder's Chemical Industries Branch was also the only division of the Control Commission which got special advance notification of any German who was to be taken. Grylls went on to say that his office was not 'aware of any Control Commission law, order or instruction that requires a British officer, NCO or soldier to present his credentials to a German under any circumstances whatever unless it be to a civil policeman on duty'. He concluded by making 'a strong protest' against Bearder's tone and suggesting that he 'may now wish to withdraw the letter'.[543] On the whole, the evidence suggests that Bearder's account of 'cloak and dagger methods' was exaggerated and far from accurate, and in reality this was simply another minor chapter in the ongoing saga of dispute between

[542] TNA, FO 1031/19, E.A. Bearder to Secretariat, T&I Division, 6 August 1946.
[543] Ibid, W.E.H. Grylls to Secretariat, T&I Division, 21 August 1946.

those tasked with rebuilding German industry and those tasked with exploiting it.[544] Nonetheless, it is worth examining the process utilised when transporting German experts from Germany to Britain, as this was a crucial element in the satisfactory operation of the exploitation programme.

The responsibility for handling the experts in transit was left mainly to T-Force, who had to locate the individual specialist, obtain security clearance for their movement and then escort them from their home all the way to a specified reception point in Britain. This involved a considerable degree of administrative work, especially as by mid-1946, approximately 20 German scientists were making this journey every week.[545] Even contacting all the relevant agencies was no small task; T-Force reported that 'four Agencies in the UK and eight Agencies in Germany are concerned with the move of every German.'[546] The procedure for each scientist usually involved giving them seven days' notice where possible, collecting them from their homes and taking them to BAOR HQ at Bad Oeynhausen for documentation, and then transporting them by train and boat, usually in parties of three or four escorted by a British military or civilian officer, to Britain. During the journey, the scientists shared the officers' messing and accommodation facilities.[547]

Escorting officers were told that the men they had custody of were not prisoners of war and 'unless instructions to the contrary have been issued, you may assume them to be peaceable and co-operative.' Furthermore, 'as the value of their information depends to a certain extent upon their goodwill, they should be treated with reasonable consideration and should be adequately fed *en route.*'[548] However, these good intentions did not always easily manifest themselves, as related in the case of a 'prominent German scientist' who was returning to Germany from Britain after interrogation. When he boarded the ship at Harwich, 'the Captain insisted that the German should go below and he was taken to that part of the hold reserved for military prisoners returning to Germany under arrest'.[549] Nevertheless, not all German scientists who travelled to and from Britain had such a bad

[544] Ian Turner, 'British Policy towards German Industry, 1945-9: Reconstruction, Restriction or Exploitation?', in Turner (ed.), *Reconstruction in Post-War Germany*, 67.
[545] TNA, FO 1031/19, Lt-Col. D.G. Edwardes to Maintenance Branch, ZEO, CCG, 23 November 1946.
[546] TNA, FO 1065/12, 'The Future of T-Force/FIAT Organisation', 16 August 1947.
[547] TNA, FO 1031/9, 'Short Visits to the UK by German and Austrian Scientists and Technicians', 24 April 1947.
[548] TNA, FO 1031/19, 'General Instructions for Escorts', 9 September 1946.
[549] Ibid., 23 November 1946.

experience. In January 1947, the Board of Trade proudly circulated an extract from a censorship report which included comments from the wife of an unnamed scientist who had been brought to Britain; she said: 'They have shown great concern for my husband. [They] took him to London personally and will bring him back personally for Christmas.' She also commented that in his absence, their home was protected from being requisitioned and they had been 'nobly looked after', with 'heavy-labour ration cards, ample fuel for the whole winter and a monthly remittance of RM 400 from the German Bank'.[550]

Once in Britain, in an effort to avoid potential public criticism, the German specialists were often housed out of view, in special interrogation centres, many of which had also served as POW camps during the war. The primary centre of this nature used by the British for scientific and technical personnel was Inkpot, based at the Beltane School in Wimbledon, directly south-west of London.[551] Here, German experts could be housed and then visited by experts from various government departments who had an interest in their particular area of expertise – staff from the Ministries of Aircraft Production and Supply, for instance, conducted interrogations on a vast range of topics, including radio control in guided projectiles, gas turbines, rocket fuels and parachute design.[552] Inkpot provided only a temporary solution however and, at the end of 1946, the Beltane School site had to be relinquished to allow for an extension to the nearby Southlands teacher training college, and to replace it a BIOS Reception Centre was created.

This was situated at Spedan Towers, in Hampstead; 'a very large, modern private house in its own grounds' and formerly the home of retail magnate John Lewis. German scientists who were to stay there, known as 'Visitors', were informed that:

> This is run on the lines of a hostel and is administered by a small unarmed military staff. There are no guards or barbed wire fences and there are no restrictions on the amount of mail either sent or received. The Visitors are accommodated in single-tier beds in rooms holding two or three each. In addition the visitors have at their disposal a dining room, a large well-furnished lounge and a library. The number of Visitors living at Spedan Towers at any one time varies between 25 and 30.

[550] Ibid., F.J. Broomfield to HQ, T-Force, 4 January 1947.
[551] Gimbel, *Science, Technology, and Reparations*, 18.
[552] TNA, AIR 40/1178, 'ADI(K) Periodical Progress Report No. 5', 11 December 1945.

The lifestyle enjoyed by Visitors at Spedan Towers was a largely pleasant one. They did not have complete freedom of movement, but board, lodgings and medical care were free, they were given a weekly cash allowance of 10 shillings (roughly £13 today), and 6 shillings (£8) worth of chocolate, cigarettes and similar items, as well as having access to a swimming pool, regular film shows, lectures on British culture and occasional tickets for concerts.[553]

Not only were the experts themselves well looked-after, and protected from dismissal by their German employer during their period of interrogation, but their families also received numerous amenities, including an ample financial allowance, as well as increased rations and fuel allocations. The importance of this cannot be understated during a time when malnutrition and starvation were very real threats to the majority of ordinary German citizens.[554] Some German experts attempted to take advantage of this system, however, and secure these benefits for friends and distant relatives too, which resulted in BIOS issuing definitions of who exactly constituted dependants – wives, children, 'aged parents, sick relatives or any such members of the family who cannot fend for themselves', or a nominated housekeeper in the case of a widower scientist with children.[555] BIOS estimated that the total payment to each individual, including 'pocket money', the allowance to his family and his own board and lodging, was about £6 (£150) a week.[556] In return for this largely favourable treatment, the German experts were expected to co-operate whole-heartedly with all interrogations conducted at the Reception Centre, as well as being prepared to travel (escorted, naturally) for short spells to other locations around Britain, for interviews *in situ* at various private firms and establishments.

Despite this fairly comfortable arrangement, the British authorities decided to pre-empt any complaints the German experts might have about their accommodation in a pamphlet issued to all Reception Centre Visitors, which explained, with a hint of accusation, that 'the housing shortage due to air-attacks during 6 years of war makes it impossible to provide better accommodation.'[557] This pamphlet was not sufficient to deflect criticism by some 'visitors' – Friedrich Uhlmann, who during the war had owned a metallurgical research

[553] TNA, FO 1031/9. Price adjustments calculated on: http://apps.nationalarchives.gov.uk/currency/ (accessed 16 December 2014).
[554] Reinisch, *Perils of Peace*, 179.
[555] TNA, FO 1031/9, 'Definition of Dependants of German Scientists & Technicians', April 1947.
[556] Ibid., 'Minutes of 6th BIOS Reception Centre Panel Meeting', 22 August 1947.
[557] TNA, FO 1031/19, 'Pamphlet for issue to personnel at BIOS Reception Centre', 5 December 1946.

and production factory, was brought to 'austere' Spedan Towers in early 1946 and left in May, 'highly incensed' by what he described as 'miserly' and 'niggardly' treatment. He felt that in return for his considerable contributions to furthering the British hard metal industry, the amount of money paid to him and his family was 'nothing less than an insult'.[558] Uhlmann's case, however, appears to be an exception rather than the rule. The BIOS Reception Centre at Spedan Towers continued to operate at a steady rate throughout 1947 but by the end of that year, the importance of short-term interrogation was considerably diminished, while the programme of recruitment for longer-term employment was in the ascendancy, and facilities were forced to change to reflect the shifting needs of the exploitation initiative as a whole.

Long-Term: Defence Recruitment

As can be seen in the policy of detainment and interrogation, in Germany as well as in Britain, the motivation was not always attempting to secure the greatest intellectual resources for Britain, but to deny those same resources to Russia. As Julian Lewis has convincingly illustrated, even by 1942, many of the more astute British policy-makers perceived the Soviet Union as the most likely opponent in a future conflict.[559] Accordingly, fears grew about the power the Soviets would wield if they were allowed to acquire a large amount of German scientific and technical expertise. While detention prevented key German specialists from passing into Soviet hands in the short-term, it became necessary to initiate a project to pre-empt and then counteract the USSR's large-scale recruitment of military scientists, technicians and engineers.[560]

As early as August 1945, while the war against Japan was in its final throes, the discussion between Britain and the US shifted from the immediate exploitation of German science to hasten the end of the Pacific War to a broader, further-reaching arrangement. The British Deputy Chiefs of Staff (DCOS) noted that 'there is no doubt that very great advantage to our own defence research and development would be derived from bringing

[558] TNA, FO 1031/25, 'EPES Special Intelligence Report No. 8', 30 June 1947.
[559] Lewis, *Changing Direction*, xcvii.
[560] On competition in exploitation between foreign powers, see Chapter Five below.

to the UK a small number of high-grade experts to carry on their work in specialised fields,' of which they included aerodynamics, hydrodynamics and power plants as preliminary examples. They did however mitigate this with three main concerns – firstly, that in so doing they might allow a small part of German war potential to endure; secondly, that it would appear hypocritical when they were so strongly trying to deter their wartime Allies from pursuing a similar policy; and thirdly, that it might arouse public discontent in Britain at paying German scientists who so recently had played a key role in the war effort against the Allies. These concerns had little real bearing though, as they were prevailed over by the widely-held belief that 'the Russians will in any event employ German technicians upon whom they can lay their hands.'[561]

Just over two weeks after this report was considered, and only two days after the end of the war against Japan, the key military ministries were already discussing which fields they would be most interested in exploiting and provisional numbers to be allocated to each. The Admiralty wanted 25 German experts in subjects such as hydrogen peroxide engines and optical crystals; the Ministry of Aircraft Production wanted 40 on topics such as supersonic aircraft and infrared-guided missiles; and the Ministry of Supply estimated it would need 85 covering rockets, ceramics, fuses and internal and external ballistics.[562] This limited programme of employment, totalling only 150 German specialists, was approved by the British Chiefs of Staff at a meeting on 24 August 1945.[563] This was then ratified by government ministers within a matter of weeks, where they agreed 'in principle that German scientists should be brought to this country to be employed on research in the national interest, provided that they are regarded as servants of the State, and subject to certain safeguards'.[564]

This programme became known as the DCOS Scheme, after its origins with the Deputy Chiefs of Staff, and that committee became the co-ordinating body for the recruitment of all German defence specialists to Britain in the post-war period. However, the scheme did not take off at any speed. By October 1946, when the programme had been in operation for just over a year, the Americans announced that they were extending the

[561] TNA, CAB 122/343, 'Policy for the Exploitation of German Science and Technology', 1 August 1945.
[562] Ibid., 17 August 1945.
[563] Ibid., 'Minutes of 206th CoS Meeting', 24 August 1945.
[564] TNA, FO 1032/300, 'Employment of German scientists and technicians', September 1945.

limit of their German military specialist recruitment to 1,000 individuals; at the same time, the British had only managed to secure under contract 33 German defence scientists, a deficit which they attributed to the 'slowness of procedure for reception in UK'.[565] By April 1947, there were 60 German experts employed under the DCOS Scheme with 28 more contracts pending.[566] In November 1948, Sir Ben Lockspeiser, the Chief Scientist at the Ministry of Supply, reported that, 'broadly speaking', there were about 90 German scientists working at British defence establishments. He also registered his concern that, due to legal restrictions, it would be very difficult to extend any of these contracts beyond 1950.[567]

One of the main reasons why the British recruitment figures remained so low was because they were reluctant to use coercion (as the Soviets often did) and thus insisted on only bringing over German specialists who were 'fully prepared to work abroad' so as to 'encourage their whole-hearted co-operation'[568], and because they were unable to make offers which could compete with those of the Americans. Britain did, however, have some potential appeal for German scientists to the point where they 'might prefer less favourable terms from the British to apparently more attractive offers from the American and Russian authorities'.[569] This was certainly the case for Hellmuth Walter, the submarine and rocketry expert whose *Walterwerke* facility in Kiel had been one of the most significant early exploitation targets, who had received offers from the Americans but felt he was too old for such an upheaval and opted to go to Britain instead.[570] One of Walter's employees, Hermann Treutler, a peroxide fuel expert, had a slightly different, and more contentious, justification for coming to work in Britain after the war – he still felt that Germans 'were the master race and Britain was part of our Anglo-Saxon race'.[571] Naturally, Treutler's case was particularly extreme but it is indicative of the fact that for some German citizens the Western Allies were more palatable employers (and occupiers) than the Soviets, though usually on political rather than skewed racial grounds.[572]

[565] TNA, CAB 122/349, FIAT Main (Br) to Intelligence Division, 4 October 1946.
[566] TNA, AVIA 54/1403, 'Employment of German scientists and technicians', 21 April 1947.
[567] Ibid., Sir Ben Lockspeiser to Ministry of Supply, 12 November 1948.
[568] Ibid., 'Policy for Exploitation of German Science and Technology', 2 May 1947.
[569] TNA, CAB 122/342, 'Minutes of DCOS Meeting', 12 December 1945.
[570] Bar-Zohar, *Hunt for the German Scientists*, 132.
[571] Hermann Treutler, cited in Bower, *The Paperclip Conspiracy*, 201.
[572] Schwarz, 'The Division of Germany', 149-150.

Attitudes such as Treutler's were deeply problematic because, as desperate as the British authorities were to secure the best and brightest of Germany's scientific and technical talent, they were also deeply concerned about security in Europe, particularly with regard to a German military resurgence.[573] To this end, it was made very clear that 'nobody whose record indicates that he was a convinced Nazi should be brought to the UK to work, however high his scientific qualifications.'[574] Even within this clarification, the term 'convinced Nazi' raised its own issues, as highlighted by a Ministry of Aircraft Production representative who commented 'exactly what this means no-one appeared to know'.[575] Furthermore, the commitment to this poorly-defined principle was not rock solid. As it became progressively clearer that the Soviets had no scruples about any scientist's political record during their recruitment process, the British noted that their own 'thorough and sincere' pursuit of denazification was driving many scientists away and into the employ of their rivals.[576] Much of the literature on denazification suggests that the British commitment to it was far from thorough and sincere, and that in reality it was a mere administrative issue which Britain lacked the finances, manpower or wherewithal to see through.[577] Nonetheless, the British authorities suggested 'a revision of the way in which denazification laws are applied' in order to 'counteract Russian attractions'.[578]

The perceived risk was not just restricted to Nazis. In August 1945, the British Joint Intelligence Sub-Committee (JIC) expressed the opinion that all Germans, even those who had come to Britain before the war, such as Social Democrats and Jews, maintained 'their fundamental loyalty to the Fatherland' and, further, that 'if there were any possibility of Germany's regeneration they would be likely as any to take advantage of it, so long as it was not Nazi'. The JIC felt that even if an independent Germany hostile to Britain was not very likely, one which was 'absorbed in the Russian orbit' presented a genuine danger.[579]

---

[573] Deighton, *Impossible Peace*, 5.
[574] TNA, AVIA 54/1403, 'Policy for Exploitation of German Science and Technology', 2 May 1947.
[575] TNA, LAB 8/1198, MAP to T. Brind, 17 November 1945.
[576] TNA, FO 1031/68, 'Russian Activities regarding German Scientists and Technicians', 21 November 1946.
[577] Perry Biddiscombe, *The Denazification of Germany: A History, 1945-1950* (Stroud: Tempus, 2007), 13. See also Chapter Six below.
[578] TNA, AVIA 54/1403, 'The Problem of Subversive Warlike Scientific and Technical Research in Germany', 3 December 1946.
[579] TNA, CAB 82/6, 'DCOS papers: 1-66', 14 August 1945.

Several of the agencies involved in exploitation prepared reports on the risk of any form of hostile German military revival, and how it could potentially be aided by German experts who had worked for Britain and gained in-depth knowledge of British military research projects. Even during the initial Anglo-American discussions about short-term utilisation of German expertise to contribute towards the war against Japan, British officials felt that 'we should not be bound to return any such scientists to Germany, either at the end of the Japanese war, or indeed at any time.' The reasoning they gave for this hard line, which was in direct contrast with the initial American proposals, was this:

> In working in the United States or in this country German scientists will necessarily become acquainted in some measure with our techniques and it is obviously undesirable that such men should return to Germany armed not only with the knowledge they now possess of German science, but British or United States knowledge.[580]

One suggestion for how to handle this risk came from the Scientific and Technical Research Board which proposed that all German scientists brought over to work in Britain be made to sign a document which 'renders them liable to prosecution if they disclose to unauthorised persons, details of the work on which they had been engaged'. The Intelligence Division of the Control Council felt this would not be sufficiently effective and suggested in addition that each German expert be given an 'informal talk' on the importance of discretion and instructed to report any attempts to elicit secret information from them to the nearest Intelligence Division office.[581]

E.E. Haddon, the Assistant Director of the Technical and Personnel Administration worried that the reduced level of German industry enforced by the occupying forces might lead to widespread unemployment and that 'scientists and technicians, particularly the first-class brains, are likely to accept unemployment less placidly than the others and may form or join subversive political groups of which, with their intelligence, they will probably become leaders.' He went on to advise that Intelligence Division among others should keep close watch on scientists, especially those who worked in fields which they identified as particularly dangerous: electronics, radar and biological warfare.[582] The inclusion of

[580] TNA, CAB 122/343, Chiefs of Staff to BJSM, 14 June 1945.
[581] TNA, FO 1031/19, Intelligence Division to Research Branch, 29 July 1946.
[582] TNA, AVIA 54/1403, 'Problem of Subversive Warlike Research in Germany', 17 February 1947.

biological warfare on this list is interesting because, as has been shown, German research in this field was generally poor, particularly in comparison to parallel British efforts, and yet fear of a bacteriological attack continued to influence British policy, in much the same way as it had done during the war.[583] The Research Branch of the Trade and Industry Division issued a similarly cautionary report in December 1946 which espoused the view that it was possible, and even likely, that if some of the scientists and technicians who had spent the greater part of their working lives on research and development in fields now prohibited under Allied occupation laws, 'find that they can continue their work without detection, they may do so, partly in the hope of attracting the attention of foreign customers, and partly because of their intense interest in their subject'.[584] Efforts were made to tackle this by promoting research into peaceful fields; representative of the wider scheme, espoused by the British occupation authorities, to 'democratise' Germany through a comprehensive but, in reality, ill-conceived programme of re-education.[585]

Despite the evident concern that all these reports and proposed solutions suggest, the risk of a native German resurgence was nearly always considered of secondary importance compared to extensive recruitment by the USSR and the combination of German expertise with Soviet manpower and physical resources.[586] It was for this reason that Matchbox proved so essential as a way to secure German scientists and technicians, and to ensure they were not lured or deported eastwards, while the formal business of arranging contracts could be completed. In some cases, this was an extremely efficient procedure, as in the case of the Linke team. This was a group of six guided missile specialists evacuated from Berlin, brought through Matchbox, interrogated and then all offered permanent employment at the Royal Aircraft Establishment (RAE), Farnborough.[587] Intelligence Division believed that their removal from the eastern zone 'seriously … affected Russian exploitation of German guided missile research'. This served the ultimate objective of Matchbox which was 'to remove from Russian influence and control, scientists and

[583] Balmer, *Britain and Biological Warfare*, 53.
[584] TNA, AVIA 54/1403, 'The Problem of Subversive Warlike Scientific and Technical Research in Germany', 3 December 1946.
[585] David Welch, 'Priming the Pump of German Democracy: British Re-Education Policy in Germany after the Second World War', in Ian Turner (ed.), *Reconstruction in Post-War Germany*, 215-238.
[586] David Reynolds, 'Great Britain', in David Reynolds (ed.), *The Origins of the Cold War in Europe: International Perspectives*, (New Haven, CT: Yale University Press, 2004), 80.
[587] TNA, AVIA 54/1403, E.V. Marchant to Ivor Worsfold, 27 July 1948.

technicians eminent in certain warlike subjects who were materially contributing, or could materially contribute, to Russian war potential'.[588]

However, Matchbox did not always satisfactorily serve its stated purposes. Scientific and Technical Intelligence Branch (STIB) worried that offers of employment were not always suitably forthcoming from potential British employers for the German experts being held at Matchbox, who had been evacuated westwards from the Soviet zone. STIB registered understanding that before employment could be offered, the relevant departments had to be satisfied that no British individual could fill the position adequately but countered that 'it should be remembered that unless Matchbox scientists and technicians can be suitably employed … there is every possibility that they will turn to their late Eastern masters.'[589]

Naturally, the situation which emerged from these circumstances was that numerous German scientists were held under Matchbox auspices lest they be seized by the Soviets but were offered no employment and so remained in an unenviable state of limbo. This was the case of Heinz Peukert who had participated in Operation Surgeon at Völkenrode but when that commitment ended in February 1947, he had been instructed by the Ministry of Supply that he could undertake no further work without their permission, and had returned to his home in the French zone of Germany. Seven months later, he wrote to the British authorities, restating his willingness to work in Britain, South Africa or Canada, and asking for a speedy resolution to his predicament, as he had no income and was encountering difficulty in obtaining a ration card. By December 1947, his case was still unresolved.[590]

The unpleasant experience of Peukert aside, Operation Surgeon proved to be, on the whole, one of the more successful British recruitment efforts, perhaps because a good understanding of the capabilities of the individual German experts involved had been reached during the work conducted at the 'Surgeon stations' in Germany itself. The Ministry of Supply was also able to reduce the vast amount of time necessary to obtain clearance to bring a German expert to work in Britain to a much more manageable two months, and by late November 1946, the Air Division of the Ministry had already brought over 16 of their 74

[588] TNA, FO 1032/1231B, 'Intelligence: operation Matchbox', 15 April 1948.
[589] TNA, AVIA 54/1403, J.J.K. Graham to F.H. Hollingdale, 22 January 1948.
[590] Ibid., Heinz Peukert to British Liaison Mission, French Army of Occupation, 10 September 1947.

target scientists (selected from a total list of 500), and they had begun work in Britain.[591] Even the streamlined process developed under Surgeon auspices involved multiple steps – Ministry of Aircraft Production (MAP) scientists working at the 'Surgeon stations' in Germany recommended which German experts they felt were worth recruiting to MAP, who in turn forwarded it to the Duchy of Lancaster, who then passed it on to the Control Commission, which might call in Air Division if necessary.[592] Again, this is evidence that the British, though keen to secure the best scientists for themselves, persistently relied on convoluted administrative channels which hampered their recruitment efforts. By January 1947, the Air element of the Ministry of Supply had effected the employment of 30 of their allotted 47 scientists under the aegis of Operation Surgeon, and these men went on to have a tangible impact on British aeronautics, especially in the field of supersonic aircraft.[593]

Most of the German specialists who were brought to work for military establishments in Britain after the war, under the DCOS Scheme or one of its smaller parallels, were subject to roughly the same basic contract terms. They were initially 'landed' for a period of six months which could be extended 'for a further limited period if justified in the national interest' and often was. During this time they were always contracted to a government ministry or department, which meant that they were '*ipso facto* a temporary government employee'.[594] Despite this, they were still subject to the 'usual enemy alien restrictions' including movement only within a five mile radius, no ownership of a car, motorcycle or camera, only one letter home per week, no contact with the Press or attendance at party political meetings, and adherence to a curfew of midnight to 6am. They were, however, permitted to visit 'local licensed premises'.[595] The salary scale offered to the experts covered quite a considerable range and was divided into six sections: Grade I to III for scientists and the same for technicians. A Grade I scientist (the highest rate) could earn between £700 and £800 p.a. (approximately £20,000 today), while a Grade III technician (the lowest) could only earn up to half that. The German employees were expected to pay

[591] TNA, AVIA 12/82, 'Operation Surgeon: memorandum', 23 November 1946.
[592] TNA, FO 942/426, 'MAP and Ministry of Supply participation in RAF Operation Surgeon', 15 February 1946.
[593] Uttley, 'Operation Surgeon', 9.
[594] TNA, FO 1031/19, Lt-Col. D.G. Edwardes to Maintenance Branch, ZEO, CCG, 23 November 1946.
[595] TNA, LAB 8/1198, 'Minutes of Inter-departmental Meeting of Security Officers', 17 December 1945.

British income tax on this salary, and they were allowed to remit up to 50% of their earnings back to their families in Germany, where it was also subject to German income tax.[596]

As in the case of German specialists brought over for short-term interrogation, the families of German experts employed in Britain were also fairly well looked after; alongside this 50% remittance, they were guaranteed protection, 'food value of 2,300 calories for wives and children and a certain amount of heat and light for essential warmth and cooking requirements'. This was considered vital, as British exploitation agencies had noted, as though it were a somewhat unusual characteristic, that the scientists attached 'great importance to the protection of their homes and families during their absence'.[597] Certainly, the calorie allocation alone made it an attractive offer as, in 1946, Germany, and the British zone, with its lack of good agricultural land, in particular, was lurching dangerously close to a starvation crisis – the average official ration for ordinary German citizens during this period was 1,630 calories, two-thirds of what it had been in 1939 and 1940.[598] The German specialists were also permitted to take occasional leave (though not until their initial six months of employment was complete) to return to Germany and visit their families. On some rare instances, it was possible for family members to travel to Britain instead, particularly in cases where it was feared that if the expert returned to Germany, he might be at risk of kidnap by the Soviets (this was particularly pertinent if his home was in Berlin).[599]

A policy was also considered wherein the wives and children of German scientists could be relocated to Britain on a semi-permanent basis. This initially encountered considerable opposition, largely due to wanting to avoid double standards 'in view of the impossibility of permitting British Officers employed by the Allied Control Commission and British Army Officers to take their families to Germany at the present time'.[600] However, by January 1947, it was agreed that in the case of scientists whose contracts were being extended for a second term, their families could be moved to Britain to join them, as long as he was 'to work there long enough to warrant the trouble and expense of getting his family

[596] CAB 122/357, H.D.B. Wood to Sir John Magowan, 26 January 1946. Price adjustments calculated on: http://apps.nationalarchives.gov.uk/currency/ (accessed 16 December 2014).
[597] Ibid., 'Employment of German Scientists in a Civil Capacity', 29 April 1946.
[598] John Farquharson, *The Western Allies and the Politics of Food: Agrarian Management in Post-War Germany* (Oxford: Berg, 1985), 254.
[599] TNA, AVIA 54/1295, J.H. Keane to B. Barrett, 25 June 1948.
[600] TNA, LAB 8/1198, 'Minutes of Board of Trade Meeting', 22 November 1945.

to England'. In addition, while they were living in Britain, the families were given assurances that 'their homes will be made available to them on their return and no furniture will be moved out during their absence'.[601]

Despite the seemingly generous terms of the contracts offered to the German specialists, this was a period of great change and hardship for the majority of the German population and areas of complaint soon presented themselves, particularly in terms of money and amenities for their families. Many experts expressed 'extreme dissatisfaction' at potentially having to pay both British and German income tax.[602] A more serious issue arose following an explosion at the Rocket Propulsion Establishment at Westcott, near Aylesbury in Buckinghamshire in late 1947, which claimed the life of Johannes Schmidt and badly injured Heinz Walter, both of whom were German specialists who had been brought over at the end of the war under the DCOS Scheme. Dr Schmidt's wife requested an increase in the pay-out of £2,920 (some £75,000 today), but the Treasury decided that it was not possible to 'treat Frau Schmidt more favourably than a British national – a consideration which is emphasised by the fact that two established [British] civil servants were killed in the same explosion which resulted in Dr Schmidt's death'.[603]

Aside from these drastic occurrences, the biggest issue raised by German scientists was the uncertainty of their fate. In April 1948, Dietrich Küchemann, the eminent aerodynamicist who would later go on to become the Chief Scientific Officer at RAE Farnborough and a key figure in the design of Concorde, wrote a letter to the Ministry of Supply on behalf of all his German colleagues at the RAE, describing the present state of affairs as 'characterised by uncertainty, a number of special regulations, and individual promises' and requesting a move towards 'normalisation'. The key elements which were desired were parity with British colleagues, 'a civic state of life for us and our families', and greater input into terms of contracts.[604] Three months later, a similar letter was received by Sir Ben Lockspeiser at the Ministry of Supply from six scientists working for the government at the steam turbine firm of C.A. Parsons in Newcastle, stating that until this time they had 'enjoyed the work which we carried out wholeheartedly' but requesting greater clarity on

[601] TNA, FO 1032/302, 'Policy for Families', 4 January 1947.
[602] TNA, AVIA 54/1294, 'Minutes of DCOS Meeting', 17 April 1946.
[603] TNA, AVIA 54/1295, W.S. Polley to J.A.H. Smith, 24 May 1948.
[604] Ibid., D. Kuchemann to The Secretary, Ministry of Supply, 22 April 1948.

their future prospects, as this would have 'significant bearing on the settling of our families and the planning of our children's education'.[605] Küchemann received no response, and the reply that the entreaty from the C.A. Parsons group received was mostly full of equivocation. The Ministry of Supply were unwilling to commit to anything, or to give any 'official promises about the future', and suggested instead that the scientists would be better off seeking employment by a private firm and perhaps naturalisation as British citizens at some point further down the line.[606]

While German experts who had already been brought over were striving to secure a future for themselves and their families, the Deputy Chiefs of Staff were contemplating the conclusion of their recruitment scheme. In July 1949, it was announced that:

> The DCOS Scheme for the recruitment of German scientists had now been terminated. It is assumed that the exceptional type of men, whom this scheme was intended to cover, have all been considered by now. Furthermore the special recruiting arrangements which formerly existed are no longer required since a routine procedure whereby anyone, government department, firm or individual can apply to employ Germans has now been laid on.

Throughout its four years of operation, the DCOS Scheme had secured the recruitment of 172 German specialists, and many of those stayed on beyond 1950 and became naturalised British citizens.[607] This figure only reveals a comparatively small segment of the British post-war recruitment of German scientists and technicians as it only accounts for those employed on government defence work; a far larger programme was created to exploit the best of German civil industry.

Long-Term: Civil Recruitment

As has been seen with the exploitation of facilities, documents and equipment which occurred on the ground in Germany, although the initial stated focus was to acquire only intelligence pertaining to defence technology, with the aim of strengthening Allied arsenals

[605] Ibid., Letter to Sir Ben Lockspeiser, 31 July 1948.
[606] Ibid., Lockspeiser to C.A. Parsons group, 6 August 1948.
[607] Uttley, 'Operation Surgeon', 19.

at the expense of Germany's, this was soon augmented and then outstripped by commercial and industrial exploitation. The same was true in the recruitment of personnel. It has been argued that even before the end of the war Britain was laying plans for an ambitious expansion of its export capacity, to be effected largely by transplanting export-relevant technologies, and the associated personnel, from Germany.[608] As early as August 1945, during the initial DCOS Scheme discussions, Dr Charles Goodeve of the Royal Navy's Research and Development department, 'raised the question of bringing German technicians to this country for use in industry not wholly connected with defence', with particular reference to the instruments industry.[609] Goodeve's query was dismissed at the time, as recruitment on defence matters alone would be a much easier policy to push through, but the concept as a whole did not disappear.

In September, the Board of Trade issued a memo commenting on the benefits to British industry, and even the war effort, offered by German craftsmen who had emigrated to Britain before the war, but cautioning that admitting German scientists and technicians so soon after the end of the war might seem to many to be 'objectionable and undesirable'.[610] By December, these qualms had all but evaporated, and the Cabinet Office contacted the British Joint Staff Mission in Washington to inform them that 'Civil Departments are so impressed with successful Combined arrangements made for Germans in the Defence field that they would like to follow similar procedure in the Civil Field.' It was also suggested that any exploitation of German specialists for civil purposes would follow the same technique as that used for defence recruitment.[611] At this stage, it was considered desirable to develop a joint policy with the Americans for any form of civil-industrial recruitment and the Joint Staff Mission tasked Sir John Magowan, the Minister in Charge of Commercial Department at the British Embassy, and R.D. Fennelly, Head of the British Raw Materials Mission, both in Washington, to discover the extent to which the US was pressing ahead with any such scheme.

---

[608] Werner Abelshauser, 'Immaterial Reparations and the Reintegration of West Germany into the World Market', in Judt and Ciesla (eds.), *Technology Transfer*, 110.
[609] TNA, CAB 122/343, 'Minutes of 10th DCOS Meeting', 15 August 1945.
[610] TNA, FO 1032/164, 'Employment of German Scientists and Technicians in Civil Industry in the United Kingdom', 28 September 1945.
[611] TNA, CAB 122/357, Cabinet Office to BJSM, 22 December 1945.

The British were impatient to begin this phase of exploitation and gave the Americans one month from the official presentation of the British proposals to signal their participation and prepare to exchange target lists or else, the British warned, 'we shall consider ourselves free to go ahead on a unilateral basis'.[612] In order to be in a position to press ahead with some urgency, whether in an Anglo-American arrangement or alone, the British authorities had already begun developing plans for the execution of such a policy. In November 1945, the Board of Trade convened a meeting to form a panel which would enact the personnel exploitation of German civil industry; roughly a non-military equivalent to the DCOS Committee. The product of this meeting was the formation of the Darwin Panel; named for its chair, Sir Charles Darwin, physicist, director of the National Physical Laboratory and grandson of the illustrious naturalist whose name he shared.[613] The panel was comprised of members from the Department of Scientific and Industrial Research, Board of Trade, Control Commission for Germany, Home Office, Treasury, German Economic Division, Admiralty, Security Services and the Ministries of Supply, Labour, Health, Agriculture & Fisheries, Aircraft Production, and Fuel & Power.[614]

The Darwin Panel did not wait to hear from Washington whether the scheme would be a combined or unilateral one, and instead began surreptitiously co-ordinating policy. It instructed all divisions of CCG(BE) that 'information should immediately become known to the Germans, by "bush telegraph", while precise conditions of service are being worked out in England'. They also asked all Branches to submit the names of 'really first class men known to them and who they consider would be suitable for employment in England' though they emphasised that 'the type of person required is the scientist or technical expert and not the "business executive" type'.[615] Another important tenet of the policy was the accessibility of the German specialists who were brought over. They were not to be employed 'in the ordinary sense of the term by the firms with whom they work … but will, in a sense, be loaned by the government, roughly in the capacity of consultants'; this was largely to ensure that their expertise was 'made available to the whole of the scientific field

[612] Ibid., 19 January 1946.
[613] A.G.M. Barrett and D.H.R. Barton, 'Darwin, Sir Charles Galton (1887–1962)', *Oxford Dictionary of National Biography* (Oxford: OUP, 2004) [accessed online 6 August 2015, http://www.oxforddnb.com/view/article/32716].
[614] TNA, FO 1032/164, 'Minutes of 1st Darwin Panel Meeting', 21 November 1945.
[615] Ibid., 'Memo from Econ 4', 29 November 1945.

or the whole of industry, and not … to individual firms who could more or less copyright the results'.[616] Although this was a necessary step, it did in fact hamper the early stages of Darwin Panel recruitment, as many Research Associations (who were among the only bodies who were actually allowed to hire German experts) considered it to be too much hassle to employ these men, or alternatively they were interested in only utilising them for a matter of weeks, which fell under the remit of BIOS interrogations and not Darwin Panel work.[617] Further reluctance came as a result of not wanting to employ a German of foreman level who would then be in a position to give orders to British workers.[618]

In the meantime, in Washington, the State Department, which had acted as the most consistent obstacle to a joint Anglo-American policy on civil-industrial recruitment, began to relent. On 21 August 1946, the US Chiefs of Staff circulated a memo, outlining their new policy 'to facilitate the entry into the United States, under the immigration laws, of a limited number of outstanding German and Austrian scientists and technicians'.[619] With US concordance, the British policy was able to increase in scale and speed. The Darwin Panel issued its first Comprehensive List of 132 German scientists and technicians approved for employment in Britain, which included: head toolmaker, highly-skilled spectrograph mechanic, chief camera designer, specialist in button manufacture, principal scientist in manufacture of gyroscopic gunsights, technical supervisor of alarm clock production, leather expert, superintendent of rubber department, authority on sugar beet, consultant on die design for turbine blades, and experts on needles and fishhooks, production of Rayon thread from viscose, and x-ray analysis, to provide just a fairly limited spectrum.[620]

The procedure utilised for Darwin Panel recruitment was very similar to that of the DCOS Scheme, and naturally there were a number of crossovers. Indeed, in January 1946, Sir William Palmer of the Lord President's Committee (which had oversight of the Darwin Panel) commented that 'it is almost impossible to draw a rigid dividing line between research for industry and for defence purposes'.[621] All of those brought over under the

[616] TNA, LAB 8/1198, 'Minutes of Board of Trade Meeting', 22 November 1945.
[617] Ibid., 'Minutes of 2nd Darwin Panel Meeting', 10 December 1945.
[618] Ibid., 'Employment of German Scientists and Technicians for Civil Purposes in the United Kingdom', 7 November 1945.
[619] TNA, CAB 122/357, 'US Chiefs of Staff Memo', 21 August 1946.
[620] Ibid., 'Comprehensive List of Names', 31 July 1946.
[621] Ibid., 'Memo by Sir William Palmer', 11 January 1946.

Darwin Panel were salaried on the same scale as those who came to Britain to do defence work, and their families were entitled to the same amenities. Another element common to both schemes was the degree to which bureaucracy and adherence to guidelines could severely hinder the process of recruitment, and this is especially clear in the case of Otto Reder, a talented German aeronautical specialist and expert in the field of helicopter technology. Reder was brought over to Britain in October 1946 to be interrogated under the BIOS Scheme and was then returned to Germany with only a vague assurance about future employment but asked not to take another job in the interim. In December, Reder wrote to L.R. Allum, the supervising officer of German scientists at RAE Farnborough, noting that he was 'still awaiting very anxiously any news from your authorities about my eventual immigration' and enquiring optimistically about when he and his family would be able to come to Britain, how much luggage they could bring, and how much notice he would have of his move. He signed off by saying 'I am very sorry to give you so much trouble, after all the trouble you have already had with me, and I thank you for all your help.'[622]

What followed was a run of correspondence between the Fairey Aviation Company, who were extremely keen to secure Reder's employment, and various government offices and agencies who appeared to be perpetually mired in bureaucracy. By May 1947, Major Malet-Warden, of FIAT Forward, contacted BIOS and described the situation in no uncertain terms:

> We are still without definite word of subject's engagement by Fairey Aviation Co Helicopter Dept. We cannot stall Reder off any longer than two more weeks as on financial grounds he will be compelled to seek other employment. Please treat as urgent or this office will not stand in Reder's way if he wants employment elsewhere.[623]

In August, Reder was brought back to Britain and housed at Spedan Towers again, in order to prevent him being employed elsewhere, while the details of his recruitment by Fairey were hammered out.

However, just as progress appeared to be being made in this case, a new obstacle presented itself – in September, the German Division at the Board of Trade discovered that

[622] TNA, AVIA 54/1403, Otto Reder to L.R. Allum, 14 December 1946.
[623] Ibid., Malet-Warden to BIOS Group II, 9 May 1947.

Reder's name appeared on the US 16th Defence List and they were therefore unable to move forward at all on the matter of his recruitment.[624] This further issue was, in fact, cleared up by Reder himself who stated that between January 1946 and January 1947 (excepting his time as a BIOS interrogation subject), he had been employed in the Science Department at an unspecified American-run university in Berlin, and the head of that Department had informed him that he had been removed from all American recruitment lists. In October 1947, this fact was confirmed by Group Captain J.R. Wilson of the British Joint Staff Mission in Washington and Reder was finally released for employment by Fairey Aviation, one full year since he had initially been brought over by BIOS and promised future employment in Britain.[625]

However, not all cases were quite as convoluted and obstructive as Reder's. In fact, the initial limit placed on the Darwin Panel scheme of 200 specialists was reached easily by the end of 1946,[626] and in May 1947, the scheme expanded significantly and the ceiling was lifted to 500.[627] This expansion was necessary in order to allow for a major change in the British civil-industrial recruitment policy – this was the beginning of 'exclusive exploitation', which allowed individual companies to have unrestricted access to a particular German specialist for their own utilisation as they saw fit (as seen above with Reder and Fairey Aviation). Previously, the German scientists and technicians were 'employed by government departments and paid out of public funds' and their service, 'like the specialised plant … seized as reparations or booty', was considered to be 'national property' so that the products of it could be circulated 'throughout the industries concerned for the benefit of the country as a whole'. However, by December 1946, it was noted that this was considered to be unsatisfactory by many:

> Private firms would, for the most part, prefer to pay the Germans' salaries themselves, and keep the technical advice and information gained as their own property *vis-à-vis* their competitors. The Germans would also prefer to be employed by the private firms since there is a ceiling of £800 per year on the salaries paid to them by government departments.

[624] Ibid., G.M. Judges to J. Protheroe, 5 September 1947.
[625] TNA, CAB 122/360, J.R. Wilson to A.H. Thorold, 2 October 1947.
[626] TNA, AVIA 54/1403, 'Minutes of Defence Committee Meeting', 11 December 1946.
[627] TNA, FO 1032/164, 'Minutes of 17th Darwin Panel Meeting', 16 May 1947.

Initial reaction to this was not positive; the Board of Trade did not feel it could work in tandem with the standard Darwin Panel scheme, and predicted further opposition from the Treasury, Home Office and other interested departments, but did concede that it might be possible as long as the private firms still allowed their German employees to publish their findings more widely, through learned societies for instance.[628]

Discussions on the possibility of this exclusive exploitation scheme continued throughout early 1947, with the ever-important denial policy very firmly borne in mind, and concerns grew that the 'Research Associations and organised trade bodies' had already absorbed all the German experts they could, and 'the widening of the scope of the transfer of German knowledge and ideas will become increasingly dependent on employment by private firms'.[629] This raised a couple of issues which the Inter-Departmental Committee on German Scientists (IDCGS) worked to smooth over. Firstly, it was decided to remove a clause which informed the German experts that they could be ejected from Britain at any time; the Home Office reserved that power over aliens at all times anyway, and it was felt that explicitly stating such 'could have a discouraging effect'. Secondly, it was noted that although 'firms generally appeared to think that their chances of getting government contracts would be improved if their staff was strengthened with German experts', there would also be 'cases where a firm employing a German could not, for that very reason, be given work of particular secrecy or importance'. In short, it was concluded that 'the employment of Germans in firms is generally likely to increase the firms' efficiency, but there may well be cases where the security value is consequently diminished.'[630]

Nonetheless, despite these reservations, the policy was formally approved by the Defence Committee of the Cabinet on 14 May 1947. The Darwin Panel still played an important part in its execution. German specialists could not be recruited directly from Germany by private British firms, and so still had to spend an initial six month period in Britain on government contract. During this time, it was the responsibility of the Darwin Panel to ensure that the specialist got maximum commercial exposure, 'either by posting him to a Research Establishment or by arranging for him to visit a number of firms', as this

[628] TNA, AVIA 54/1403, 'Employment of German scientists and technicians', 9 December 1946.
[629] Ibid., 'Russian Enticement of German Scientists', 18 April 1947.
[630] Ibid., 'Minutes of IDCGS Meeting', 11 February 1947.

would help him to build a network of contacts and increase 'the likelihood of his finding ultimate employment in which his knowledge would be fully utilised'. This had the additional benefit of increasing the chances of the expert securing fair financial reward for his services to British industry on the whole.[631]

The policy of 'exclusive exploitation' threw some of the potential sources of friction between the German experts and their new British colleagues and neighbours into stark relief.[632] General British perceptions of the German people during the initial post-war period were decidedly mixed, a combination of horror at the evil which had brought about the Holocaust, pity for the suffering now endured by ordinary German citizens in the aftermath of war and a sense of moral superiority as a victorious occupier in the position to re-educate and reform.[633] More specifically, housing was in dire shortage and the Ministry of Health insisted that the German experts compete on the same equal terms as British citizens in their search for accommodation. Further problems which were foreseen included difficulties of assimilating the new German employees into British workplaces, and opposition from British professional staff organisations to the recruitment of foreigners.[634] The British authorities knew that with the German scientists receiving increasingly attractive offers from the Soviet Union, among others, it was important to make sure that those experts already working in Britain were satisfied and felt like valued colleagues.[635] This was part of a wider policy to carefully manage the way in which the recruitment of German experts in Britain was perceived in the press and public domain.[636]

In other cases, where neither the British government nor private firms could find employment for German specialists whom it was desired to keep out of Soviet hands, the authorities looked to foreign (but allied) countries to step in. Britain was especially keen to utilise Commonwealth countries, especially Canada, Australia and India,[637] to share the

[631] TNA, FO 1032/164, 'Minutes of 18th Darwin Panel Meeting', 30 May 1947.
[632] Inge Weber-Newth and Johannes-Dieter Steinert, *German Migrants in Post-War Britain: An Enemy Embrace* (Abingdon: Routledge, 2006), 152.
[633] Evgenios Michail, 'After the War and After the Wall: British Perceptions of Germany following 1945 and 1989', *University of Sussex Journal of Contemporary History*, 3 (2001), 3.
[634] TNA, AVIA 54/1403, 'Memo from Director of TPA', April 1947.
[635] Patricia Meehan, *A Strange Enemy People: Germans Under the British, 1945-50* (London: Peter Owen, 2001), 211.
[636] See Chapter Six below.
[637] See Neufeld, 'The Nazi Aerospace Exodus', 49-67; Evan Jones, 'The Employment of German Scientists in Australia after World War II', *Prometheus: Critical Studies in Innovation*, 20 (2002), 305-321; Steven T. Koerner,

burden of recruiting German specialists, though they acknowledged that the Soviets would probably object to the employment of these men in countries they considered 'unfriendly'.[638] Professor Willy Messerschmitt, the infamous aircraft designer, was considered too much of a security risk to be eligible for employment in Britain, but was granted permission to travel to India to 'assist the Government of India in setting up an Aircraft Industry'.[639] Kurt Tank, the eminent aeronautical engineer who had been head of design at Focke-Wulf from 1931 to 1945, was wanted by the Swedish Air Force, and although there were concerns about his research in Sweden ending up in Soviet hands, the Foreign Office concluded that 'if … he was not on the "Denial List" and not required by the Ministry of Supply, he should be allowed to go to Sweden'.[640]

In some cases, however, certain German specialists who the British wanted had already gone to a foreign country, which presented a different set of challenges. Perhaps the most interesting case study in this respect is that of a group of German hosiery machine needle experts, comprising two highly-skilled technicians and approximately 50 other workmen. They were suspected to have left Germany illegally and as of January 1947 were employed in Switzerland. There was a strong incentive to the British industry to capture the world market for hosiery machine needles, but the success of this venture depended on obtaining German machines and manufacturing technique 'since the German industry was previously far ahead in this sphere'.[641] In considering the best course of action for obtaining these men, 'it was stressed that to show too much eagerness to get the men (or some of them) might defeat the project by causing the Swiss government to put difficulties in the way of their leaving Switzerland.'[642] By May, no progress had been made and the team of men had received an offer from an Argentine firm which was willing to finance large-scale production in Argentina, and the British looked for a way to prevent this offer being taken up. It was concluded that 'there was no legitimate means of preventing the Germans from going to Argentina and that the UK must rely on offering greater inducements in order to

---

'Technology Transfer from Germany to Canada after 1945: A Study in Failure?', *Comparative Technology Transfer and Society,* 2 (2004), 99-124.

[638] TNA, AVIA 54/1403, 'Draft Paper for Ministers on the Emigration of German Scientists and Technicians', 21 July 1947.

[639] Ibid., BJSM to Ministry of Defence, 23 September 1949.

[640] Ibid., 'Employment of German Scientists in Countries other than the UK, Dominions or USA', 8 May 1947.

[641] Ibid.

[642] TNA, FO 1032/164, 'Minutes of 14th Darwin Panel Meeting', 10 January 1947.

obtain their services in this country'.[643] This proposed exploitation is especially interesting because it was driven with a purely commercial intent – there were no real benefits for the nation as a whole, aside from replacing German market dominance in one small field with British.

Overall, it is clear why many of those involved saw the interrogation and recruitment of German scientists and technicians as the most valuable phase of the post-war exploitation of science and technology. While visits to facilities in Germany and the examination of confiscated documents and equipment had loose antecedents in the conventional looting and plundering which traditionally accompanied the occupation of enemy territory at the end of a conflict, the interrogation and recruitment of individuals with specialist knowledge was all but unprecedented. This new development was the product of many factors: an intelligence network which had expanded considerably in wartime and which understood the benefits of human intelligence, domestic British industry which had built closer links to the state during the war and was now crying out for support and investment in return for the contributions it had made to the national war effort and, perhaps most importantly, the looming spectre of some future war, in which it was assumed that a nation's scientists and technicians would be as significant as its soldiers, sailors and airmen.

Crucially, personnel exploitation represented a new element of forward planning – while the removal of machinery and documents could be attributed to natural curiosity or thirst for reparation, the benefits of exploiting experts could have considerably greater longevity, especially if the specialists concerned could be employed on a permanent basis. Although it may have proved the most productive and innovative element of exploitation, the utilisation of personnel still had much in common with other aspects of the wider initiative – it began with a military focus but soon shifted to a much more commercial angle, including the involvement of private firms; it was dependent on a vast and labyrinthine network of bureaucracy and administration, which often hindered more than it helped; it was a diverse and multifarious process, with parallel efforts active simultaneously in both Germany and Britain; and lastly it was inextricable from the web of foreign relations,

[643] TNA, AVIA 54/1403, 8 May 1947.

whether in terms of co-operation with the Americans or competition with the Soviets. It is this final point, concerning interactions between world powers, both at the policy-making level and on the ground, which forms the subject of the next chapter.

PART III

Exploitation in Context

CHAPTER FIVE
The International Dimension

As we have seen, Britain was certainly not the only nation pursuing exploitation at this time, and the United States, France and the Soviet Union all had very similar schemes. It is all but impossible to understand British exploitation in isolation, and it is essential to site it within a wider international context. As the emerging Cold War began to shape a new world order, shifting foreign relations had a direct impact on the way exploitation was conducted. While the United States remained a close, if not wholly trustworthy, ally to Britain, the Soviet Union was swiftly recast as a treacherous foe, while France occupied a middle ground of ambiguous allegiance. Ultimately the resources to be exploited in Germany were finite so an element of competition to obtaining the most valuable parts was to be expected. Tom Bower has written that it was the 'plunder' of Germany which split the tight wartime alliance,[644] while Alec Cairncross and others have argued that reparations (of which exploitation was one component) proved to be the biggest bone of contention between the former Allies.[645] Conclusions such as this should be treated with caution however; there were bigger, ideological issues involved while long-term strategic concerns often played a decisive role. The competitive process of exploitation was, in itself, potentially divisive but it was also a product of the rapidly-polarising geopolitics of the immediate post-war period.

In his work on the Russian occupation of Germany, Norman Naimark asserts that British and American exploitation can *only* be understood in terms of the relationship with the Soviet Union.[646] Certainly, one of the key aspects of the Cold War was the arms race between East and West, as both sides quickly established that an advantage in the science and technology of warfare might give them a crucial edge at the negotiating table as much as on the battlefield. This arms race was christened in the struggle for the spoils of Germany, with all participants realising that a shortcut to technological superiority might be found among the exposed ruins of the Third Reich. This lends considerable credence to

[644] Bower, *Paperclip Conspiracy*, 223.
[645] Cairncross, *Price of War*, 16; Hoffmann, 'Germany is No More', 606.
[646] Naimark, *Russians in Germany*, 206.

Naimark's point, in that exploitation would never have ranged so widely or lasted so long had the spectre of another global conflict not been looming on the horizon.[647]

The main thrust of this chapter, therefore, is to contextualise British exploitation on the international stage, where Britain's relations with its three wartime allies – the USA, France and the Soviet Union – coloured the planning and execution of exploitation, and led to some of its greatest successes and failings. It is important to note that there were often differences between official policy (decided by those who were perpetually mindful of geopolitical considerations) and the actions taken by those on the ground (for whom pragmatism was essential to overcome various practical obstacles); for example, the competitive friction between Britain and the US at the higher policy-making levels, experienced most acutely by the new Foreign Secretary, Ernest Bevin, was not always reflected in the mostly cordial Anglo-American interactions in the field.[648] This chapter will address matters of policy, and the grassroots competition and co-operation, in tandem. Each section is dedicated to one of Britain's three main wartime Allies – the USA, France and the Soviet Union. On the whole, this chapter will show how scientific and technical exploitation fitted into the wider framework of the new post-war world, both within Germany and in broader global terms.

The United States

In wartime, the relationship between Britain and the United States was the closest of any of the Allies, leading John Baylis to argue that it was so intimate and informal that traditional state sovereignty was eroded and replaced by a common Anglo-Saxon identity and purpose.[649] Although the speed with which this 'special relationship' was set aside immediately after the end of the war challenges Baylis' core assumption, there is no doubt that, in wartime, good communication and frequent consultations meant that many Anglo-American actions were taken bilaterally. This was certainly true of many aspects of scientific and technical research which took place during the war, not least the atomic bomb project.

[647] Ibid.
[648] Martin Folly, ''The impression is growing … that the United States is hard when dealing with us': Ernest Bevin and Anglo-American relations at the dawn of the Cold War', *Journal of Transatlantic Studies*, 10 (2012).
[649] John Baylis, *Anglo-American Relations since 1939: The Enduring Alliance* (Manchester: Manchester University Press, 1997), 18.

Although the Manhattan Engineer District (the codename given to the project) was an American affair, many of the experts from the British 'Tube Alloys' programme were involved closely too. As a result, when Manhattan head Brigadier Groves put together the Alsos initiative, though it was US-led, it operated in close alignment with the British too.[650] Unsurprisingly, this attitude of Anglo-American collaboration carried over into the origins of the scientific and technical exploitation programme proper. When the Combined Intelligence Priorities Committee (CIPC) was first proposed, it rested firmly on the assumption that it would be responsible for gathering intelligence for the benefit of both nations. Despite this, there was a simmering sense of competition beneath the surface, and the British were keen to have the committee chaired by one of their own, partly because it was to be based in London and would utilise intelligence primarily from British sources, and also because they imagined that the US would institute and lead a similar committee in Washington to handle similar matters in the Far East, and they wished to have balance.[651]

When the CIPC came into existence (quickly becoming CIOS), balance was actually achieved by having an American military chairman, Brigadier-General T.J. Betts, and a British civilian deputy, R.P. Linstead. This was palatable to the British as, for the time being, there was no parallel organisation in the US tasked with Japanese investigations. The British certainly had their own ideas for how exploitation should proceed, and this was a topic for discussion at many different committees and staff meetings throughout Whitehall in 1944, but they were constantly aware of their commitment to their allies. Alastair Balfour of the War Office's Civil Affairs department wrote to Lieutenant-Colonel Alexander Geddes, at the Deputy Chief of the Imperial General Staff's office, cautioning him that it would be premature to submit any outline blueprint for exploitation to SHAEF before the Americans had a chance to do so as 'SHAEF is entirely a joint affair and I feel we should be treading on dangerous ground if we were to submit our plans unilaterally'.[652]

CIOS operated fairly effectively in its Anglo-American format under the jurisdiction of SHAEF during the last year of the war and the first two months of peace, but as its necessary dissolution drew closer, officials on both sides of the Atlantic began to consider how to

[650] TNA, WO 219/1669, Col. G.G. Vickers to Maj-Gen. K.W.D. Strong, 7 September 1944.
[651] TNA, WO 193/432, 'Notes for a Chiefs of Staff Committee meeting', 13 June 1944.
[652] TNA, FO 942/27, A. Balfour to Lt-Col. A. Geddes, April 1944.

proceed on a more unilateral basis. For the Americans, this meant pushing forward on a scheme to bring German experts over to the United States for work on a number of military projects to aid in the Pacific War – a theatre in which American efforts dwarfed those of its allies.[653] Constrained by their close relationship with Britain, they pestered their ally for their assent to such a scheme, which the British gave on 14 June 1945, with the key proviso that 'the knowledge so obtained will be available not only to interested United States agencies but our own as well'.[654] The common view among British officials was that 'it seemed most unlikely that any research and development work could fructify before the end of the Japanese war' but they kept this opinion to themselves. A bigger concern was that of allocation – that is, a system to ensure that the best German brains were fairly distributed between the two nations. At this juncture, CIOS was considered to be a suitable body to adjudicate on these matters but it was an issue which would bedevil Anglo-American relations throughout this period.[655]

The British began considering this issue with even greater concern in the immediate run-up to the demise of SHAEF. On 4 July 1945, nine days before the Supreme Headquarters ceased to exist, the British Chiefs of Staff sent a note to the Joint Staff Mission in Washington, acknowledging that, on account of their greater commitment to the Pacific War, the Americans should be given preference on any exploitation material in cases where the quantity was insufficient to meet both US and British demands, but mitigated this by insisting that the Americans 'not be given *carte blanche* to remove equipment, scientific personnel and documents without consultation' and that they keep and share records of all that they did evacuate.[656] The Deputy Chiefs of Staff committee shared this sentiment too, when, in a meeting held the next day, they warned of the Americans conducting a 'somewhat piratical policy … which was likely to prove extremely effective' in the absence of any relative British procedure, and also expressed concern that German scientists taken to the US may well be reluctant to subsequently come and work in Britain.[657]

[653] Roy MacLeod, introduction to Roy MacLeod (ed.), *Science and the Pacific War: Science and Survival in the Pacific, 1939-45* (Dordrecht, Holland: Kluwer, 2000), 5.
[654] TNA, CAB 122/343, Chiefs of Staff to Joint Staff Mission, 14 June 1945.
[655] TNA, CAB 122/342, 'Minutes of DCOS Meeting', 6 June 1945.
[656] TNA, CAB 122/343, Chiefs of Staff to Joint Staff Mission, 4 July 1945.
[657] Ibid., 'Minutes of 6th DCOS Meeting', 5 July 1945.

That is not to say that the US attitude was more aggressively acquisitive than the British. This became especially clear when the British wanted to open personnel exploitation up to include German specialists who had no connection with defence, and were met with considerable reluctance on the American side, especially from the State Department. This disinclination was the result of a number of sticking points, including concerns about immigration (defence scientists had been brought over as prisoners-of-war, a categorisation which could not be extended to civilian experts) and potential accusations of hypocrisy, regarding US efforts to deter Latin American countries from recruiting Germans while doing it themselves.[658] Nonetheless, the British considered the State Department's obstacles to be delaying, rather than prohibitive, factors and turned their mind to concerns about a fair allocation policy for these civil-industrial specialists. Officials at the Board of Trade, who were masterminding this element of personnel exploitation, worried about the 'influence wielded by private American interests' and sought, therefore, a 'UK/US agreement which would allocate demands for scientists on a non-competitive basis. Otherwise we might find ourselves outbid both in respect of salaries and conditions of service.'[659]

Unsurprisingly, personnel exploitation was the area of the greatest competition between Britain and America, largely because it was difficult for any one individual to be effectively exploited by more than one nation. In other areas, however, co-operation was more evident. Investigations in Japan, for example, were being primarily conducted by the Americans, as had been predicted, but they were more than happy to share the fruits of their labours with the British, through BIOS channels.[660] BIOS also received reports, though usually only single copies, of any interrogations of German scientists carried out in the US.[661] Policy on documents and archives was developed on an Anglo-American basis in order to facilitate the easiest possible exploitation of this material by representatives of both countries. For maximum convenience, the records of the German government were held at the Ministerial Control Centre at Kassel which was situated practically on the border between the British and American zones of occupation.[662]

[658] TNA, CAB 122/357, Sir John Magowan to Brig. A.T. Cornwall-Jones, 17 January 1946.
[659] Ibid., Derek Wood to Sir John Magowan, 26 January 1946.
[660] TNA, FO 1031/50, 'Minutes of 7th BIOS Meeting', 8 May 1946.
[661] Ibid., 'Minutes of 6th BIOS Meeting', 17 April 1946.
[662] TNA, FO 1032/179, 'The Handling of German Documents and Archives', 6 September 1945.

Generally speaking, it was the agents and organisations in the field which showed the greatest propensity for co-operation between Britain and America, especially seen in contrast to the policy-makers in London and Washington with their more adversarial approach. Paul Maddrell has highlighted general collaboration in scientific intelligence-gathering on the ground during the period of occupation, much of which was based on the sharing of information and the mutual imitation of technique.[663] Furthermore, in the conclusion to an official history of T-Force, it was noted that the unit had 'provided the most striking and happy occasions for Anglo-American co-operation'.[664] FIAT, meanwhile, being the only British unit based in the American zone, 'had built up a goodwill with the Americans, which is of immense value to the Control Commission, and to Ministries and Departments in the UK'.[665] This was important as FIAT was handling roughly 80 individual British visits to the US zone every week, most of which lasted for an average of three weeks.[666]

These British visitors to the American zone were subject to strict rules and regulations, many of which were in place to avoid incidents which could jeopardise friendly and collaborative relations between the two countries. According to orders issued in July 1945, the visiting investigators were instructed not to drive any unlicensed or captured enemy vehicles, nor to leave US military vehicles unattended at any time, they were to stick to non-fraternisation restrictions in their encounters with German civilians, and they were told that, at all times, 'military courtesy, discipline and proper wearing of uniform will be observed'. They were also expected to always have personal identification ready for inspection and were not permitted to deviate from approved routes, without recourse to the appropriate authorities.[667] Writing in his memoirs after the war, R.V. Jones, the Air Ministry's head of scientific intelligence, who briefly travelled to Europe with the Assistant Directorate of Intelligence (Science) mission, recalled that 'wherever one wanted to go in the American zone … a piece of paper was essential because no American officer would act without written authority', jokingly surmising that this predisposition 'stemmed from having

[663] Maddrell, 'British-American Scientific Intelligence Collaboration', 81ff.
[664] TNA, FO 1031/49, 'Concluding Remarks', 1945.
[665] TNA, FO 1032/1459, 'FIAT', 10 December 1946.
[666] TNA, FO 1065/12, 'Investigation of T-Force: Report No. 47', 12 December 1946.
[667] TNA, FO 1032/177, 'Entrance of Intelligence Investigators into European Theatre, American zone of Occupation', 23 July 1945.

a written Constitution'.[668] When these American guidelines were not met, it could have serious repercussions. At the beginning of 1946, the Americans became increasingly reluctant to allow British reparations teams to enter the US zone, and the reason given was that the US officials 'were aggrieved by the conduct of certain of our reparations assessment teams in the past when visiting factories'.[669] One aspect of this poor conduct was British assessors informing German workers that their factory was due for reparations which supposedly reduced worker efficiency and output and risked sabotage.[670]

On the other hand, engineer Eddie Aspden, who visited Germany in the autumn of 1945 on a BIOS trip to investigate oil engines, felt that 'greater restriction was placed on investigators' in the British zone, though he did concede that officials there were more helpful.[671] In fact, he reflected the views of many of his fellow BIOS investigators, in having little but praise for the Americans' better-funded military occupation, and its abundant amenities:

> Conditions in the American zone were much more comfortable than those in the British, where we had to use our sleeping kit the whole of the time, and to wash and shave in cold water. A bath was almost out of the question. Laundry too was difficult, though in both zones. Rations for the road were very good in the American zone, where it was possible to buy the American Army K-rations, a carefully balanced meal packed into a sealed carton and graded breakfast, dinner and supper. We consumed quite a number of these. In the British zone, however, we were provided with bully beef sandwiches, frequently wrapped in newspaper.[672]

These comments on the general conditions of each zone were actually indicative of a larger truth – that the American zone was far better-appointed than those of the other Allies, on account of its economic strength, which affected the lives not only of US soldiers and British visitors, but the German civilian population too.[673] Partly as a result of these economic

[668] Jones, *Most Secret War*, 612.
[669] TNA, FO 1032/166, 'Visits by Reparations Assessment Teams to Factories in US zones', 18 January 1946.
[670] Ibid.
[671] IWM, 05/48/1, Private Papers of Edward C. Aspden, September-October 1945.
[672] Ibid.
[673] Thomas W. Maulucci Jr., introduction to Thomas W. Maulucci Jr. and Detlef Junker (eds.), *G.I.s in Germany* (Cambridge: CUP, 2013), 10-11.

variations, and despite striving towards roughly the same goal, the British and American exploitation efforts also differed in many aspects of procedure and implementation.

This disparity in approach became especially clear in July 1945, when FIAT attempted to provide a 'Standard Operating Procedure' to apply to both British and American investigators. It gave rise to considerable protest from the British and led FIAT to conclude that 'what may be a perfectly reasonable and sound procedure for the Americans appears unwarrantable interference when applied to the British.'[674] Ultimately, this was essentially just an issue of geography; for the British, 'proximity to Germany means that the appropriate expert for each target can be sent direct from England appropriately briefed' whereas the US teams needed greater co-ordination upon arrival.[675] Another benefit of Britain's location was that they could send over as many investigators as they wanted to, while the US had to be considerably more frugal. This too fed into the evolution of different methodologies. At a BIOS meeting in May 1946, Derek Wood of the Board of Trade highlighted this, explaining that 'it was sometimes difficult for the Americans to appreciate the necessity for perhaps 60 British investigators to visit the same target when only 6 had exploited it from the US angle.'[676]

These differences did not prevent Britain from learning from, and even imitating, the American strategy in exploitation. As a result of the greater resources at the United States' disposal, they were often able to take bold new steps first, and once their success had been proven, the more tentative British were able to follow suit. The US created a major detention and denial centre for German scientists and technicians, and their families, at Landshut in Bavaria towards the end of 1945. Conditions at the Landshut centre were reportedly dire, which concurs with accounts of many prisoner-of-war camps in the American zone, which suffered from woeful shortages of shelter, food and sanitation.[677] Nonetheless, Landshut allowed the US Army to keep an eye on their prizes, arrange for convenient travel to America and prevent any of the experts falling into Soviet hands.[678] This arrangement certainly impressed the British and in January 1946, FIAT (Br.) strongly

[674] TNA, FO 1032/177, 'British Industry and Information from Germany', 27 July 1945.
[675] Ibid.
[676] TNA, FO 1031/50, 'Minutes of 7th BIOS Meeting', 8 May 1945.
[677] Bessel, *Germany 1945*, 200-1.
[678] Bower, *Paperclip Conspiracy*, 158.

recommended that 'arrangements be made to establish [a] concentration area in [the] British zone similar to that operated by US authorities at Landshut'.[679] As discussed elsewhere, the Americans also led the way in reactivating the German hotel industry to facilitate easier travel to Germany for investigators and industrialists – an initiative which was far less successful when the British attempted to emulate it some months later.[680]

Not all interactions between the US and British were as positive or as productive as those described here. There were occasions when a lack of co-ordination, especially over valuable and sought-after targets like chemical warfare installations, led to confusion and redundancy.[681] Beyond this, though, there was also a genuine rivalry; a continuation of the often fractious relationship between the two countries' intelligence services during the war.[682] On many, if not most, topics, both sides were willing to share intelligence, resources and access but, as part of the scramble to assert a new global identity in the post-war world, the compromises of the wartime alliance were discarded, and replaced by fertile ground for contention and conflict.[683] Clarence Lasby has defined the two countries as 'resolute adversaries' in the race for the spoils, describing a relationship characterised by 'strong feelings of suspicion and competition', and quoting US Major-General Hugh J. Knerr as saying that the British were uninterested in co-operation and that, for them, 'what is best for the British Empire is the compelling motive'.[684] This reflects a prevalent view among contemporary Americans that Great Britain could not be trusted on account of their apparently avowed imperialism; while, in a Gallup poll of July 1948, 14 per cent of British respondents stated their belief that the USA were trying to dominate the world (though, to qualify, a staggering 70 per cent felt that world domination was the goal of the USSR).[685] This was all indicative of the British struggle to adjust to their new role as junior partner in the Anglo-American alliance.[686]

---

[679] TNA, FO 1032/302, 'Policy for Families', 2 January 1946.
[680] TNA, FO 1031/2, 'Minutes of a JEIA Meeting', 24 February 1948.
[681] Tucker, *War of Nerves*, 83.
[682] Hastings, *Secret War*, 291-3.
[683] McKercher, *Transition of Power*, 339.
[684] Lasby, *Project Paperclip*, 112.
[685] George H. Gallup, *The Gallup International Public Opinion Polls: Great Britain, 1937-1975* (New York: Random House, 1976), 179.
[686] Hathaway, *Great Britain and the United States*, 13-4.

In order to defend themselves against America's aggressively acquisitive approach to exploitation, the British expended considerable effort trying to wrangle a fair allocation policy. This was built around the principle of 40% each to Britain and the US, and 10% each to France and the Soviet Union, on all samples of 'secret weapons'. In addition, preference was to be given to the Americans 'in all cases where there are insufficient samples, personnel or equipment available to provide for development to be continued simultaneously both in this country and the United States'. The Deputy Chiefs of Staff, ever cautious about granting the US any kind of 'blank cheque', felt they would rather have 'a suitable allocation machine to decide which country is best fitted to pursue development in cases where the limitations to which we have referred apply', but worried that to raise this issue would be to add weight to American complaints that they were being uncooperative.[687] It seemed, however, that these allocation arrangements were a token gesture to the British which the Americans simply took little or no notice of. This was clear in May 1945 when sixteen ships carrying 100 V-2 rockets from Antwerp to New Orleans were intercepted and forced to halt by the Royal Navy in the North Sea. The captains of the Navy ships demanded that, in accordance with the allocation agreements, fifty of the rockets be handed over to them. The Americans refused, and continued to refuse, even when the Foreign Office sent a direct request to the State Department, and eventually the British relented and the ships continued on their way, their precious cargo intact.[688]

When it came to the exploitation of documents and material, with the exception of the special case of V-2 technology, the Anglo-American relationship was mostly a harmonious one. The exploitation of personnel, however, provided frequent opportunities for friction. The American equivalent of the British DCOS and Darwin Panel recruitment schemes was Project Paperclip which targeted the employment of around 1,000 German scientists and technicians in a variety of fields, most of which with some direct military utility. Paperclip was a child of many parents but it was primarily co-ordinated by the Joint Intelligence Objectives Agency (JIOA), an organisation which, like its counterpart BIOS, had

[687] TNA, CAB 122/363, 'Allocation of Samples of German Material for Intelligence and Research Purposes', 30 June 1945.
[688] Bar-Zohar, *Hunt for the German Scientists*, 119-20.

come about following the dissolution of CIOS.[689] Once again, America's economic supremacy gave them a considerable edge in recruitment, allowing them to offer much better terms than the British could. In June 1946, Piers Synott, Under-Secretary of State for the Admiralty, voiced concerns about this in a letter to G.H. Curtis at the Treasury, worrying that dissatisfied German scientists were 'passing out of our hands' and into those of the Americans, as well as the Soviets and French.[690]

The Americans also did much to frustrate British recruitment efforts, sometimes deliberately and sometimes through generally obtuse behaviour. For instance, when BIOS wanted to bring a group of IG Farben employees who were in US custody in Germany to Britain for two months of interrogation, the Americans refused, stating that they would only release three of the men, and for a seemingly arbitrary three-week period.[691] In addition, the British were left in a weak position when the US decided to shift the Dustbin detention centre from an Anglo-American operation to a unilateral one – a process they conducted gradually by steadily increasing the restrictions on, and obstacles to, British access to the detainees until, despite no change to official policy, the British were left with 'virtually no control in any matters appertaining to this Detention Camp'.[692] The effects of these American efforts to limit British exploitation potential can be seen in the recruitment figures – by October 1946, the USA had contracted approximately 240 German scientists and technicians, the British only 33.[693] Of some 2,500 aeronautical specialists in Germany in 1945, within two years 12 per cent were in American hands while Britain barely had 1 per cent.[694] Not all of this can be attributed to American treachery though; on account of resources the British scheme was necessarily smaller, and Britain was a less attractive prospect for many targeted Germans than the United States.

As with the competition over physical material, the biggest bone of contention between Britain and America in personnel exploitation was rocketry, in this case the V-2

[689] Douglas O'Reagan, 'Science, Technology, and Know-How: Exploitation of German Science and the Challenges of Technology Transfer in the Postwar World', Ph.D. dissertation, University of California, Berkeley (2014), 51.
[690] TNA, AVIA 54/1294, P.N.N. Synott to G.H. Curtis, 12 June 1946.
[691] TNA, FO 1031/9, 'Minutes of 6th BIOS Reception Centre Panel Meeting', 19 June 1947.
[692] TNA, FO 1031/69, P.M. Wilson to R.J. Maunsell, 9 November 1946.
[693] TNA, CAB 122/349, FIAT Main (Br) to Intelligence Division, 4 October 1946.
[694] Bower, *Paperclip Conspiracy*, 321. In addition, 25 per cent were in Russia, 8 per cent were in France and the rest had remained in Germany.

specialists. The post-war discovery of German plans to launch a long-range guided missile at New York by 1946 spurred on fears of such an attack on US soil, possibly with an atomic warhead, and prompted key changes in American strategic defence policy.[695] When the British first tried to move German rocketry experts to Cuxhaven for Operation Backfire, they found that the Americans were reluctant to let them go, with the US Forces headquarters even issuing an order to the Third and Seventh Armies, which stated that 'no V-weapon engineers or scientists will be allowed to leave the US Occupied area without authorities from this headquarters.'[696] The Americans, who had no real interest in the supposedly joint-led Backfire, were pressing ahead with their own investigations of rocketry and did not acknowledge the special importance which the British had granted to the operation.

Of the 500 German personnel involved in the project, only 79 were scientists, and of these, the US had requested that 26 be transferred to them immediately. Major-General A.M. Cameron, the officer in charge of Backfire, felt he had to make every effort to meet the US requirements, eventually handing over 14 – a decision made 'after consideration of all available substitutes and acceptance of a lower standard of technical skill being available for the operation'.[697] Even after this concession, the Americans were not sated and the British had to be dogged in their efforts to keep hold of the remaining twelve, who they described as 'key men'. The DCOS Committee discussed the American request and surmised that, as the Japanese war was over, the only use the Americans might make of these scientists was in a long-term research project. Therefore, they concluded that:

> Under these circumstances we cannot believe that their retention at Cuxhaven, for what would probably be a maximum of 2 months, could seriously inconvenience the United States Chiefs of Staff, whereas their withdrawal at this juncture would prejudice the success of Backfire into which much hard work and valuable effort has been put.[698]

In this instance, the British were able to retain the men which they required and the operation was able to proceed, but it is indicative of the fierce competition emerging between Britain and America for the best technical experts in Germany.

---

[695] Reuben Steff, *Strategic Thinking, Deterrence and the US Ballistic Missile Defence Project: From Truman to Obama* (Farnham: Ashgate, 2013), 36-7.
[696] TNA, FO 1031/85, USFET to Third and Seventh Armies, 8 August 1945.
[697] Ibid., Maj-Gen. A.M. Cameron to HQ, USFET, 13 August 1945.
[698] Ibid., 3 September 1945.

There were other examples of America's unscrupulous pursuit of German rocketry and aeronautics experts besides their interference with Backfire. In late August 1945, it was noted that a USAAF officer had simply turned up at RAF Völkenrode (one of the sites utilised as part of the British Operation Surgeon) in order to 'collect' 13 German specialists, '8 of which we had previously agreed to turn over to the Americans for work on Japanese war objectives, and 4 of which they agreed we should have', forcing the RAF officials to take 'delaying action'.[699] This action is even less justifiable as by this point the Japanese war had been over for almost two weeks. Elsewhere, another USAAF representative, Lieutenant Rosenbauer, was reported as having 'already surreptitiously removed one German scientist who was not on the original list of personnel requested by the Americans' and was interested in two more, so the British were forced to place these men 'in safe custody to prevent removal'.[700] This skulduggery does not suggest a harmonious relationship between two of the closest wartime Allies, and the British attributed the friction largely to 'the mysterious and rather parochial way in which it pleased [the US authorities] to work'.[701]

In reality, much of the difficulty which plagued the Anglo-American relationship throughout exploitation had its roots in shifting world power status. In October 1940, when Sir Henry Tizard travelled to the USA with new British scientific and technical developments, he got the strong, and accurate, impression that the British had far more to offer the Americans than vice versa.[702] By 1945, however, on account of the fortunes of war, the United States was the technologically superior power, which led to two opposing schools of thought on American exploitation – firstly, that as they were so industrially advanced, they would be able to more easily make use of the captured science and technology or, conversely, that as they were so advanced, they had far less to learn from their vanquished foe.[703] Either way, the US ended the war economically, diplomatically and militarily more powerful than Britain, and acknowledged that Britain was almost entirely dependent on America for its very survival, making it even more surprising that the US relied so heavily on

[699] TNA, CAB 82/6, 'Deputy Chiefs of Staff Committee', 27 August 1945.
[700] Ibid., 3 September 1945.
[701] TNA, FO 1031/85, 'German V-2 Technicians', 2 September 1945.
[702] David Zimmerman, *Top Secret Exchange: The Tizard Mission and the Scientific War* (Stroud: Alan Sutton, 1996).
[703] Gimbel, *Science, Technology, and Reparations*, 140, 145.

deception and trickery to try and secure the best spoils for themselves.[704] Nonetheless, of its relationships with the other members of the Grand Alliance which had won the war, Britain's interactions with America were the most collaborative and successful. Writing in April 1945, R.P. Linstead, the deputy chair of CIOS, worried that this co-operation with the USA would not be replicated with other nations, lamenting that 'it would be very much simpler' if it was.[705]

France

In the immediate post-war years, France occupied a curious position on the world stage – having been defeated then occupied and split by Nazi Germany in 1940, it could not be considered a major member of the wartime alliance dominated by Britain, the United States and the Soviet Union. Once the liberation of Europe began, Charles de Gaulle's bullish nature allowed France to half negotiate, half force their way back to the top table of international politics.[706] One key element of this was the securing of an occupation zone in Germany, albeit one notably smaller than that of the other Allies, which in turn entitled France to a seat on the quadripartite Control Council and granted it a say in all matters pertaining to the future of Germany.[707] While many expected the French to pursue a harsh, vengeful policy against their great European enemy, in reality they were remarkably willing to reintegrate Germany into a Western alliance. This was in part because many senior French leaders expressed genuine concern, in private at least, about the threat of the Soviet Union sweeping across Europe, and they sought to build closer links with Britain and especially the US in the name of greater national security. However, the presence of powerful communist elements in the French coalition government meant that, in public, these senior figures could not take such a strong anti-Soviet line, and instead showed a

[704] Robert Hathaway, *Ambiguous Partnership: Britain and America, 1944-47* (New York: Columbia University Press, 1981), 15.
[705] TNA, FO 1032/475, 'The Future of CIOS', 13 April 1945.
[706] William I. Hitchcock, *France Restored : Cold War Diplomacy and the Quest for Leadership in Europe, 1944-1954* (Chapel Hill, NC: UNC Press, 1998), 12.
[707] G. Maguire, *Anglo-American Policy towards the Free French* (Basingstoke: Macmillan, 1995), 146-7. See also: K.H. Adler 'Selling France to the French: The French Zone of Occupation in Western Germany, 1945-c.1955', *Contemporary European History*, 21 (2012), 575-595.

willingness to cultivate cordial relationships with both sides.[708] This outward impression caused the US, and by extension the British, authorities to view France with caution, fearing that it might soon align itself outright with the USSR.[709] Nonetheless, British Foreign Office personnel, including the post-war Foreign Secretary, Ernest Bevin, viewed collaboration with France (and other western European allies) as one of the three pillars of British foreign policy, along with the transatlantic partnership and the Empire and Commonwealth.[710]

In terms of exploitation, after almost five years of Nazi occupation, the French were more in need of a boost to their military-scientific research complex than any other major power.[711] They saw the extraction of German resources as a way both to relieve the French taxpayer of the costs of occupying their old enemy and to overcome the economic stagnation which France had suffered in the interwar years. In the words of Philippe Livry-Level, a Resistance hero and post-war centrist politician, in a National Assembly debate in March 1946 – 'we have here a land for us to exploit'.[712] Their position as an occupying power allowed them to conduct exploitation of their own, and not just rely on the unwanted scraps discarded by the three larger powers, as was the case for smaller members of the United Nations, such as the Netherlands and Norway. However, they did not begin as participants but rather as subjects, with facilities across France which had been maintained and utilised under the Nazi occupation investigated by CIOS teams sent over in the immediate aftermath of their liberation. French protests about this fell on deaf ears in Britain and America – as William Hitchcock has put it, at this stage, France remained a dim and distant star in the international constellation.[713]

Perhaps as a result of this, and perhaps from a desire to not let their wartime occupation translate into being left behind in the race for the spoils of Germany, the French were quick off the mark in exploitation, and their policy was resourceful and unscrupulous

[708] Michael Creswell and Marc Trachtenberg, 'France and the German Question, 1945-55', *Journal of Cold War Studies*, 5:3 (2003), 9.
[709] Aldrich, *Hidden Hand*, 200.
[710] Alex May, *Britain and Europe since 1945* (London: Routledge, 2014), 9.
[711] Doris T. Zallen, 'Louis Rapkine and the Restoration of French Science after the Second World War', *French Historical Studies*, 17 (1991), 6.
[712] Bessel, *Germany 1945*, 381-2.
[713] Hitchcock, *France Restored*, 45.

in equal measure.[714] For a start, they turned their struggle for recognition as a major post-war power into an advantage – having not been represented at the Potsdam Conference, they concluded that they were not bound by any decisions made there, allowing them to proceed practically unilaterally in securing advance deliveries of reparations from their zone.[715] They also used their shared border with Germany to their benefit. When German scientists refused to come to France for fear of the hostile attitudes of the native population, the French allowed them to live on the German side of the Rhine but ferried them across every day to work in laboratories in France.[716] The French also saw no need to limit themselves by working too consistently alongside any one power, often preferring to operate independently, and, as a result, they have been described as 'enjoying reasonable relations with all parties, but [being] trusted by none'.[717]

They certainly had the potential to be a valuable ally to the British, especially in the early days of exploitation. Indeed, in April 1945, CIOS received word from its French equivalent, the Committee of Scientific Co-ordination of National Defence, suggesting that the two organisations co-operate closely. The French felt they had much to offer: troops to guard targets, skilled personnel to help exploit them and intelligence on 'known and unknown German objectives … through French prisoners and deported workers'; in return, they hoped for the 'complete exchange of information, co-ordination of research plans and association of French and Allied field teams'.[718]

Although collaboration on this scale was never achieved, with the British and Americans unable to fully divest themselves of their misgivings about the French, they eventually relented and partly acquiesced to their ally's requests, and a workable and largely reciprocal relationship was established, albeit one tinged with a persistent edge of suspicion.[719] When the Intelligence Group of the British Element of the Control Council divided foreign countries into three groups on account of security, France were placed in the second group, along with, among others, Eire, Norway and Greece, which entitled them

[714] Douglas O'Reagan, 'French Scientific Exploitation and Technology Transfer from Germany in the Diplomatic Context of the Early Cold War', *International History Review*, 37 (2014), 366-385.
[715] Roy F. Willis, *The French in Germany, 1945-1949* (Stanford, CA: Stanford University Press, 1962), 112.
[716] Bar-Zohar, *Hunt for the German Scientists*, 134.
[717] Aldrich, *Hidden Hand*, 189.
[718] TNA, FO 1031/51, 'French Participation in CIOS', 9 April 1945.
[719] O'Reagan, 'French Scientific Exploitation', 367.

to receive British material bearing classifications up to and including 'Confidential'.[720] This gave them greater access than the Soviets but less than the USA, India and the Dominions; a categorisation indicative of Anglo-French relations on exploitation. Brian Balmer has written on the way that security classification is more than just an indication of scientific content – it can also be an expression of the strength, or fragility, of collaboration between nations.[721] For instance, in June 1945, it was agreed that France would be provided with a copy of the CIOS Black List – however, they were only to be given the 'geographical' list which contained the locations of targets, and not the 'technical' list which featured specifications about the items to be investigated. Not only was this second list not directly issued to the French but SHAEF insisted that 'care should be taken to insure that the French do not become aware of its existence'.[722] This lack of trust was also evident when the War Office decreed that 'no information on German Chemical Warfare developments during the war should be passed on to the French.'[723] On the other hand, the French were given copies of the majority of CIOS and BIOS Final Reports which were filed by investigating teams;[724] a courtesy which was not returned, though the reason behind this was assumed to be 'not any lack of goodwill on the part of the French, but the absence of any adequate organisation for dissemination'.[725] The semblance of open co-operation which was maintained throughout concealed a more uncertain relationship between Britain and France.[726]

Nonetheless, the core principle of mutual access to each other's zones of occupation was held to by both sides, as noted by Brigadier R.J. Maunsell of FIAT at a BIOS meeting held at the end of August 1945.[727] By December, a system was in place for reciprocal visits, wherein BIOS Liaison Officers, from specific ministries and departments, handled the French assessors.[728] As with trips to the US zone, British exploitation teams travelling to the French zone were expected to abide by a set of specific bureaucratic rules. Firstly, they were to obtain authorisation from a Liaison Officer at Höchst, near Frankfurt, then proceed to Offenburg, deep in the French zone and just across the border from Strasbourg, where they

[720] TNA, FO 1031/5, CCG Intelligence Group to JIC, 9 February 1946.
[721] Balmer, *Secrecy and Science*, 58.
[722] Ibid., 'French Participation in the Collection of Technical Intelligence in Germany', 15 June 1945.
[723] Ibid., Brig. Pennycook to R.J. Maunsell, 12 August 1945.
[724] TNA, FO 1031/7, 'Advance Notes for Investigators', 2 September 1946.
[725] Ibid., 'Minutes of a Panel Meeting', 23 September 1946.
[726] O'Reagan, 'French Scientific Exploitation', 368.
[727] TNA, FO 1031/50, 'Minutes of 2nd BIOS Meeting (1945)', 29 August 1945.
[728] Ibid., 'Minutes of 9th BIOS Meeting (1945)', 5 December 1945.

would be handled by French FIAT, and receive the necessary passes.[729] They were expected to be 'equipped with their own transport, bedding and emergency rations [though] gasoline, billets and meals will be provided by the French authorities during their stay in that zone'. In addition, they were forbidden from removing any documents, material or equipment without 'prior consent of T-Section, French Army of Occupation'.[730] Monica Maurice, who travelled through the French zone *en route* from Frankfurt to Cologne on a BIOS trip in May 1947, felt that the implementation of these regulations was ineffectual, as the control points on the borders of the French zone seemed to be there only to 'make quite sure we came out at the other end'.[731] These restrictions were significant as investigations into foreign zones made up a sizeable component of British exploitation activity in the eighteen months after the end of the war – between June 1945 and October 1946, 1,601 BIOS and British Reparations teams visited targets in the French and American zones.[732]

French exploitation teams were subject to similar regulations when visiting the British zone and their frequent failure to comply caused much consternation in the British element of FIAT. They protested particularly strongly about scheduled French teams never arriving or reporting to HQ, which was 'a source of extra work and worry for all concerned and in addition it often means that other teams are unnecessarily delayed in getting clearance'.[733] In some cases, though, the British authorities made considerable effort to ensure these visits went well. When a group of French industrialists wishing to examine the Volkswagen factory and subsidiaries in Wolfsburg for reparations purposes arrived in the British zone in December 1945, S.G. Galpin of the Economic Division suggested that 'they be given special treatment', including the use of more ostentatious accommodation than was normally used. He took particular interest in this case as he felt it would 'improve relations between [Economic Division] and the French Mechanical Engineering Branch'.[734]

The British were not only concerned with their relationship with the French on its own merits, but also how it made Britain appear in comparison with other nations. When the initial arrangements were still being developed, Brigadier Maunsell insisted that Anglo-

[729] TNA, FO 1031/7, 'Notes for the Guidance of British Technical Investigators', 9 August 1946.
[730] TNA, FO 1031/5, 'British Investigators Visiting the French zone', 31 July 1945.
[731] IWM, 99/76/1, Private Papers of Monica Maurice, 18 May 1947.
[732] TNA, FO 1065/12, 'Investigation of T-Force: Report No. 47', 12 December 1946.
[733] TNA, FO 1031/7, 'Non-arrival of Investigators', 21 June 1946.
[734] TNA, FO 1031/6, MG Econ 11 to MG Econ 1, 28 December 1945.

French relations were 'extremely cordial', but worried that 'if the French apply for, and receive, permission to visit the American zone and have access to records but are refused the same facilities by FIAT (British), it will inevitably place the British in an unfavourable light.' Even if the British did refuse, the French could still access the same records through the American side of FIAT, as they were pooled and shared, creating an 'obviously anomalous' situation which would 'soon give rise to bad political relations'.[735] Despite this comparison, American relations with the French were not wholly harmonious either. In April 1945, the US-led Alsos mission launched Operation Harborage which aimed to sweep into the German towns of Hechingen, Bisingen and Haigerloch, forty miles south of Stuttgart, and seize or destroy any atomic research equipment, and remove any specialists, before the frontline troops arrived. This was important because these towns were 'in the line of advance of the French Army'[736] and the head of Alsos, Brigadier-General Leslie Groves, was convinced that 'nothing that might be of interest to the Russians should ever be allowed to fall into French hands'.[737]

This attitude of equating the French with the much more serious Soviet threat had some legitimate grounds – for instance, in late 1944, de Gaulle had signed a mutual assistance pact with Stalin – but in reality, the Soviets viewed France as little more than a British and American pawn, as displayed by their refusal to cede any of their occupation territory in Germany in order to create a French zone.[738] Nonetheless, suspicion of closeness to the Soviet Union had a direct impact on the approach which Britain and the US took towards France during exploitation. In a JIC report from May 1946, it was noted that French attempts to entice German scientists should be monitored carefully, not only on account of 'the general anxiety felt as to French lack of security' but more importantly, 'the possibility of French co-operation with the Russians'.[739] One year earlier, before the war had even ended, the Deputy Chiefs of Staff had reached similar conclusions and, as such, informed SHAEF that 'we do not wish other secret weapons, such as new rockets, rocket assisted shells, controlled glider bombs … and successive types to be given to the French, [unless] samples of these weapons are captured by the French, or are already known to them' and

[735] TNA, FO 1031/5, Brig. R.J. Maunsell to MG Intelligence Division, 25 August 1945.
[736] TNA, CAB 126/333, 'German TA (Tube Alloy) Activities', 26 September 1945.
[737] Groves, *Now It Can Be Told*, 234.
[738] Hitchcock, *France Restored*, 43-5.
[739] TNA, CAB 81/133, 'JIC(46)51(0)', 24 May 1946.

instructed that 'any quantities captured in excess of [US and British] requirements should be destroyed.'[740] Two months later, in July 1945, the Combined Chiefs of Staff expanded on this policy, making it clear that no allocation of scientific and technical intelligence material should be made to the French until British and American needs 'have been satisfied and then only on specific request'.[741]

In practice, this bred an atmosphere of suspicion which in turn gave rise to clandestine behaviour which would become all too common under the hostile conditions of the Cold War. In Berlin, Enemy Personnel Exploitation Section (EPES) officers were given a list of intelligence desired on Soviet exploitation efforts and were also told to 'pay attention to the obtaining of information on similar activities carried out by the French in Berlin'.[742] In August 1946, the head of EPES, Lieutenant-Colonel P.M. Wilson wrote to his superior, R.J. Maunsell, expressing his concerns about 'the possibility of leakage of Top Secret information to the French'. He felt that having to share the EPES office in Berlin with the French element of FIAT compromised its security and suggested 'transferring all Top Secret activities at present carried out by this Section to a special office to which only British and American personnel will have access'. He also summed up the crux of the issue in Anglo-French relations on exploitation when he noted that we 'require the French to do a great deal for us in regard to finding Germans and in giving clearances for their evacuation from the French zone to UK' and therefore 'any restrictions we place on the French … would have unfavourable effects on our relations with them, and their co-operation in locating for us in the French zone.'[743] In short, the British had to rely on the French but they felt unable to trust them.

Even in the areas where the British were reliant on French co-operation, it was not always as forthcoming as they hoped. Even by June 1947, 'the French authorities took many months to give clearance' on evacuating German specialists from their zone, but the British still felt it was inadvisable to apply any pressure on the French to try and expedite the process 'as it might be possible to obtain them later when official negotiations with the

[740] TNA, CAB 82/6, 'General Allocational Policy on Secret Weapons', 1 May 1945.
[741] TNA, CAB 122/343, CCS to SCAEF, 14 July 1945.
[742] TNA, FO 1031/59, 'Attachment of personnel of Enemy Personnel Exploitation Section to FIAT Forward (British)', 14 August 1946.
[743] TNA, FO 1031/65, Lt-Col. P.M. Wilson to Brig. R.J. Maunsell, 20 August 1946.

French had been undertaken'.[744] Not only could French agencies be truculent in releasing German specialists in their custody to their allies, they were also quite devious when it came to trying to poach targeted experts who were held by Britain or America. In one example, French intelligence officers infiltrated a guarded American transit hotel in Bad Kissingen, Bavaria and went from room to room, talking to the scientists, casting doubts on their prospects in the United States and offering them a much better future in France. By the time they were discovered and escorted away, they had successfully managed to convince some of the specialists to go with them.[745]

In another instance, the French displayed a remarkable lack of scruples when they seized Otto Ambros while he was on his way to trial for war crimes. Ambros, the senior IG Farben chemist who had considerable responsibility for the Nazis' development of the new nerve gases and who had links to unethical human experiments and slave labour, was being interrogated by an Anglo-American team at Gendorf in Bavaria when a warrant for his arrest arrived from SHAEF. According to this warrant, he was to be immediately transported to the Ashcan detention centre at Mondorf-les-Bains in Luxembourg. The route took him through the French zone, where he was held by the French and set to work for them at Ludwigshafen.[746] It took considerable diplomatic protest on the part of the Americans to finally secure his release back into their custody.[747] These are just two examples of France's remarkably comprehensive programme of poaching German experts from their wartime allies. Altogether, Britain's relationship with France over exploitation, veering between close collaboration and deep suspicion, was an unsteady one. However, no matter how fierce the Anglo-French competition got over the best spoils of Germany, it pales in comparison when set against British relations with the real adversary of the post-war period – the Soviet Union.

[744] TNA, FO 1031/9, 'Minutes of the 6th BIOS Reception Centre Panel Meeting', 19 June 1947.
[745] Bar-Zohar, *Hunt for the German Scientists*, 125.
[746] Jeffreys, *Hell's Cartel*, 298-9.
[747] Bower, *Paperclip Conspiracy*, 268.

The Soviet Union

In the improbable wartime alliance, the Soviet Union was certainly the most anomalous element. Since the Russian Revolution of 1917 and the subsequent civil war, relations between the Soviet Union and the West had been largely unfriendly and characterised by suspicion and one-upmanship, and they were only forced to collaborate in the Second World War by Nazi Germany's betrayal of the Soviets when Operation Barbarossa was launched in June 1941. Under these inauspicious circumstances, a marriage of convenience was reached, where parties set aside, or at least veiled, ideological differences, racial stereotypes and varying strategic aims in order to unite for a common cause – the defeat of Nazi Germany. Once that aim had been achieved, or even before, when it looked increasingly likely, the already unsteady foundations of the alliance began to tremble and shake.[748] Those differing strategic aims, which had been buried away in the name of international unity, returned to the fore in Soviet planning, as they did in Britain and the USA too.[749]

The Soviets disliked, mistrusted and feared the Germans with remarkable vigour, a product of two world wars involving two brutal German incursions onto Russian territory, and they sought to use the balance of power at the end of the war to ensure these sufferings would not be repeated.[750] This guided much of their policy in Eastern Europe, especially Poland, where the creation of loyal 'buffer states' was a high priority, and it also shaped their actions towards their zone of Germany, namely striking a balance between punitive measures, such as dismantling, and restorative ones, necessary to ensure Germany was peaceful and self-sufficient.[751] On the ground, Soviet soldiers were the worst perpetrators of crimes against the German population, with incidents of rape, pillage and murder horrifyingly commonplace.[752] George F. Kennan, the senior American diplomat, later wrote in his memoirs that the Russians 'swept the native population clean in a manner that had no parallel since the days of the Asiatic hordes'.[753] British exploitation teams even heard

[748] Richard Overy, *Russia's War* (London: Penguin, 1998), 282-3.
[749] Geoffrey Roberts, *Stalin's Wars: From World War to Cold War, 1939-53* (New Haven, CT: Yale University Press, 2006), 296.
[750] Ibid., 288.
[751] Naimark, *Russians in Germany*, 10; Judt, *Postwar*, 118-122.
[752] Judt, *Postwar*, 19-21.
[753] George F. Kennan, *Memoirs 1925-1950* (London: Hutchinson, 1968), 265.

first-hand stories of the horrors of Soviet occupation – the works manager at the *Dominitwerke* in Brilon, Westphalia, described the effect of the presence of 1,500 Russian soldiers for six weeks as being 'as good as an air raid except that the ceilings remained intact'.[754]

At a policy level, much Soviet thinking was centred on the principle that Germany should never again be allowed to reach a position where it could launch an attack against Russia. Any form of German resurgence had to be explicitly on Soviet terms, and so German economic recovery was viewed with great caution. Moreover, as they had invested so much, not just in terms of human lives but also economically, in the war against the Nazis, they felt they had a right to strip Germany of all it had to offer.[755] In many ways, this mirrored the British attitude towards Germany who, even as late as 1949, was still considered by many in Britain to be the biggest threat to peace in Europe.[756] However, British attitudes were forced to change by a number of factors, not least a desire to see Germany return to self-sufficiency in order to reduce its reliance on Britain's already grossly overstretched resources.

In addition, some British intelligence and security experts had never stopped thinking of the Soviet Union as the real enemy even while the war was still being fought. This view became more and more widespread and popular as the post-war period matured and developed, largely because it also became the prevailing opinion of the most powerful nation in the Western bloc – the United States. The Americans, relative newcomers to a Europe still governed by lingering grievances and enmities between the former Great Powers, and with a foreign policy unencumbered by this weighty heritage, within a year had recast the Soviet Union into the role of enemy with one hand, and repositioned Germany as, if not quite an ally, then at least as a tool to be wielded against Soviet ambitions with the other.[757] Some have argued that it was actually the British who led the way on this reconfiguration of the world order, deliberately attempting to influence American policy towards the USSR, and to prevent the USA from reverting to isolationism as they had in

[754] IWM, 99/76/1, Private Papers of Monica Maurice, 21 May 1947.
[755] Graham-Dixon, *Allied Occupation of Germany*, 100.
[756] Alan Kramer, 'British Dismantling Politics, 1945-9: A Reassessment', in Turner (ed.), *Reconstruction in Post-War Germany*, 152.
[757] Deighton, *Impossible Peace*, 5-7.

1919.[758] Either way, the British public did not find it difficult to adapt to this realignment – by September 1946, a Gallup poll revealed that 61 per cent of British respondents felt that the alliance between the US, Britain and the Soviet Union had disappeared, while less than a quarter thought it was still intact.[759] Julian Lewis has observed that British military planners adjusted to the breakdown in Anglo-Soviet relations with foresight, prudence and exceptional rapidity.[760] These planners even began conducting assessments of what military strategy would be most appropriate for defeating the Soviets should it come to war between East and West, concluding that the use of weapons of mass destruction would be necessary to counteract the Soviet Union's overwhelming superiority in conventional land forces.[761] This meant that the British and Americans became very concerned about any Soviet efforts to achieve parity in 'scientific strength', which in turn made exploitation the opening gambit of the distinctly research-driven Cold War arms race.[762]

The Soviets' initial exploitation efforts were hasty and haphazard, little more than an extension of the widespread looting conducted by the untrained peasant troops of the Red Army, who stripped factories and laboratories of their valuable equipment in such a chaotic and careless fashion that much which was of value was lost.[763] In addition, the transport available to move the materials back to the Soviet Union was insufficient and large quantities were simply abandoned at railway sidings, to the double fury of the wastefully deprived German population.[764] This did not last long though and soon the Soviets were marshalling an exploitation programme to rival those of Britain and America in terms of scale and thoroughness. They also began taking a keen interest in the activities of their rivals, most notably the removal of anything of scientific or technical worth from the areas of Germany which British and American troops had seized in the last weeks of the war but which were due to be handed over to the Soviets for occupation.

---

[758] May, *Britain and Europe since 1945*, 11.
[759] Gallup, *Public Opinion Polls*, 137.
[760] Lewis, *Changing Direction*, xcvii.
[761] Aldrich, 'British intelligence and the Anglo-American 'Special Relationship' during the Cold War', 332-3.
[762] Jon Agar and Brian Balmer, 'British Scientists and the Cold War: The Defence Research Policy Committee and Information Networks, 1947-1963', *Historical Studies in the Physical and Biological Sciences*, 28 (1998), 209; Audra Wolfe, *Competing with the Soviets: Science, Technology, and the State in Cold War America* (Baltimore, MD: Johns Hopkins University Press, 2013).
[763] Filip Slaveski, *The Soviet Occupation of Germany: Hunger, Mass Violence and the Struggle for Peace* (Cambridge: CUP, 2013), 28.
[764] J.P. Nettl, *The Eastern Zone and Soviet Policy in Germany, 1945-50* (New York: Octagon, 1977), 200-1.

At the Potsdam Conference, Stalin directly challenged President Truman on these removals.[765] Truman had come prepared for such an exchange and responded that the removals 'were not made under instructions of the American government and that they would be accounted for… He added that no people had been removed by the American Army.'[766] He also promised to have a full investigation into these removals conducted by the US Military Governor, Dwight D. Eisenhower, which duly took place and concluded that, 'with certain exceptions, we did evacuate equipment and personnel from the Russian zone as claimed,' meaning that not only were the Soviet accusations true, they were actually a little underestimated.[767] Truman unsurprisingly felt no need to share these findings with Stalin or the Soviets. An EPES report filed a year later, in August 1946, went further and noted that the British evacuated 250 German experts and their families from the future Soviet zone, while the number handled by the Americans was closer to 2,000, surmising that 'the whole operation is now regarded with favour by British and American authorities, especially in view of the valuable results which have been obtained in the exploitation of German evacuated scientific and technical personnel.'[768]

A note appended to this report by R.J. Maunsell of FIAT warned of the 'strenuous efforts' which the Soviets were making to induce the evacuated specialists to return to their zone. It detailed that:

> Every effort is now being made by the Russians to persuade the evacuees to go back. Russian methods of persuasion include the offer of lucrative terms of employment and if these are not accepted the victimisation of the families of evacuees still in the Russian zone and the confiscation of their property.[769]

These carrot-and-stick tactics would later become characteristic of the whole Soviet recruitment effort, but their strong protests about these British and American removals concealed, perhaps deliberately, the fact that they had done something very similar in parts of Berlin before they were handed over to Western occupying forces. In the district of

[765] Gimbel, 'US Policy and German Scientists', 433-4.
[766] FRUS, 'Minutes of 11th Plenary Meeting', 31 July 1945, 516-7. Available at: http://digital.library.wisc.edu/1711.dl/FRUS [accessed 27 May 2015].
[767] 'Eisenhower to Truman', 24 September 1945, in *The Papers of Dwight David Eisenhower,* Vol.6 (Baltimore: Johns Hopkins University Press, 1978), 367-8.
[768] TNA, FO 1031/67, 'Evacuation of German Scientists and Technicians from Russian zone', 14 August 1946.
[769] Ibid., R.J. Maunsell to EPES HQ, 14 August 1945.

Dahlem, for instance, the Soviets lured away the bulk of the scientific workforce at the Kaiser Wilhelm Institutes for Biology, Biochemistry, Chemistry and Anthropology, using offers of lard to prove that they were serious about looking after these men and their families.[770]

These initial mutual poaching attempts were just the first phase in what became a fierce struggle for the spoils of Germany between the two fast-emerging Cold War camps. In the conclusion to a FIAT intelligence report from August 1946, the unnamed author expressed his feeling that 'we may just as well acknowledge the situation for what it is between Russia and the Western powers: a completely open race for the best talent and skill Germany has to offer.'[771] The British and American side of this race was spurred on by an overwhelming concern about what could happen if the Soviet Union was able to maximise the benefits of exploitation. A Joint Intelligence Committee report from May 1946 reveals that the security services feared that, by the end of the year, 'a large proportion of German brainpower will have gone to the Russians and there will be no looking back'.[772] They also worried that 'the alliance of German brainpower and Russian resources may well prove to be the most important outcome of the occupation of Germany'.[773] In reality, the extent to which German experts contributed in a significant way to Soviet technological development after the war is unclear, muddied as much by contemporary secrecy and national pride as by subsequent historiography, much of which has been based on only limited access to the pertinent files.[774]

As with all international interactions on exploitation, the biggest sources of contention were linked to the most significant technological advances achieved by German researchers. The Soviets were not allowed access to any 'Top Secret, Secret or Confidential' British documents relating to the V-weapons or rocketry in general,[775] and in terms of the allotment of specimens of these secret weapons to the Soviets, it was decreed that they should not be handed over until specifically asked for and even then 'should always be

[770] Naimark, *Russians in Germany*, 209.
[771] TNA, FO 1031/59, 'Periodic Intelligence Report No. 2', 6 August 1946.
[772] TNA, CAB 81/133, 'JIC(46)51(0)', 24 May 1946.
[773] Ibid.
[774] Asif Siddiqi, 'Germans in Russia: Cold War, Technology Transfer, and National Identity', *Osiris*, 24 (2009), 122-3.
[775] TNA, CAB 82/6, 'DCOS Papers', 22 June 1945.

subject to reciprocal action, not necessarily in kind but in equitable exchange of information, materiel or visits'.[776] The Americans even considered destroying the *Mittelwerk* underground V-2 factory near Nordhausen before the area was handed over to the Soviets, in order to 'preclude resumption of production within a comparatively short time'.[777] However, it was deemed that such action could have 'unfortunate repercussions' so it was called off, though as much specialist equipment as possible was removed before the handover, and relevant German experts were relocated to Cuxhaven, deep within the British zone.[778] In Albert Speer's memoirs, he recounts a rumour that the Soviets had contrived to use the kitchen staff at the US Army's camp at Garmisch-Partenkirchen in southern Bavaria to pass a secret offer of employment to Wernher von Braun, while he was briefly held there after the war.[779]

Unsurprisingly, another area which gave rise to considerable conflict and competition was over the German atomic research programme. Britain and the US were obviously very concerned that the West should maintain a monopoly on atomic weapons in order to give them a greater edge at the negotiating table with the USSR, but intelligence on the Soviet atomic bomb project was notoriously difficult to gather.[780] As they had little faith in Soviet science to develop an atomic bomb of their own accord, the withholding of any German material, equipment or personnel with connections to atomic research became of paramount importance.[781] Brigadier Leslie Groves, head of the Manhattan Project, described prominent German atomic physicist Werner Heisenberg as of greater worth than ten divisions of German soldiers and predicted that if he fell into Soviet hands, he would prove 'invaluable' to them.[782] Alsos was at the forefront of the efforts to prevent the Soviets deriving any benefit from German atomic science, an endeavour which included denying them access to any relevant substances as well as personnel – in March 1945, following intelligence gathered by Alsos operatives, the US Air Force bombed a thorium and uranium processing plant at Oranienburg, while in April, an Anglo-American team removed some

[776] TNA, CAB 122/363, JIC London to JIC Washington, 10 May 1945.
[777] TNA, WO 219/2165, 'Operation Backfire', 19 June 1945.
[778] TNA, CAB 122/363, 'Allocation Policy on Samples of Secret Weapons', 26 May 1945.
[779] Speer, *Inside the Third Reich*, 674.
[780] Catherine Haddon, 'Union Jacks and Red Stars on Them: UK Intelligence, the Soviet Nuclear Threat and British Nuclear Weapons Policy, 1945-1970', Ph.D. dissertation, QMUL (2008), 66.
[781] McNeill, *Pursuit of Power*, 367.
[782] Groves, *Now It Can Be Told*, 245.

1,200 tons of uranium ore from a salt mine near Staßfurt and shipped it back to Britain.[783] Both Oranienburg and Staßfurt were due to fall within the Soviet zone, and this marked the first incidence of the denial of fissile materials being employed as an atomic non-proliferation measure – a tactic which has persisted, but not proved widely successful, throughout the Cold War and up to the present day.[784]

The Soviets knew that to hesitate would be to lose out in the atomic exploitation race so they quickly established their own atomic investigative organisation which has been dubbed 'Russian Alsos', and which was led by an NKVD lieutenant-colonel, Avraamii Zaveniagin, who brought an approach more driven by intelligence-gathering than by scientific curiosity. In fact, many Soviet scientists were reluctant to participate, fearing that they would be replaced by the very German experts whom they helped to recruit. Although the Soviets soon discovered that they had missed out on the most talented of the German physicists (who by this stage were interned at Farm Hall, near Cambridge) they were able to benefit from the fact that many others did not wish to go to the USA as they felt that they had nothing to offer to the vastly advanced American project and did not want to rely on charity. The Soviet bomb project, meanwhile, was only slightly ahead of German research and therefore the German experts felt they could contribute more to it.[785] Certainly this competition for German expertise was the first phase in the close relationship between espionage and atomic physics which existed throughout the Cold War, and gave both sides ample experience.[786]

Certainly, concerns about atomic secrecy did not disappear after the initial mad rush for spoils which took place in 1945. For instance, when the Farm Hall scientists returned to Germany after their period of internment in Britain had ended, they were placed under 'special surveillance', codenamed Operation Scrum Half. This continued and expanded in 1947 and 1948, as fears of these scientists being kidnapped, murdered or swept up by the Soviets in the instance of a land invasion of the western zones of Germany grew. However, it also came in for considerable criticism, including by the US Military Governor Lucius Clay,

[783] David Holloway, *Stalin and the Bomb: The Soviet Union and Atomic Energy, 1939 – 1956* (New Haven, CT: Yale University Press, 1994), 111.
[784] Harold A. Feiveson et al., *Unmaking the Bomb: A Fissile Material Approach to Nuclear Disarmament and Non-Proliferation* (Cambridge, MA: MIT Press, 2014), 174.
[785] Holloway, *Stalin and the Bomb*, 109-10.
[786] Richelson, *Spying on the Bomb*, 62.

who felt it was foolish to have these vital individuals living freely in Germany, but under almost prohibitively expensive surveillance. It was suggested that it would be better to either incarcerate them or move them permanently to Britain or the US.[787]

The particularly high-priority examples of rocketry and atomic physics aside, the early stages of East-West relations on exploitation attempted, on the face of it at least, to maintain a sense of cordiality and civility. While some on the Western side advocated a strongly collaborative approach, such as the British FIAT chief, R.J. Maunsell, who called for 'basically, full co-operation',[788] but with some excluded topics such as chemical warfare, the prevailing view in the months following the end of the war was that some form of reserved, partial co-operation was the best option, including an insistence on reciprocity for any exchanges. For example, Admiral Sir Harold Burrough, the British Naval Commander-in-Chief in Germany, replied to Maunsell's suggestions by saying that his 'past experience has shown that Russians are prepared to take everything and give nothing' and suggesting a firm reciprocal basis, with all 'requests and proposals to be initiated by Russians'.[789]

The official policy which was handed down by the British Chiefs of Staff in September 1945 followed much this line of thinking, stating that Britain 'should have reasonable latitude in permitting conducted Russian visits to German intelligence targets within our zone for strictly limited periods, subject to the exclusion of certain specific targets'.[790] Areas which were not open for exchange with the Soviets included bacteriological warfare, applied nuclear physics, supersonic aerodynamics, control of guided missiles, anything on chemical warfare, the work of IG Farben and all diplomatic and political documents. Problems were found with this scheme almost immediately. The economic intelligence division of the Military Government wrote to the JIC, describing the exclusions as 'somewhat unrealistic' and listing several particularly telling examples:

> In particular, the exclusion of Russians from all IG Farben plants and the ban on any reference to this cannot be effected while there is a quadripartite enquiry into the ramifications of the IG Farben. It is also going to be very difficult to avoid discussion about the control of guided missiles when the Russians have been asked to attend the Backfire

[787] Aldrich, *Hidden Hand*, 222-3.
[788] TNA, FO 1031/5, Brig. R.J. Maunsell to Mil. Gov., 9 August 1945.
[789] Ibid., Admiral H. Burrough to Brig. R.J. Maunsell, 11 August 1945.
[790] Ibid., Lt-Gen. B. Robertson to Lt-Gen. L. Clay, 17 September 1945.

> demonstrations. Again, there seems little point in restricting information on the new poison gases Sarin and Tabun when the plant for their manufacture is in the Russian zone. Other examples could be mentioned, but these are typical.

It was also noted that the list was so comprehensive that if it was adhered to literally, 'we are bound to create a feeling of suspicion in the minds of the Russians and all to very little purpose'. [791]

There was also a feeling that any push for reciprocity was foolish as 'it is likely that worthwhile intelligence targets within the Russian zone are few' but it was still considered 'desirable to learn what does in fact remain in the Russian zone'.[792] This was not a new concern but in fact reflected a similar point which had been raised by the British at the Potsdam Conference, that 'even if a more general undertaking for reciprocal exchange of all information were made and loyally observed by the Russians, we should not expect to obtain much valuable information from them'.[793] Moreover, early experience showed that the Soviets were not particularly willing to loyally observe the terms of reciprocity, with representatives of the Chemical Industries Branch of the CCG(BE) complaining that 'the position with regard to Russian visits to our zone is extremely unsatisfactory'.[794] This was in no small part because the Soviets kept sending new teams without allowing for British return visits, thus removing any chance that 'a proper give and take basis would be established'.[795] Sometimes obstructions were not created by the Soviets, but rather by the security-conscious British authorities – Monica Maurice, who led a BIOS trip to Germany in 1947, recorded ruefully that one member of her team was offered a 'heaven sent opportunity' to visit the Soviet zone 'but we are not allowed to do that'.[796]

In contrast, however, in April 1946, BIOS reported that although 'some difficulty had been experienced in making the initial arrangements' a British team which had travelled to the Soviet zone 'had been extremely well treated'. The team leader emphasised the 'courtesy and good treatment' he and his men had received, and even suggested that a

[791] Ibid., Mil. Gov. Econ. 3 to JIC, 15 October 1945.
[792] Ibid., 'Russian Access to Targets in the British zone of Germany', 20 August 1945.
[793] TNA, CAB 122/343, 'Policy for the Exploitation of German Science and Technology', 1 August 1945.
[794] TNA, FO 1031/6, M. Zvegintzov to C.G. Wickham, 23 February 1946.
[795] Ibid.
[796] IWM, 99/76/1, Private Papers of Monica Maurice, 26 April 1947.

letter of thanks be sent to the Russian Liaison Officer in Berlin.[797] Investigations into IG Farben offered another occasion for greater co-operation, and in January 1946, British officials chose to visit three IG facilities under Soviet control (at Auschwitz, Staßfurt and Bitterfeld) in return for Soviet visits to three facilities in the British zone (at Düsseldorf, Uerdingen and Leverkusen).[798] This was, in part, the legacy of a proposed Quadripartite IG Investigation Working Committee (QIIWC) which had been plagued by a number of issues, including the lack of a dedicated detention centre and conflict with the Nuremberg Trials, and in December 1945 was dissolved as it 'has not now and never has had official sanction, and in fact has never acted on a quadripartite basis'.[799]

As the post-war period progressed, incidences of collaboration between East and West became fewer and further between and restrictions on British investigators in the Soviet zone became much tighter. Monica Maurice noted that though they were permitted to travel through the Soviet zone to get to Berlin, they were not allowed to stop anywhere *en route*.[800] They were also not permitted to travel through the Soviet zone after dark, and there were Red Army sentries posted every two or three miles along the roads to make sure these rules were acknowledged.[801] It was also during this time that the British and Americans began to take a greater interest in exactly how the Soviets were conducting their own exploitation programme. As early as July 1945, the Deputy Chiefs of Staff were informed that 'public offers of employment of German scientists have already been made over the Russian-controlled radio',[802] while in March 1946, the US branch of FIAT produced a report entitled 'Soviet Sponsored Research Organisations Currently Active in Berlin'. This report comprehensively detailed the way in which these organisations contributed towards Soviet exploitation and commented that 'interested Russian agencies largely dominate scientific and technological life in Berlin. The three Western powers, for their own part, are apparently unaware of the nature and extent of this domination.'[803]

[797] TNA, FO 1031/50, 'Minutes of 6th BIOS Meeting (1946)', 17 April 1946.
[798] TNA, FO 1031/6, 'Mutual Visits to IG Farben Plants', 8 January 1946.
[799] TNA, FO 1031/53, 'Quadripartite policy', 11 December 1945. For more on the fate of IG Farben in occupied Germany, see Raymond Stokes, *Divide and Prosper: The Heirs of I.G. Farben under Allied Authority, 1945-1951* (Berkeley, CA: University of California Press, 1988), esp. chapters 2-4.
[800] IWM, 99/76/1, Private Papers of Monica Maurice, 22 May 1947.
[801] IWM, 09/21/1, Private Papers of Gilbert A. Hunter, January 1946.
[802] TNA, CAB 122/343, 'British Requirements from Germany', 16 July 1945.
[803] TNA, FO 1031/65, 'Soviet Sponsored Research Organisations Currently Active in Berlin', 1 March 1946.

Despite this, British and American exploitation agencies took solace in their belief that the German people had a fundamental dislike of the Soviets and were therefore generally reluctant to work for them. In January 1946, Brigadier C.F.C. Spedding of Research Branch dismissed claims that it was risky to let desirable German specialists live too close to the border of the Soviet zone, 'since popularity of Russian zone is inversely proportionate to its proximity'.[804] A Civil Censorship intercept from August 1946 revealed that, upon receiving an offer to go and work for the Soviets, German rocket scientist Helmut Reichstein felt that although he 'would have immediately acquiesced for the Americans, the matter requires some real deliberation when it concerns the Russians'.[805] Reports such as these gave the Western powers an inflated sense of confidence, leading one FIAT intelligence assessment to conclude that, in terms of the majority of German scientists and technicians, 'most of them are ours for the asking – if we ask'.[806]

However, the Soviets actually had many ways to make their offers attractive to a wide range of German experts. By the end of 1946, the British began to recognise that their own commitment to fairly thorough programmes of denazification and disarmament was 'having the effect of driving German scientists and technicians to work for the Russians … who have no such scruples'.[807] The extent of Soviet commitment to denazification has been disputed,[808] but there are clear examples of their active recruitment of fairly obvious and committed Nazis, such as physical chemist Peter Adolf Thiessen, who had been a senior figure in the Nazi scientific hierarchy, the holder of several Nazi Party awards and had been a member of the Party since 1933 – in short, he was no mere 'fellow traveller' nor one of the so-called 'apolitical' scientists which the British and Americans claimed to exclusively recruit.[809] When the British tried to understand how such a man as Thiessen could be happy to go and work for the Soviets, the conclusion they drew was that he had done so 'probably to contribute to Germany's renewed strength and greatness with the help of the country which made a pact with Hitler against Britain in August 1939'.[810] Such a move certainly did

[804] TNA, PREM 8/373, Brig. C.F.C. Spedding to M.W. Perrin, 17 January 1946.
[805] TNA, FO 1031/65, 'Civil Censorship Submission: H. Reichstein to K. Hoertnagel', 31 August 1946.
[806] TNA, FO 1031/59, 'Periodic Intelligence Report No. 2', 6 August 1946.
[807] TNA, FO 1031/68, 'Russian Activities regarding German Scientists and Technicians', 21 November 1946.
[808] Timothy Vogt, *Denazification in Soviet-Occupied Germany: Brandenburg, 1945-8* (Cambridge, MA: Harvard University Press, 2000); Fulbrook, *Dissonant Lives*, 286-8.
[809] Naimark, *Russians in Germany*, 209.
[810] TNA, FO 1031/138, Maj. E. Tilley to Lt-Col. P.M. Wilson, 21 May 1946.

Thiessen's career no harm – while working in the Soviet Union, he was even able to add the Stalin Prize to his collection of Nazi accolades.[811]

For other experts, especially those with a less tainted political background, there were other elements of the Soviet offers which they found appealing. The Soviets offered salaries ranging from RM 800 to 8,000 a month, which completely dwarfed the average British offers of RM 400, and they augmented this with generous double ration packages.[812] The Soviets also used a system of *payoks* to entice their targeted specialists – these were variously-sized parcels of much sought-after items used to sweeten the deal, ranging from five cigarettes at one end of the scale to two cases of foodstuffs at the other.[813] As the food shortages in the British zone worsened in 1946, more and more German experts began looking eastwards for a more secure future, though the British wondered 'whether the prospects of physical starvation weigh as heavily with these men as the virtual certainty of mental starvation if they remain in western Germany'.[814] This was in reference not only to the Anglo-American policy of picking a German's brain, leaving him in uncertainty and often not offering him any financial recompense or job prospects in return, but also in reference to the ban on any warlike industries in the western zones, which included fields such as aeronautics and rocketry, in which many of the relevant experts specialised.[815] In March 1946, Heinrich Waas, a German naval technician, compiled a report for the JIC, in which he sardonically reflected German views on Allied recruitment policies: 'one can often think that an agreement exists between the British and Americans on the one hand, the Russians on the other, to drive all valuable technicians out of the western zones into the Russian.'[816]

The British and Americans consoled themselves by suggesting that the German scientists which the Soviets were able to recruit were fairly insignificant individuals. Some government officials felt that Britain had secured some of the truly outstanding German researchers, too much emphasis was being placed on the 'aiders and abettors', and that

[811] Pavel V. Oleynikov, 'German Scientists in the Soviet Atomic Project', *The Non-Proliferation Review*, 7:2 (2000), 20.
[812] TNA, FO 1032/1231B, 'Matchbox: general report', 15 April 1948.
[813] Naimark, *Russians in Germany*, 218-9.
[814] TNA, CAB 81/133, 'Employment of German Scientists by Russians', 7 April 1946.
[815] John Krige, *American Hegemony and the Postwar Reconstruction of Science in Europe* (Cambridge, MA: MIT Press, 2008), 46-7.
[816] Ibid., 'Report by Heinrich Waas', 26 March 1946.

Britain should not 'really mind if these lesser lights do go to the Russians'.[817] EPES, meanwhile, noted that the Soviets had taken 'chiefly technicians and engineers … and left behind many of those who specialised in construction and planning', which it was hoped would limit the amount of long-term benefit the Soviet Union could derive from exploitation.[818] It was also recognised that, being mostly younger men, 'assistants are usually more willing to take the risk with the Russians', but sufficient foresight was shown to acknowledge that as 'the assistants will normally be the professors in about ten years it is considered just as important to keep them in work and in good will towards us'.[819]

The Soviets however were not content with simply siphoning off a sizeable number of able German scientists and technicians of all levels using attractive offers of continued work in their particular field, good pay and rations allowances, real opportunities for professional development, and a working environment characterised by respect and good relations with their supervisors. Under the Cold War conditions of heightened paranoia, they began contemplating a more drastic way to secure a large number of Germany's best and brightest for themselves. In the autumn of 1945, the German press in the British and American zones ran numerous sensationalist stories about the Soviet kidnappings of countless German specialists; much of which was little more than a thinly-veiled propaganda attempt to counter the many positives of Soviet recruitment.[820] Nonetheless, these fears were felt very acutely by British exploitation officials, as shown by the continued monitoring of the Farm Hall scientists upon their return to Germany, mentioned above.

The fears were also not totally groundless. In the autumn of 1946, the Soviets began moving small groups of German specialists forcibly from the eastern zone to the Soviet Union proper. In many cases, they did so covertly, in order not to incite their targeted men to flee or to arouse too much suspicion in the West. In one example, the British Scientific and Technical Intelligence Branch (STIB) recorded that during deportations from the Junkers works around Magdeburg and Dessau, the presence of German police and Red Army soldiers on the streets was explained away as 'a drive … being made against Black Market

[817] TNA, AVIA 54/1403, 'PDSR(D)', 20 September 1946.
[818] TNA, FO 1031/25, 'Special Intelligence Report No. 3', 31 January 1947
[819] TNA, FO 1031/75, 'EPES: policy', 25 April 1946.
[820] Naimark, *Russians in Germany*, 219.

racketeers'.[821] However, it was at 4 a.m. on Tuesday 22 October 1946 that the real extent of the Soviet deportation plan came to light. This was 'zero hour' for Operation Osoaviakhim, a well-planned and neatly-executed mass forced evacuation scheme. It was co-ordinated and led by General Ivan Serov, who was a Deputy Commissar of the NKVD under Lavrentiy Beria, Stalin's fearsome secret police chief, once again reinforcing the image that Soviet exploitation fell very much in the domain of intelligence and espionage as opposed to the civil service, as was the case in Britain.[822]

The immediate goal of Osoaviakhim was to move huge aviation, rocketry, and other weapons research and production facilities from Saxony and Thuringia to the Soviet Union. These Nazi-era facilities had been rebuilt and the staff was primarily German, under the supervision of the Soviets, who were well aware of the perils of conducting military research in Germany, given the relatively porous frontiers between the various zones of occupation and the supposed four-power prohibition of such research.[823] The aim therefore was to relocate these men from Germany, where, despite already being in Soviet employ, they were at risk of poaching by another occupying nation, to the USSR where they were almost completely safe. Firms whose employees fell under the remit of Osoaviakhim included BMW, AEG, Junkers, GEMA, Askania, Kabelwerk Oberspree, among many, many more.

The process for each individual who was included in Osoaviakhim was much the same across the board:

> The man concerned was awakened by Russian soldiers in the early hours of the morning and informed that he would be leaving for Russia immediately. In many cases the man was permitted to take with him his family and as much of his furniture as could be loaded into one third of a railway freight wagon.[824]

These men and their families were then moved by lorry and private car to the eastern outskirts of Berlin, where they were loaded onto 92 trains, totalling some 700 coaches, at the stations of Friedrichshagen and Köpenick. The destinations of these trains were major cities and industrial centres in the USSR, including Moscow and Odessa, and the Germans

[821] TNA, FO 1039/672, 'Reports from STIB', 25 November 1946.
[822] Naimark, *Russians in Germany*, 220.
[823] Dolores L. Augustine, *Red Prometheus: Engineering and Dictatorship in East Germany, 1945-1990* (Cambridge, MA: MIT Press, 2007), 8.
[824] TNA, FO 1031/59, 'Special Intelligence Report No. 2', 6 November 1946.

aboard were vaguely told that their journeys would last from three to seven days.[825] Needless to say, at no stage in the proceedings were the German detainees given any choice in the matter. The deportations continued throughout 22 October and were still ongoing at 5pm that evening, with trucks loaded with scientists, their families and their household possessions arriving at the railway stations every three to four minutes. The scale of the operation was unprecedented, involving roughly 2,300 German specialists (plus their families) – it has been estimated that approximately 84 per cent of the German scientific workers deported to the Soviet Union in the years after the war were taken in this operation.[826]

There is no doubt that Osoaviakhim was meticulously well planned and prepared for. In the months leading up to it, the Soviets had lured many German experts who worked in their zone or sector of Berlin, but lived elsewhere, to relocate closer to their workplace, by offering much larger and more comfortable accommodation at a fraction of the cost. With the dire housing shortage in Germany at this time, especially in Berlin, it was considered 'small wonder' that few could bring themselves to refuse such a tempting offer.[827] In addition, Red Army commando units and troops with trucks were posted to street corners and important locations during the night, in order to pre-emptively deter any resistance which might be provoked.[828] Even these measures were not enough to dissuade certain 'rugged individualists' who 'refused to budge, and stuck in their homes in the British or US Sectors', thus forcing the Soviets to make some very risky, and largely fruitless, raids outside of their own zone, sometimes using German police officers to bring the specialists in question from their homes to their workplaces where they were promptly handed over to the Soviet commissars.[829]

Some individuals still remained undaunted, such as Dipl.-Ing. Zumpe, chief of the flak rocket department at GEMA in Berlin, who turned up to work as usual on the morning of 22 October, where the Russian director informed him he was to go to the USSR for work. Zumpe immediately acquiesced, knowing that to refuse could prove fatal, and arranged for

[825] Ibid.
[826] Maddrell, *Spying on Science*, 30.
[827] Ibid.
[828] Naimark, *Russians in Germany*, 220-1.
[829] TNA, FO 1031/59, 6 November 1946.

Soviet transport to fetch him, his wife and their possessions from their home in the British Sector the following morning. Before they could do so, the Zumpes concealed themselves at a friend's apartment nearby and watched as a succession of different Soviet officials and soldiers attempted to locate them. In the meantime, he managed to contact the British element of EPES, who arranged to evacuate them, by air, to Frankfurt, just over a week later. EPES also recorded the story of Dr Ulrich Capeller, a physicist from Jena in Thuringia, who was loaded onto a train by the Soviets, but managed to jump off while it was moving during the night and make his way back to Berlin, where he immediately made himself known to the British authorities.[830]

Unsurprisingly, despite its secretive origins, the full extent of Osoaviakhim soon came to the attention of the shocked British and American exploitation agencies, and to the wider public too. Horror stories appeared in the Western press, which the Soviets dismissed as 'calumnious attacks', and they attempted to mitigate the damage which the deportations threatened to wreak to their public image in Germany by arguing that their operation was no worse than the removals made by the Americans and British from areas due to be handed over to the Soviets in the summer of 1945. One story from the time runs that Marshal Vasiliy Sokolovsky, the head of the Soviet Military Administration in Germany, snidely told Colonel Frank Howley, the American commandant of Berlin, 'I am not asking the Americans and British at what hour of the day or night they took their technicians - why are you so concerned about the hour at which I took mine?'[831]

Despite the uproar from the Western powers, Osoaviakhim was only really concerned with the evacuation of German specialists already in Soviet hands and its repercussions for Britain and the US were, in reality, predominantly positive. The majority of German scientific and technical experts were so shocked by Osoaviakhim that EPES was almost immediately swamped by a great number of 'callers, correspondents and other enquirers, all with the same aim in view' – to escape the possibility of deportation and remove themselves as quickly as possible to the western zones, the United Kingdom or the USA. 'One man went so far as to ask to be arrested for his own safety.'[832] The FIAT Forward

[830] Ibid.
[831] Naimark, *Russians in Germany*, 226.
[832] TNA, FO 1031/59, 6 November 1946.

office predicted that if more serious threats of deportation arose, this stream of applicants was 'liable to become a flood'.[833] Desperation was truly commonplace – at a Zeiss plant in Jena, the removal of so many personnel as well as nine-tenths of the equipment led to a spate of suicides.[834] More generally though this was a golden opportunity for the Western powers, especially Britain, to reverse the flow of German specialists heading eastwards on account of generous Soviet inducements, and maximise their own exploitation potential.[835]

What Osoaviakhim allowed Britain and the US to finally realise was a policy of denial, which had been in the pipeline, albeit putatively, since the end of the previous year. In December 1945, the Joint Intelligence Committee of the Control Council for Germany (JIC-CCG) had received reports from the Naval Intelligence Division, which threw a 'somewhat sinister light on Russian activities *vis-à-vis* German scientists', and prompted them to call for 'policy guidance at a high level … as to whether HMG would wish strenuous efforts to be made to deny scientists and technicians to the Russians'.[836] It was May 1946 before the main JIC considered these reports in full, and they concluded that, as a result of the efficiency of Soviet recruitment and the lack of British countermeasures, 'by the end of 1946 a large proportion of German brainpower will have gone to the Russians and there will be no looking back'.[837] Osoaviakhim lent considerable credence to these fears and in December, almost exactly one year after the JIC-CCG had submitted its initial report, the Defence Committee of the Cabinet, chaired by Attlee, 'agreed in principle that it was necessary to deny to the Russians those German scientists and technicians, within our influence, who could contribute substantially to the building up of Russian war potential'[838] – this marked the first ministerial approval of such a policy.[839] Thus began the 'scientific containment' of the USSR, bringing exploitation into line with wider diplomatic thinking on the West's strategy towards the Soviet Union, as espoused in George Kennan's 'Long

[833] TNA, FO 1031/68, 'German Scientists and Technicians escaping from Russian zone', 9 January 1947.
[834] Naimark, *Russians in Germany*, 229.
[835] Maddrell, *Spying on Science*, 31-2.
[836] TNA, CAB 176/8, 'JIC/1907/45', 15 December 1945.
[837] TNA, CAB 81/133, 'JIC(46)51(0)', 24 May 1946.
[838] TNA, CAB 131/1, 'Minutes of 24th Meeting of Defence Committee', 11 December 1946.
[839] TNA, CAB 124/1924, T. Gilmour Jenkins to Lt-Gen. B. Robertson, 6 January 1947.

Telegram' and the Truman Doctrine – that is, to prevent Soviet expansion at every opportunity.[840]

The practical implications of this new development were almost immediately evident. While previously the only criterion for securing a German scientist or technician had been whether he had some contribution to make to British science, this was now expanded to include any expert who could offer something of value to the Soviet Union. In April 1947, the newly-formed Ministry of Defence estimated that there were approximately 290 such scientists within the British zone, but this figure got considerably larger as time wore on.[841] The most obvious manifestation of this new policy was the creation of the Matchbox holding centre, which has been discussed in the previous chapter. Generally speaking, the purpose of Matchbox was 'to prevent or damage Russian sponsored scientific and technical enterprises of a war potential nature by the removal of key personnel'. Intelligence Division produced a report which suggested that the work of the design and development departments of a number of important aircraft firms, including Junkers, Heinkel and BMW, reconstituted under Soviet administration, had been 'retarded by the evacuation of some good specialists from each Establishment'.[842] FIAT meanwhile felt about the best that could be said of denial policy was that, while it 'may have delayed Russian developments, it has hardly prevented them', and that 'the main value of [securing] a first rate man, at the moment anyhow, consists in saving time.'[843]

Denial policy gradually became something of an obsession for the British exploitation agencies – it became unthinkable to let any German scientist of any calibre slip through the net lest he turn towards the East – which in turn opened the whole policy up to ample criticism. Bertie Blount, the Director of Research Branch, was one particularly persistent and vitriolic critic. In March 1948, he wondered 'whether the financial results of setting up Matchbox were ever envisaged' and stated his belief that it was quickly becoming 'quite a big and expensive show which directly or indirectly must fall on the British taxpayer', foreseeing that 'sooner or later the cost … will be queried and there may be a gigantic row'. On the other hand, he worried that if they tried to save money by being more restrictive on

[840] Maddrell, 'Operation Matchbox', 174.
[841] TNA, AVIA 54/1403, 'Russian Enticement of German Scientists', 18 April 1947.
[842] TNA, FO 1032/1231B, 'Matchbox: general report', 15 April 1948.
[843] TNA, FO 1031/59, 'Periodic Intelligence Report No. 2', 6 August 1946.

who was admitted to Matchbox, Research Branch would be blamed 'for almost every scientist and technician who crosses over to the Russians'.[844]

Blount's criticisms were, for the most part, fair and valid, but relate primarily to Matchbox, which was only the front line of the denial initiative. Efforts along similar lines were being made back in Britain to create employment for German scientists and technicians which would prevent them from having cause to go and work for the Soviets. The Darwin Panel, which was only concerned with recruitment for civil-industrial work, looked to bring over 'German technicians and scientists possessing knowledge of secret processes … in order to deny their services to the Russians'.[845] The needs of denial were also a strong positive argument when the Inter-Departmental Committee on German Scientists was pushing to allow private firms to employ German specialists exclusively.[846] Even in Operation Bottleneck – a scheme to outsource some of the work of British firms to the surplus labour force in Germany – it was hoped that 'by providing employment for Germans, [it would] help to arrest their drift to employment with the Russians'.[847]

Unsurprisingly, this ongoing wrangling over the fates of innumerable German scientists and technicians, which became a major post-war preoccupation for British exploitation officials both in Britain and in Germany, gave rise to a considerable increase in the use of espionage and subterfuge – a development which would come to characterise scientific intelligence throughout the secrecy-heavy years of the Cold War.[848] One suggested tactic for British agencies wanting to contact German experts living in the eastern zone was to write a letter on German stationery 'under a false German name such as Muller' (or Schmidt or Wolff) and send it to a private address in the British or French sector of Berlin – 'the owners of such houses should be selected for trustworthiness and should be offered cigarettes etc. as an inducement to cooperate.' The letter would state that 'Muller' had been offered work in an Allied country, and that they were looking for other men for this same work, with emphasis to be laid on the 'excellent conditions and good and fair treatment offered, and the fact that there will be an opportunity to work outside Germany'.

[844] TNA, FO 371/71038, B.K. Blount to I. Worsfold, 5 March 1948.
[845] TNA, LAB 8/1198, 'Darwin Panel Scheme', November 1945.
[846] TNA, AVIA 54/1403, 'Employment of Germans in Industry in a Private Capacity', 24 January 1947.
[847] TNA, BT 211/62, 'Operation Bottleneck: policy and arrangements', November 1947.
[848] Dylan, *Defence Intelligence and the Cold War*, 157.

This letter would then be forwarded on to the desired German expert to await his response.[849] There is no evidence that this elaborate strategy was ever employed, let alone that it was successful.

Another option was to send a loyal German to enquire directly with the targeted specialist but as a travel permit, including stated purpose of journey, was needed for a German civilian to enter the Soviet zone, this was not always practicable.[850] Moreover, it could be quite hazardous for ordinary German citizens to aid the British exploitation efforts. Henry Mecklenburg, who ran a hotel in the British Sector of Berlin which was used as a transit point for German scientists on their way to Matchbox, had several close encounters with the Soviet security services. His night-porter was detained by the police, questioned by a Soviet agent and told to report back on the British officers who visited the hotel, with the threat of 'Red Army disciplinary action' if he did not comply. Mecklenburg himself felt he was about to be attacked by two uniformed Russian men on one occasion when walking home late at night with his wife but the timely arrival of a British Volkswagen scared them off.[851] The Soviets often acted with remarkable impunity in their attempts to counteract British exploitation. On the night of 18 October 1946, the British Military Train from Berlin to Hannover was halted while passing through the Soviet zone and, despite the armed guard, a number of German passengers were removed from a sealed coach, often used to transport scientists recruited by FIAT and EPES. On this occasion there were no such scientists aboard, but the Soviets had obviously hoped there would be, as they had turned up with enough men to leave the train guards 'heavily outnumbered'. Only the guard commander's 'anxiety to avoid an international incident coupled with his uncertainty as to how to act in these extraordinary circumstances' maintained calm, and the train's guard cohort was strengthened thereafter.[852]

In conclusion, the British exploitation programme can only be fully understood through the lens of international relations. The most important elements of this are undoubtedly the

[849] TNA, FO 1031/59, Col. P.M. Wilson to Maj. E.C. Malet-Warden, 31 May 1946.
[850] Ibid., Malet-Warden to Wilson, 24 May 1946.
[851] TNA, FO 1031/25, 'Special Intelligence Report No. 7', 31 May 1947.
[852] TNA, FO 1031/59, 'Incidents on the British Military Train', 6 November 1946.

perceptions of the Soviet Union and the initial suspicion and hostility of the nascent Cold War. As soon as the war with Germany ended, and in fact even while it was still being fought, British intelligence operatives became very aware that the new enemy was likely to be the Soviet Union; a reversion to the East-West hostility of the interwar years and even the nineteenth century. The new ideological divide and the absorption of both Britain and the western zones of Germany into the American orbit simply brought the conflict into sharper contrast. Denial policy and Operation Osoaviakhim are both examples of the two camps focusing all their attention on the next war, and not the last. Shaped by the significant role which new weapons and forms of warfare had played during the Second World War, it was evident that any future conflict would be decisively affected by the technological fruits of scientific labour. Therefore, exploitation of German expertise can be seen as the first phase of the Cold War arms race.

The situation was not, however, just a simple black-and-white dichotomy. Britain's position was further complicated by the general difficulties of asserting a new role in the post-war world. Faced with various options – stronger ties with a western European bloc, reliance on the new United Nations organisation, reinforced cohesion with the Empire and Commonwealth, or subordination to an ascendant USA – Britain had to settle for the latter as it provided the most immediate assurances of security and support, crucial in a time of economic powerlessness and strategic uncertainty.[853] France was struggling with similar issues as Britain, albeit from a position of even greater weakness, compounded by domestic political wrangling, but tackled them differently – they were obstinate and insistent, even though their limited resources made such an approach all but unsustainable. As a result of these new national identities, in terms of exploitation, Britain found itself competing with a materially-poorer but more avaricious France, and collaborating inconsistently with the United States, who were only willing to share the spoils when it did not pose even the smallest threat to their new global dominance.

This shifting balance of competition and co-operation between Britain and its two close allies, France and the USA, shows the value which every country placed on scientific and technical superiority. Nonetheless, within three years of VE-Day, they were all preparing to fight the same future war; that is, against the Soviet Union. By this stage, denial policy

[853] Hathaway, *Great Britain and the United States*, 11.

reigned supreme; the three Western occupying powers were willing to set aside their differences and work together in order to shore up their resistance to Soviet ambitions. This was as clear in exploitation as it was in the decision to merge the three western zones in June 1948. In short, exploitation was intrinsically shaped and guided by the realignment of world power which took place in the immediate post-war period, and it is for this reason that the exploitation policy of any nation, no matter how much its origins may lie in domestic politics, cannot be fully comprehended without recourse to the international dimension.

CHAPTER SIX
Principles and Pragmatism

Studying the international dimension of exploitation is essential for placing Britain's strategy against the backdrop of shifting post-war foreign relations, but it is also necessary to contextualise the policy on a domestic level, in order to understand how such a significant and potentially controversial programme was situated within the contemporary political environment of Britain in the years surrounding the end of the Second World War. As has been explored in previous chapters, it is evident that although exploitation had its earliest roots in the clandestine world of military intelligence, it was soon brought under the control of the civil service. As such, this policy did not exist in a vacuum; rather it was influenced by a wide range of external factors, including the varying commitments of the immense undertaking which was the British occupation of Germany, the need to uphold moral and legal principles while also seeking reparation for the costs of the war, and, of course, the perennial thorn in the side of policy-makers: public and press reaction. Indeed, exploitation was shaped both by the high-minded principles on which the British occupation mission was founded and by the pragmatism which such a complex and multifaceted situation swiftly necessitated. Elements on both sides of this divide played a part in bringing exploitation to its eventual conclusion in the latter part of the occupation period.

Several of these areas will be examined in this chapter with a view to creating a rounded picture of the political context in which the programme of exploitation was developed, prioritised, co-ordinated, and finally brought to a close. Firstly, one of the main issues which affected decision-making throughout was the awareness that exploitation was but one, comparatively quite small, aspect of the general British occupation policy in Germany. As Adam Tooze has noted, western Germany was where the European dilemma of coming to terms with the past, encouraging economic growth, and satisfying the urgent demands of the Cold War was felt most acutely.[854] British occupation policy had to reflect, and attempt to reconcile, these diverse intentions. Aspects of this policy with which

[854] Adam Tooze, 'Reassessing the Moral Economy of Post-War Reconstruction: The Terms of the West German Settlement in 1952', in Mark Mazower, Jessica Reinisch and David Feldman (eds.), *Post-War Reconstruction in Europe: International Perspectives, 1945-49* (Oxford: OUP, 2011), 47.

exploitation had direct links included the control of science, the process of denazification, and efforts to demilitarise, disarm and partially deindustrialise the British zone of occupation, all of which were, in one way or another, geared towards preventing Germany from ever again posing a threat to world peace. What this ultimately resulted in was a delicate balancing act in which Britain tried to learn as much as possible about Germany's technique from the last war while preventing them from waging the next. Secondly, it is necessary to examine the other major issue of conflict – reparations. While some have dubbed exploitation as 'intellectual reparations',[855] the accuracy of this can be called into question – the term 'reparations' suggests a degree of legitimacy and accountability which was not always present in exploitation. Unsurprisingly, this raised questions of the Allies' moral right to exploit Germany's resources and of the unsteady legal framework in which they did so.

Thirdly, it was neither possible, nor entirely desirable, to hide the programme of exploitation from the British public indefinitely, despite its covert origins. Publicity was necessary to maximise the utilisation of the information gleaned from investigations in Germany. However, the public, and especially the press, could pose awkward questions about the policy, and the idea of offering German citizens, who until so recently had been Britain's avowed enemies, attractive employment terms in Britain had the potential to be enormously toxic in the public domain. It was not just the newspapers which reflected this, but on occasion it also became a topic of debate in Parliament, as Westminster examined Whitehall's handling of such a sensitive project. Finally, it is important to understand the political climate which led to the end of exploitation in the late 1940s, and how this was influenced by the other factors which this chapter covers – occupation commitments, reparations arrangements, and public opinion. Ultimately, this chapter aims to present a wide-angle view of exploitation, situating it within the British political landscape of the immediate post-war years.

[855] Gimbel, *Science, Technology, and Reparations,* 52.

Occupation Policy and Exploitation

Substantial though the administrative endeavour expended on exploitation was, it was still only one part of a wide array of policies and measures necessary for Britain to successfully run its zone of occupation in Germany. It has been said that of the allocation of German territory between the Western powers at the end of the war, the Americans got the scenery, the French got the wine, and the British got the ruins.[856] Certainly, it was true that the British zone contained some of the territory which had been most severely ravaged by Allied bombing in the latter years of the war, including both the industrial heartland of the Ruhr and the important port city of Hamburg. As such, the expense of sustaining and governing such an area was considerable; in October 1946, the British element of the Control Commission employed some 26,000 people,[857] and the estimated cost of the British occupation for that year alone was £80 million (some £2 billion in today's money), no small sum as Britain teetered on the brink of economic insolvency in the immediate post-war years.[858] Therefore, one of the primary aims of British occupation policy was to restore German self-sufficiency while simultaneously ensuring that Germany remained peaceful and amenable.[859] However, this latter priority faded as the target of British enmity shifted from Germany to the Soviet Union, and the idea of building Germany up as a bulwark against Communist expansion gained traction.[860] Three key policies which both fit into the wider strategy mentioned above and coexisted in close proximity with exploitation, and which are therefore worthy of examination here, are the control of science, denazification, and industrial disarmament or demilitarisation.

Control of science was considered especially important as the lessons of the war had taught all involved how large a contribution new weapons could make to the course of a conflict.[861] In the House of Lords on 29 May 1945, Baron Robert Vansittart, the renowned Germanophobe, bemoaned how inadequate British responses to German advances in

[856] Meehan, *Strange Enemy People*, 13.
[857] Edith Raim, *Nazi Crimes against Jews and German Post-War Justice* (Oldenbourg: De Gruyter, 2015), 22.
[858] Anne Deighton, 'Cold War Diplomacy: British Policy Towards Germany's Role in Europe, 1945-9', in Turner (ed.), *Reconstruction in Post-War Germany*, 21.
[859] Turner, 'British Policy towards German Industry', 67.
[860] Aldrich, *Hidden Hand*, 191-2.
[861] David Cassidy, 'Controlling German Science I: US and Allied Forces in Germany, 1945-1947', *Historical Studies in the Physical and Biological Sciences*, 24 (1994), 197-235; Alan Beyerchen, 'German Scientists and Research Institutions in Allied Occupation Policy', *History of Education Quarterly*, 22 (1982), 289-299.

military technology had been during both the First and Second World Wars. He complained that the only remedy which had been found to the threat of the V-weapons had been to overrun the launch sites – 'the answer of infantry and not of science' – and warned that, as the range of long-distance weapons increased, such a solution would not always be available. From this, and coloured deeply by his personal prejudices, he surmised that 'in dealing with a nation that is periodically homicidal, I think no precaution is excessive'.[862] His attitude was shared by many other Peers, and by some civil servants too – in June, the Economic and Industrial Planning Staff (EIPS) produced a report which commented that Nazi Germany had 'succeeded in focussing every aspect of scientific activity, within the framework of a planned organisation, to waging war' and that it was the only nation which 'carried the prostitution of science to this extremity [*sic*]'. The EIPS felt that these factors should be taken into account when deciding how to deal with German science after the war.[863]

Quite how this control and restriction was to be implemented was a topic of fervent discussion, and a plethora of committees and agencies were established by the British to develop and enforce these measures of scientific control. Alongside the German Science and Industry Committee (GSIC), the Scientific and Technical Intelligence Branch (STIB), and the Scientific Committee for Germany, was Research Branch, who had arguably the most challenging task. They were charged not only with monitoring any potentially dangerous German scientific research, but also with preventing too many German scientists leaving the British zone (especially for Soviet employment), showing a clear convergence of interest with the exploitation and denial initiatives. This led them to advocate a 'conception of control' which was not 'merely the negative one of preventing the Germans from doing undesirable things' but also taking 'positive action to provide conditions in which German research can develop along the right line'.[864] This positive strategy, formulated loosely, meant giving 'as much encouragement as possible to peaceful research, and to all measures

[862] Hansard, HL Deb, 29 May 1945, vol. 136, cc. 246-7.
[863] TNA, CAB 124/544, 'Technical and Scientific Research in Germany After the War', 19 June 1945.
[864] TNA, FO 1062/149, 'The Control of Scientific Research in the British Zone of Germany', 23 April 1946.

which increase the prestige of Western democratic ideals – in particular, interchange of scientific views, and increased facilities for scientific publications'.[865]

The negative side of this approach, meanwhile, was officially codified in April 1946, when the Allied Control Council issued Law No. 25, entitled 'Control of Scientific Research', which forbade any applied or fundamental research 'of a wholly or primarily military nature', as well as any non-warlike research which would require the use of facilities which could also be used for military research.[866] This became the guiding principle for British policy on the control of science in Germany. Topics which were banned included research in the chemical, rubber, steel and synthetic fuel industries, as well as the manufacture of civilian aircraft out of concern that such work could conceal more sinister research on flying bombs, rocketry, or dispersal methods for bacterial warfare.[867] In terms of positive inducements to peaceable work, some hoped that British industry may be able to help by placing research contracts with German firms. However, it was felt that while British industrialists wished to 'benefit by the fruits of past German research', through BIOS and other exploitation channels, it was 'doubted very much whether they wished German research to continue'.[868]

It is definitely important to note that, while the policies of exploitation and control of science often came into contact, they were separate initiatives with differing aims and methods. In July 1945, an EIPS memorandum stated: 'a distinction should be drawn between the control of German research pure and simple, and the positive exploitation of the results of German research for the benefit of this country and the United Nations generally.' This separation did not mean that the two programmes had no impact on one another. For example, many German scientists who had remained in Germany and were suffering under the restrictions imposed on their disciplines voiced resentment at what they considered to be the unjustly preferential treatment afforded to those scientists who had been recruited by the Allies. Their disenchantment was exacerbated by the belief that many of the men who had gone to Britain and the US were in fact lesser minds, who had risen to

[865] TNA, AVIA 54/1403, 'The Problem of Subversive Warlike Scientific and Technical Research in Germany', 3 December 1946.
[866] 'ACC Law No. 25: Control of Scientific Research (29 April 1946)', in B. Ruhm v. Oppen (compiler), *Documents on Germany under Occupation, 1945-54*, (Oxford: OUP, 1955), 131-4.
[867] TNA, CAB 124/544, 'Interim Report to the Secretary of State for Foreign Affairs', 20 April 1945.
[868] TNA, CAB 124/1928, 'Minutes of 1st GSIC Meeting', 22 May 1946.

prominence in the Third Reich merely on account of their unscrupulous political opportunism.[869] As mentioned with reference to the role of Research Branch above, the biggest conflict came with denial policy, and there was a concern among many British officials that strict implementation of Law No. 25 would leave many German specialists out of work but who would 'find a ready market for their services with the Russians'.[870]

Similar concerns arose with regard to the programme of denazification which the British aimed to implement in their zone. All four occupying powers used various tactics to remove all traces of Nazism from public (and, to a lesser extent, personal) life in Germany.[871] This mission, often characterised as something of a moral crusade, soon faltered over issues of practicality. It became necessary to limit denazification in order to facilitate reconstruction in Germany and to allow the occupiers to build working relationships with the German people.[872] As time went on, it was also shaped by 'changes of view, occurring in high places, regarding the relative danger of Nazism and communism'.[873] The British approached denazification with particular pragmatism and soon gained a reputation for being a 'soft touch' in this respect. The reasons for this are difficult to ascertain – on one hand, some have argued that Britain simply did not see the complete re-education of an entire country as a feasible aim, and did not have the resources to even try.[874] On the other, some have suggested more prosaic considerations, such as the British belief that low-level Nazis would be more amenable to taking orders than clear anti-Nazis (many of whom were communists and socialists), especially in minor but necessary administrative positions, or that too firm a commitment to denazification could hamper vital German economic recovery.[875] Even the moral rectitude of the policy could be called into question – William Boulton, the head of the British Legal Division in Germany (the organisation ultimately responsible for denazification), described it as 'a temporary and evil

[869] Krige, *American Hegemony*, 49.
[870] TNA, FO 1062/149, 'STRB policy report', July 1946.
[871] Biddiscombe, *Denazification of Germany*; Ian Turner, 'Denazification in the British Zone', in Turner (ed.), *Reconstruction in Post-War Germany*, 239-67; Richard Bessel, *Nazism and War* (London: Weidenfeld & Nicolson, 2004), 173-182; Bessel, *Germany 1945*, 193-5.
[872] Toby Thacker, *The End of the Third Reich: Defeat, Denazification and Nuremberg* (Stroud: Tempus, 2006), 153.
[873] TNA, FO 1032/2555, 'Denazification', 6 March 1948.
[874] Olick, *In the House of the Hangman*, 50.
[875] Bessel, *Germany 1945*, 193.

necessity'[876] – and Winston Churchill also expressed his disapproval of the scheme, opining that 'retributive persecution is of all policies the most pernicious', showing that even Britain's bold and forthright wartime leader was essentially a post-war pragmatist.[877] In any case, denazification was a Sisyphean task, the conduct of which was likely to satisfy nobody.[878]

The denazification of science was arguably one of the more difficult elements of the policy as a whole. Large swathes of the German population believed they would be exempted from harsh retribution, either because of their (rarely convincing) anti-Nazi credentials or because their skills and experience would be essential for post-war administration and reconstruction.[879] Although on the whole this belief was quickly revealed to be a delusion once denazification measures took effect, the official history of the British occupation makes it clear that exceptions were made for various classes of 'indispensable' experts.[880] This certainly included German scientists, who the occupiers believed had generally not supported Nazism, or had in some cases directly opposed it. In September 1946, the Deputy Chiefs of Staff voiced the opinion that denazification of science would hardly be necessary as 'from a political point of view the records of scientists as a class were reasonably good'.[881] The US National Academy of the Sciences took this even further, expressing the belief that the scientific community had withdrawn into their ivory tower during the Third Reich and thus composed an 'island of non-conformity' within the regime.[882] Others preferred to view the situation in more practically beneficial but abstract terms – scientists, especially physicists, were to be seen as little more than tools, and tools could not be Nazified or denazified.[883] This view translated into practical action, or the distinct lack of it. The Kaiser Wilhelm Society, for instance, was left to largely denazify itself,

[876] Raim, *Nazi Crimes against Jews*, 99-100.
[877] John Ramsden, *Don't Mention the War: The British and the Germans since 1890* (London: Little, Brown, 2006), 219-225.
[878] Raim, *Nazi Crimes against Jews*, 94.
[879] Rebecca Boehling, *A Question of Priorities: Democratic Reform and Economic Recovery in Postwar Germany* (Oxford: Berghahn, 1996), 73.
[880] Donnison, *Civil Affairs and Military Government*, 361.
[881] TNA, CAB 82/8, 'Minutes of 27th DCOS Meeting', 11 September 1946.
[882] Simpson, *Blowback*, 34.
[883] Mark Walker, 'The Nazification and Denazification of Physics' in Judt and Ciesla (eds.), *Technology Transfer*, 57.

which led to it further promoting the view that all German scientists had either resisted the Nazi regime or were victims of it.[884]

The exploitation initiative also provided ways to limit the severity of denazification. John Gimbel has noted that FIAT was sought out by many German specialists as a source of employment when their political records prevented them from finding work through more conventional channels.[885] As this shows, the utilisation of German science was often seen as more important than a thorough process of denazification, and especially so when the Cold War spectre of Soviet recruitment loomed large.[886] In October 1946, Bertie Blount of Research Branch (who was a persistent critic of the failings of exploitation policy) complained acidly, and in no uncertain terms, about how successful Britain's 'denazification policy, as carried out by the clever young men of Intelligence Division, is being in driving ability and intelligence into the ranks of our enemies'.[887] Blount's sentiments were echoed by Herbert Cremer, a chemical engineer and member of the Scientific Committee for Germany, who considered it the 'height of folly' that by Britain's 'literal adherence to the [inter-Allied] denazification agreement, we should be helping to drive German scientists into the hands of the Russians, who themselves treated the same agreement with complete cynicism'.[888] This was not a wholly accurate appraisal of the situation – as we have seen, this 'literal adherence' was not especially evident in the British zone and, as Mary Fulbrook has noted, retribution for Nazi-era crimes was often meted out far more harshly in the eastern zone[889] – but that the very idea of it was seen as inimical to successful exploitation is the salient point here.

Both control of science and denazification were aimed primarily towards ensuring that Germany could never again wage an offensive or aggressive war. The third aspect of this endeavour was a policy of widespread demilitarisation and disarmament, of industry as well as of the armed forces. A Gallup poll of January 1947 showed that 43 per cent of British respondents felt Germany would become an aggressor state again, though almost half of

[884] Kristie Macrakis, *Surviving the Swastika: Scientific Research in Nazi Germany* (Oxford: OUP, 1993), 195.
[885] John Gimbel, 'German Scientists, US Denazification Policy and the 'Paperclip Conspiracy'', *International History Review*, 12 (1990), 446-7.
[886] Hoffmann, 'Germany is No More', 601.
[887] TNA, FO 1032/170, Bertie Blount to Brig. Spedding, 19 October 1946.
[888] TNA, CAB 124/1928, 'Minutes of 1st SCG Meeting', 7 January 1947.
[889] Fulbrook, *Dissonant Lives*, 286-8.

those could give no reasoning behind this judgement, while only 23 per cent believed Germany would become a democratic, peace-loving nation instead.[890] This was coloured in no small part by memories of the aftermath of the First World War, when the core of German militarism had been left intact. Furthermore, a shortage of relevant information had hindered effective demilitarisation and made it 'impossible to be sure that all the war material in question was surrendered'.[891] There was to be no repeat of the mistakes of 1918-19 and the first step in this process was to determine exactly what needed to be destroyed or confiscated. The given definition of 'war material' was: 'any material of whatever nature and wherever situated, intended for war on land, at sea, or in the air, or which is or may be or has been at any time in use by, or intended for use by, the armed forces, civil defence, or other formations or organisations.'[892] With the aid of this remarkably broad classification, handling conventional war material was fairly straightforward, certainly when compared to the more troublesome subject of German industry.

In September 1945, the Cabinet approved British policy on industrial disarmament which described it as 'of the greatest value to the United Nations, by lengthening the time between the start and the fruition of Germany's rearmament', though acknowledging that it did not 'in itself furnish security or avert the need for armed force'.[893] Any factories or plants directly associated with weaponry or war material had to be liquidated, and there were three ways by which this could be achieved – they could be destroyed, dismantled and taken as reparations, or converted for use in the peacetime economy.[894] Of these, the middle option swiftly emerged as the most favourable for eliminating Germany's war potential. One clear reason for this was that dismantling represented something of a compromise between the conflicting aims of weakening Germany's military power and maintaining its economic viability.[895] So naturally obvious were the links between demilitarisation and reparations that the official British policy statement contained a clear distinction between the two, and the assertion that disarmament measures 'should be

[890] Gallup, *Public Opinion Polls*, 148.
[891] TNA, FO 1032/35, 'German War Material', 3 August 1944.
[892] TNA, FO 1062/396, 'General Definition and Preliminary List', 24 October 1945.
[893] TNA, FO 1032/169, 'UK Policy on Industrial Disarmament of Germany', 2 October 1945.
[894] TNA, FO 1062/396, 'Liquidation of German War and Industrial Potential', 2 October 1945.
[895] Jörg Fisch, 'Reparations and Intellectual Property' in Judt and Ciesla (eds.), *Technology Transfer*, 18.

carried out regardless of their effect on Germany's capacity to make reparation for the damage she has done'.[896] There were serious risks to this approach, however, most notably the concern that if industrial dismantling was carried out too thoroughly, it could cause economic crisis and incur greater expenditure for the occupiers, or that it would engender protest among the German workforce and local populace.[897]

Once again, those with an eye to exploitation soon began to consider how policies of disarmament might also affect the efforts to secure Germany's best scientific and technological spoils for Britain. The Ministry of Aircraft Production saw the two efforts as complementary, especially in terms of recruitment, believing that putting potentially dangerous German experts under American or British control would prevent them from contributing to German rearmament (or Soviet weapons development) 'while at the same time gaining substantial advantage to our own war potential'.[898] On the other hand, there was an anxiety that German scientists would only stay in the British zone if 'congenial work' could be provided for them, and this would be particularly problematic 'in the case of those who have devoted themselves to aerodynamics, ship design, or other subjects in which applied research is forbidden'.[899] Additionally, Britain acknowledged that a strong and profitable Germany was more resistant to communism, which thrived on hunger, chaos and poverty.[900] Most occupation officials therefore disagreed with punitive dismantling, and preferred a humanitarian and practical reconstructive approach instead.[901] In short, all the main policies aimed at limiting German war potential – control of science, denazification, and industrial demilitarisation – fell to the wayside in the wake of the change of thinking which placed the Soviet Union above Germany in the list of threats to peace and security. Exploitation, meanwhile, was much more in line with this newly dominant viewpoint so more often than not triumphed over those other initiatives with which it came into conflict.

[896] TNA, FO 1032/169.
[897] Krige, *American Hegemony*, 22; Alan Kramer, 'Demontagepolitik in Hamburg', in Foschepoth and Steininger (eds.), *Die britische Deutschland- und Besatzungspolitik*, 170-180.
[898] TNA, FO 1062/114, F.N. Tribe to F. Bovenschen, 13 July 1945.
[899] TNA, FO 1062/149, 'The Control of Scientific Research in the British Zone of Germany', 23 April 1946.
[900] Deighton, 'Cold War Diplomacy', 21.
[901] John Killick, *The United States and European Reconstruction, 1945-60* (New York: Routledge, 2013), 61.

Reparations, the Law, and Morality

Unsurprisingly, the element of British post-war policy towards Germany which experienced greatest concomitance with exploitation was the drive for reparations. As early as March 1944, Lieutenant-General Ronald Weeks, the Deputy Chief of the Imperial General Staff, predicted that German research and development information might be 'the only form of reparation which it will be possible to exact from Germany'.[902] To be sure, the reparations scheme encompassed the removal of equipment, documents and other material from Germany's laboratories, factories and research facilities, but greater difficulty was encountered with the utilisation of expert personnel and their specialist knowledge, both of which were practically unquantifiable. The value of so-called intellectual reparations was, almost by definition, impossible to calculate, and it was very easy, in theory at least, for Germany to limit the benefit obtained from them by the creditor nations.[903] In fact, quantifying the spoils of exploitation soon became a major sticking point, as the British officials were keen to take as much as possible, without having to debit it against their internationally-allocated reparations account. This naturally raised questions of the morality of exploitation, especially whether Britain could justify all it had extricated from Germany in terms of recompense for the aggressive war which Germany had both started and lost. The officials sought answers for these uncomfortable moral questions in the letter of the law, assuming that if they could find a legal mandate for exploitation, through reparations or otherwise, then any challenge to their right to exploit could be easily deflected or defended against.

As with many other policies, the Allies' attitude towards reparations was shaped considerably by the experience at the end of the First World War. The approach adopted then had proved immensely unsuccessful for a number of reasons, not only failing to make Germany pay adequately for the war, but also generating much bitterness in Germany, which Hitler and the Nazis were able to turn into support for their programme of national rejuvenation.[904] The main lesson learned was that it was ineffective to demand reparations in direct financial form – instead, payment in kind was to be encouraged.[905] Initially, this

[902] TNA, FO 942/27, 'Post-Hostilities Equipment Policy', 29 March 1944.
[903] Fisch, 'Reparations and Intellectual Property', 14-5.
[904] Richard Bessel, *Germany after the First World War* (Oxford: OUP, 1993), 99-100.
[905] Cairncross, *Price of War*, 10.

would take the form of capital equipment, dismantled and shipped abroad, and then this would be followed by annual deliveries of goods from current German production.[906] The USA actively pressed for patents, secret processes, and technical know-how to be included as part of these reparations in kind, as their post-war economy was enormous, and at risk of overproduction and huge surpluses, so bringing in ordinary machinery or goods from Germany was not only uninteresting but actually undesirable.[907] It is also worth noting here that, following extensive discussion at the Potsdam Conference, the Soviet Union was granted the lion's share of the reparations total, but that this was little more than a formality as, by that point, they were already busily stripping their zone of anything of value.[908]

The exploitation programme was affected by the quest for reparations in two main ways – on the one hand, reparations provided a very useful panacea, justifying all physical removals from Germany and thus granting some legitimacy to exploitation; on the other, reparations were strictly governed, both domestically and internationally, often tying the hands of acquisitive exploitation agents. To examine the positive, complementary side of the relationship first, it was quickly established that equipment and documentation comprised an 'essential counterpart' to the industrial intelligence gathered by BIOS, and that the value of this intelligence would be 'seriously reduced' without having 'the physical material for purposes of experiment' in Britain.[909] In addition, exploitation teams were permitted to visit sites earmarked for reparations right up until the point when they were handed over to the recipient power and sometimes even up until dismantling actually began.[910] On occasion, incomplete exploitation could lead to a particular facility being selected for reparations, as was the case with the Thyssen steel plant in Duisburg, which could produce 1,200 tons a month of 'special extra low-loss transformer steel' and which Research Branch felt had been 'imperfectly exploited by BIOS'. It was suggested that either

[906] John Farquharson, 'Anglo-American Policy on German Reparations from Yalta to Potsdam', *English Historical Review*, 112 (1997), 906.
[907] Fisch, 'Reparations and Intellectual Property', 17.
[908] Marc Trachtenberg, *A Constructed Peace: The Making of the European Settlement, 1945-63* (Princeton, NJ: Princeton University Press, 1999), 23.
[909] TNA, FO 1032/166.
[910] TNA, FO 1031/7, 'Advance Notes for Investigators', 2 September 1946.

the plant continued to operate under British supervision, or that it should be brought to Britain in its entirety, both of which were forms of reparations.[911]

On the other side of the coin, the relationship had great potential to be fractious. In October 1945, it was reported that the DCOS committee were 'anxious to get as much equipment as possible out of Germany now, before items are frozen for reparations'.[912] Once reparations policy came into force, there were three permissible ways in which material could be removed from Germany: it could be taken as reparations, as long as it passed through all the necessary official international channels; it could be paid for in approved currency as a straightforward export; or, if regarded as 'booty', it could be 'removed outside the reparations procedure and without payment'.[913] Naturally, for the exploitation agencies, this last option was the most attractive. However, the material in question had to qualify as 'booty' for this route to be legitimate – the given definition of booty was: 'Arms, munitions and implements of war, and all research and development facilities (including documents, material and training devices) relative thereto.' What this entailed in real terms was any equipment found within research establishments concerned solely with warlike subjects, as well as certain industrial items required as prototypes or for further examination in Britain.[914] Nonetheless, the exploitation officials constantly searched for new ways to remove equipment without having to go through the restrictive reparations channels.

For example, when the Board of Trade tried to push for scientific equipment, such as microscopes and chemical balances, to be removed as reparations, they came up against opposition from Research Branch, who insisted that there was too great a shortage of such equipment in Germany. The Board of Trade considered it probable that 'the Germans have successfully pulled the wool over the eyes of Research Branch' in this respect, but felt that any protest would be futile, and decided that this should be written off as 'one more long drawn-out and losing battle … on which no more effort need be expended'.[915] Instead, it was hoped that some of this equipment could be removed 'as a result of the limitation or

[911] TNA, 1032/167, Maj. D.E. Evans to Econ. Branch, 4 March 1946.
[912] TNA, FO 1032/166, 'Report on Visit to London', 19 October 1945.
[913] TNA, FO 1032/166, War Office to BERCOMB, 17 December 1945.
[914] Ibid.
[915] TNA, BT 211/117, S.A. Dakin to D. Wood, 15 August 1947.

prohibition of certain lines of research in Germany', thus exempting it from reparations restrictions.[916] Elsewhere, the Ministry of Aircraft Production argued that all material taken under the aegis of Operation Surgeon, from establishments such as LFA Volkenröde, should be considered 'booty', irrespective of its actual purpose.[917] Another tactic, which was used when reporting to the Inter-Allied Reparations Agency (established in Brussels to handle the allocation of reparations to the claimant nations), was to point out that all information obtained from removed material was made internationally available in the published reports of BIOS and others and therefore these removals could 'not be regarded as constituting a unilateral acquisition of German reparation by the United Kingdom'.[918]

There were, however, some items which no amount of semantic manipulation could help secure. For example, a gas turbine discovered at the *Reichswerke* at Watenstedt near Brunswick had no conceivable military application so could not be taken as booty, but it was unique in Germany which meant that it was barred from being claimed for reparations. Aside from securing 'a very high level decision to break all the rules', which was considered doubtful, the only solution that could be devised was to have Britain lead a quadripartite investigation into the turbine – a convoluted suggestion which reveals how exploitation could all too easily become hamstrung by strict reparations rules.[919] A further issue arose in the field, between exploitation investigators and Reparations Assessment Teams (RATs) – which were dispatched by the Reparations, Deliveries and Restitution (RDR) Division – particularly as both groups' logistics were handled by the same military authority.[920] This contact soon gave rise to friction, not least because the RAT trips (of which there were three or four going out every day in early 1946, each one consisting of around three members) shared resources with their BIOS counterparts, and had priority on both accommodation and transport.[921]

However, the overriding factor which influenced the relationship between exploitation and reparations was, as with the other occupation policies detailed above, the international dimension. During a discussion by the Deputy Chiefs of Staff committee on

[916] TNA, FO 942/425, 'Draft Letter to be sent to industries', 14 November 1946.
[917] TNA, FO 942/426, W.J. Deveen to G. Whitham, 31 August 1946.
[918] TNA, BT 211/117, 'Reply from the Delegate of the United Kingdom', 9 September 1946.
[919] TNA, FO 1012/421, Ritchie to Prentice and Brig. Spedding, 13 March 1946.
[920] TNA, FO 1012/420, 'Visits of Industrialists to Survey Plant for Reparations', 19 October 1945.
[921] TNA, BT 211/116, L.E. Chazanovitch to D. Wood, 18 January 1946.

increasingly obstructive reparations restrictions, Sidney Kirkman, Deputy Chief of the Imperial General Staff, voiced his fears 'that by too much red tape we should damage our own interests while the other Allies were helping themselves under the heading "booty."' The remark was met with widespread agreement among other members of the committee.[922] With the passage of time, this debate diminished in importance as the focus of exploitation shifted overwhelmingly towards recruiting and utilising specialist German personnel, while reparations fell sharply out of favour, thus losing what little merit it had retained as a cover-all justification for equipment and material removals. One reason for this fall from grace was that the reparations scheme was engendering increasingly hostile foreign public opinion, particularly in Germany, and Britain had come to appreciate the importance of keeping the German people on side if they were to form a bulwark against Soviet expansion. Lieutenant-General Brian Robertson, the Deputy Military Governor of the British zone, wrote in February 1947 of his concerns that the discrepancy 'between our own economic requirements and our political objectives in Germany' may lead the German people 'to complain that we are treating them as the cat treats the mouse'.[923] Indeed, the Foreign Office felt it was 'virtually certain' that there would be 'a greater or lesser element of organised resistance' among the German workers tasked with dismantling factories for reparations.[924] Beyond Germany, there were those who expressed the opinion that the real purpose of the British reparations plan was to limit German competition in world markets for the sake of Britain's 'own selfish interests', an accusation which was firmly refuted in the House of Lords.[925]

Perhaps of greater importance was the fact that reparations were not serving their primary purpose of recouping some of Britain's expenses from the Second World War. Britain was spending approximately £80 million a year on its zone in Germany, and claiming no more than £29 million in reparations – in the opinion of Hugh Dalton, the Chancellor of the Exchequer, Britain had ended up paying reparations *to* Germany.[926] In most cases, it was clear that the removal of an established plant was a far greater loss to Germany than it was

[922] TNA, CAB 122/342, 'Minutes of 23rd Meeting of DCOS', 12 December 1945.
[923] TNA, FO 943/42, Lieut-Gen. B. Robertson to COGA, 12 February 1947.
[924] TNA, FO 1010/20, 'Reparations and Dismantling Programme', 14 August 1947.
[925] Hansard, HL Deb, 22 October 1947, vol. 152, c. 154.
[926] Judt, *Postwar*, 123.

a gain to the recipient nation.[927] This did not fit in with plans to rebuild a strong and prosperous Germany. This was certainly the case with the Volkswagen plant in Wolfsburg, the size and quality of which impressed British experts, but also gave them concerns about how its introduction to Britain might throw domestic automobile manufacturing into turmoil, as well as the potentially injurious effect it could have on any German economic revitalisation.[928] Generally speaking, it was swiftly realised that the small benefit derived from dismantling factories for reparations was dwarfed by the benefit of reconstructing German industry, both for national self-sufficiency and general European security in the face of potential Soviet aggression. As John Farquharson has put it, despite pressure from the Treasury and the Board of Trade for extensive financial compensation to be extracted from Germany, those who pushed for greater German economic reconstruction carried the day, and it is difficult to find a time when reparations was granted precedence in the British zone.[929]

One of the great benefits afforded to the exploitation scheme by the push for reparations was that it provided it with some form of legal grounding. The concept of reparations has roots in international law, based on the principle that the victors and the vanquished enter into a contract by way of a peace treaty, and this obliges the defeated nation to pay, in one form or another, for losing the war – a clear example of this is the Treaty of Versailles at the end of the First World War, despite the opprobrium which this agreement attracted both in Germany and abroad. At the end of the Second World War, Germany as a nation state technically ceased to exist, so no peace treaty could be signed and '*de facto* reparations' became the norm, with the occupiers simply taking what they wanted from the territory they controlled.[930] Intellectual reparations were especially problematic as they did not offer direct redress for actual losses suffered during the war by the victors.[931] Booty, as we have seen, was far more flexible than reparations, but the Allies were ultimately answerable to one another on how much they took from Germany. In October 1945, the Economic Division of the Control Commission persuaded the Treasury to

[927] Backer, *Priming the German Economy*, 64.
[928] Bernhard Rieger, *The People's Car: A Global History of the Volkswagen Beetle* (Cambridge, MA: Harvard University Press, 2013), 106-7.
[929] Farquharson, 'Governed or Exploited?', 42.
[930] Fisch, 'Reparations and Intellectual Property', 12.
[931] Ibid., 16.

authorise a programme of 'advance deliveries', up to the value of around £1 million 'without consulting the Allies' as either 'the Allies have no claims or … if such claims exist they may safely be ignored'.[932]

Another legal issue which presented problems to the exploitation officials concerned German patents, with many believing that the British acquisition of these commercial secrets would have more profound consequences for the German economy than the destruction or dismantling of industrial material.[933] Indeed, many of the larger German firms, such as IG Farben and Siemens, began to demand payment from the British for the information which they had given up. These requests had little weight behind them as Article 12 of Control Council Proclamation No. 2 (issued as additional terms to the German surrender) unequivocally instructed German authorities to hand over 'all research, experiment, development and design' relating to war, 'whether in government or private establishments'.[934] As such, this element of the issue was rather easily handled – all CCG personnel were instructed that 'any such demands for payment should be answered with an immediate and firm refusal.'[935] This reflected an inherent hostility among the British authorities towards any attempts by the German people to restrict or challenge their ability as occupiers to exert their will over their zone of occupation. In March 1947, the Control Commission stated in no uncertain terms their opposition to 'the enactment of any legislation which might seem to cast doubt on our complete freedom to dispose of BIOS information as we wish in Germany or elsewhere'.[936] Similarly, when Erich Klabunde, an SPD member of the Hamburg *Bürgerschaft*, made a statement accusing the British of conducting unaccountable appropriations of German assets and thus illegitimately gaining 'the deepest secrets of Germany's economic life', T-Force HQ bitterly responded that it was 'most undesirable' that British authorities should have to 'justify their legal actions to a German', and deemed Klabunde's statement 'a direct attack on the authority of the Occupying Powers' which 'should be dealt with accordingly'.[937]

[932] TNA, FO 1062/114, E.A. Seal to E.W. Playfair, 23 October 1945.
[933] Koop, *Besetzt*, 135.
[934] 'Control Council Proclamation No. 2 (20 September 1945)' in Ruhm v. Oppen, *Documents on Germany under Occupation*, 68-79.
[935] TNA, FO 1032/1470A, CONFOLK to BERCOMB, 14 January 1947.
[936] Ibid., BERCOMB to CONFOLK, 1 March 1947.
[937] TNA, FO 1031/19, 'Disclosure of Information by German Scientists', 6 February 1947.

A different side of the problem arose when German firms began to protest about their industrial secrets being made freely available to domestic rivals, after exploitation. This prompted considerable consternation among the British occupation authorities. On one hand, there was the opinion that Britain would be abusing its position as an occupying power if German firms were encouraged 'to utilise the secret processes (not necessarily patented, and therefore not actionable at law), divulged to Allied investigators without compensation to the owning firm'. On the other, bans against using this information could hinder Germany's economic recovery, or limit the supplies of vital commodities, such as insulin.[938] Either way, the BIOS reports were publicly available from HMSO, so the information contained within was 'no longer a secret'.[939] If the technical material in question was patented, however, the German owners were in a slightly stronger position. Control Commission policy stated that any other German who used information in a BIOS report which was the subject of patent protection in Germany was 'liable for infringement' and the German patentee would 'be able to take action when the patent system is reactivated'.[940] This does show that the benefits of exploitation were not only derived by foreign occupiers but could also be of use to domestic rivals.[941]

Exploitation was not only challenged in legal terms, but also came under criticism on moral grounds. Unsurprisingly, defeating a country as completely as Germany had been by May 1945, to the point of unconditional surrender and total occupation by foreign powers, and then proceeding to comprehensively remove not only large quantities of that country's specialised equipment and documents, but also many of its brightest minds and a wealth of scientific and technical know-how, prompted many questions about the moral conduct of the victorious Allies. The response which came from those in power in Britain, the USA, the Soviet Union and France was that these were reparations – a concept which had a strong legal basis and much historical precedent, and thus minimised any further criticism. However, the moral question surrounding reparations is more complex than this defence strategy suggests, and it is worth examining here, by taking advantage of the clarity, and trying to avoid the pitfalls, offered by retrospective analysis.

[938] TNA, FO 1032/1470A, CONFOLK to BERCOMB, 31 December 1946.
[939] Ibid., BERCOMB to CONFOLK, 14 January 1947.
[940] Ibid., 1 March 1947.
[941] Farquharson, 'Governed or Exploited?', 39.

A good starting point is the term 'exploitation' itself. According to the *Oxford English Dictionary*, there are two definitions of the verb 'to exploit' – the first is 'to make use of (a resource etc.); derive benefit from', while the second is 'to utilise or take advantage of for one's own ends.'[942] The connotations traditionally associated with the post-war exploitation of German science and technology tend to reflect an emphasis on the second definition, but for those involved in the planning and execution of the programme, it is the first definition which would have seemed most apt. Clarence Lasby believes that the exploitation officials conceived of the word 'exploitation' in its military sense – 'to gain value from personnel' – a point which is reinforced by the subsequent decision to replace it with the far less provocative alternative, 'utilisation'.[943] Others argue that the notion that Germany was 'exploited' after the war does not hold up when the figures of economic gains made by the exploitation scheme are compared to the cost to Britain of supporting its zone of occupation and fending off disease, starvation and unrest – if all exploitation did was offset some of the costs of sustaining the German population, how immoral can it be judged to have been?[944] Certainly, minimising the burden of occupation on the long-suffering and war-weary British taxpayer was often rolled out as a rationale for the exploitation programme.[945]

The main justification offered up for exploitation by the officials concerned was that it was 'part of the price that the Germans were having to pay for losing the war'.[946] These were the words of Charles Ellis, the scientific advisor to the War Office, spoken to his colleagues on the Deputy Chiefs of Staff committee in November 1945. He felt that this approach would help to improve British public reception to the employment of German experts in Britain. These sentiments were echoed on the ground in Germany; in January 1947, the Control Commission reaffirmed that 'the right of the Allies to use information collected by Allied investigating agencies such as BIOS is one of the consequences of Germany losing the war.'[947] In short, the guiding principle was 'to the victor, the spoils' but the reality was slightly more complex than that. The Allies had the right to exploit Germany not simply because it had lost the war, but because it had lost a war which it had started.

[942] Della Thompson (ed.), *OED,* 9th ed. (Oxford: OUP, 1998), 475.
[943] Lasby, *Project Paperclip*, 4.
[944] Farquharson, 'Governed or Exploited?', 42.
[945] Koop, *Besetzt*, 132.
[946] TNA, CAB 82/3, 'Minutes of 20th Meeting of DCOS', 21 November 1945.
[947] TNA, FO 1032/1470A, BERCOMB to CONFOLK, 14 January 1947.

This is evidenced by the fact that materials and equipment taken by Germany from countries which it had occupied during the war, such as France, were, where possible, restored to their original owners. Germany's wartime removals were deemed wrong and in need of restitution, while the Allies' post-war removals were not, because Germany in 1945 was not an innocent victim, but the original perpetrator. All of this ties in with the notion that Britain promulgated an image of its contribution to the war as 'just' and 'good' in the latter half of the 1940s.[948]

Another aspect of the morality debate concerns denazification. As discussed above, this was both a practical endeavour, to eliminate Germany's militarism, as well as a moral crusade for many of the occupiers. However, as has been shown, sticking too closely to the international denazification agreements was considered the 'height of folly' as it meant Britain might lose out on the best German experts to its supposedly less scrupulous allies.[949] In the House of Lords on 12 March 1946, the Lord Chancellor, William Jowitt, responded to criticism by Lord Vansittart of the employment of politically questionable German individuals in Britain, by declaring 'I am willing to risk their being Nazis – and I think they probably are – so long as they are highly skilled technicians who will teach our people something which they did not previously know.'[950] Expediency trumped morality in no uncertain terms.[951]

Overall, the story of the occupation period is that pragmatism consistently prevailed over principles. Moral missions such as completing a comprehensive purge of all Nazis from public life or claiming full financial recompense for the cost of the war fell to the wayside, especially for Britain, because of a shortage of funds and the growing fear of the Soviet Union. Instead, policies of German reconstruction and a western European defence strategy became far more popular and viable.[952] Initially, exploitation benefited from this pragmatism, offering a clear and cost-effective way for Britain to profit from victory in the war and improve its armouries in preparation for any future conflict against the USSR, but

[948] Toby Haggith, 'Great Britain: Remembering a Just War (1945-1950)', in Lothar Kettenacker and Torsten Riotte (eds.), *The Legacies of Two World Wars: European Societies in the Twentieth Century* (Oxford: Berghahn, 2011), 225-256; Welch and Fox, *Justifying War,* 1-20.
[949] TNA, CAB 124/1928, 'Minutes of 1st SCG Meeting', 7 January 1947.
[950] Hansard, HL Deb, 12 March 1946, vol. 140, c. 62.
[951] Bower, *Paperclip Conspiracy*, 256.
[952] Turner, 'British Policy Towards German Industry', 91.

later, when it threatened both healthy Anglo-German relations and the pace of German economic recovery, it fell out of favour just as quickly. As a pragmatic, rather than idealist, initiative, it only remained desirable while the circumstances surrounding it remained unchanged.

The Public Domain

The narrative of exploitation has, thus far, focused primarily on official policy and the work of military officials and civil servants, both in domestic and international terms. The British non-governmental actors have been few and far between, amounting to no more than a handful of industrialists, privately-employed scientists, frontline soldiers, and some others. These groups either had no influence whatsoever, and were involved only through obedience to instructions from above, or were able to exert influence only because they had been inducted deliberately into the inner workings of the scheme by those in higher authority. What this discourse has therefore neglected to account for is any factors which lay beyond the control of the policy-makers and their operatives – the clearest example of this is popular opinion, or how the notion of exploitation played out in the public domain in Britain. It is necessary to examine this, particularly through press response to the policy, in order to place exploitation in sufficient context, and to understand its broader ramifications.

The importance of public opinion was in the minds of policy-makers from an early stage, which arguably presents a marked contrast with many other, more secretive intelligence operations. At a Department of Scientific and Industrial Research meeting in June 1945, 'it was recognised that public opinion might be offended by proposals to employ German scientists' but it was thought that if it was explained that the scientists were 'supernumerary to normal staffs' and were here for British benefit, 'there would be no serious outcry'.[953] When the DCOS committee discussed recruitment in August, the chair, First Sea Lord Charles Kennedy-Purvis, wished to know 'what difficulties, if any, [were] anticipated from local opposition within the establishments to which they were posted'. Similarly, Henry Hulme, the Director of Operational Research at the Admiralty, 'thought it was important to be prepared to answer the argument that these Germans would be taking

[953] TNA, FO 1032/176, 'Minutes of Meeting of DSIR', 25 June 1945.

other people's jobs and other people's houses'. He was reassured that there were plenty of vacant jobs and that German scientists would not be displacing British subjects.[954] Nonetheless, in the report which emerged from this meeting, one of the three potential objections to the recruitment scheme was 'public criticism of the employment, presumably with remuneration, of Germans who so recently directed the main German scientific effort against us'.[955]

Accordingly, the government departments responsible for exploitation followed a course of strategic publicity – a tactic which used the control of secrecy to pre-emptively defend the government from any potential criticism.[956] On 19 December 1945, Stafford Cripps, the President of the Board of Trade, delivered a carefully drafted public statement to the House of Commons. Cripps announced that:

> It is the Government's policy to secure from Germany a knowledge of scientific and technical developments that will be of benefit to this country and to make such knowledge available to those who can use it. This step seems desirable since although we were generally ahead, there are certain fields in which the Germans held a temporary lead. As part of this policy it is proposed to recruit … a strictly limited number of German scientists and technicians of the highest grade for service in this country.

In order to strengthen his case, Cripps added that 'our American and Russian Allies are pursuing a similar policy'.[957] In choosing to characterise the aggressively acquisitive process of exploitation as an international contest, in which Britain's global standing and 'Great Power' status hung in the balance, Cripps hoped the scheme would be more palatable to Parliament and the general public alike, especially when considered in the light of widespread uncertainty about Britain's position in the new post-war world.[958] Pre-empting other potential criticism, he also reassured his audience that these men would be 'politically unobjectionable', and that 'in no case will a German be brought in to undertake work that could equally well be performed by a British subject'.[959] Despite this public statement, a degree of secrecy persisted; the following March, when Arthur Lewis, MP for West Ham

[954] TNA, CAB 82/3, 'Minutes of 8th Meeting of DCOS', 1 August 1945.
[955] TNA, CAB 122/343, 'Policy for the Exploitation of German Science and Technology', 1 August 1945.
[956] Balmer, *Secrecy and Science*, 67-8.
[957] Hansard, HC, 19 December 1945, vol. 417, cc. 1504-5W.
[958] Reynolds, *Britannia Overruled*, 169.
[959] Hansard, HC, 19 December 1945, vol. 417, c. 1504-5w.

Upton, asked Cripps if he would release a list of the names, qualifications and political histories of the German experts being brought to Britain, Cripps refused on the grounds that it 'would not be practicable … nor would it be desirable in the public interest'.[960] In this instance, it is clear that secrecy has been used not in the interests of security but to shield the project from moral opprobrium.[961]

Another tactic which was devised to manage public reaction was the use of the Ministry of Labour's Regional Industrial Relations Officers (RIROs), who would be well-informed about the principles of the scheme and would be deployed to visit British firms and issue reassurances, such as that none of the German recruits were pro-Nazi and that no British jobs would be lost. The RIROs were also instructed to make a report if they became aware of 'difficulties arising from the attitude of workpeople to the introduction of a German scientist'.[962] A similar procedure was enacted through co-ordination with the Trade Unions Congress (TUC) which, by the end of the war and following the 1945 election of a Labour government, had become an indispensable forum of debate on all industrial matters.[963] Trade unions had plenty of reasons to be hostile towards an influx of migrants, fearing that it could keep wages low and harm their efforts to obtain better working conditions.[964] Union consultation took place at a high level – the Board of Trade met directly with Sir Walter Citrine, the General Secretary of the TUC, for instance – and then information was filtered down to local branches, to ensure that all unions concerned were 'fully acquainted with the reasons for the adoption of the scheme, so that they would be able to inform employees of the factories to which Germans would be attached and also meet uninformed criticism'.[965]

Exploitation officials also took an interest in the role of the press; more specifically, they aimed to restrict their access to all elements of the programme. No press were admitted to the Dustbin internment camp, lest they ended up 'seriously prejudicing

[960] Hansard, HC, 18 March 1946, vol. 420, c. 295w.
[961] Balmer, *Secrecy and Science*, 20.
[962] TNA, LAB 8/1198, 'Memo to RIROs', 27 February 1946.
[963] Chris Wrigley, 'Introduction', in Chris Wrigley (ed.), *British Trade Unions, 1945-1995* (Manchester: Manchester University Press, 1997), 2.
[964] Weber-Newth and Steinert, *German Migrants in Post-War Britain,* 33-4.
[965] TNA, FO 1032/164, 'Minutes of 6th Darwin Panel Meeting', 30 January 1946.

interrogations' being conducted there.[966] Similarly, EPES officers were warned to be 'particularly careful in their dealings with the Press' and to 'check personally and thoroughly any authority which pressmen claim to have'.[967] The German scientists were warned along these lines too. All the experts in residence at the BIOS Reception Centre in Hampstead were not permitted to 'give any statement to the Press or any other Person or write any article or grant any interview to any person concerning his service or otherwise give or facilitate any publicity in regard thereto'.[968] Some members of the press were permitted to visit the chemical warfare experimental station at Raubkammer while Porton Group No. 1 was conducting its on-site investigations, but the journalists were deliberately given very few details about the nature of the new agents which had been discovered there.[969]

Despite these measures, the British newspapers did indeed report on exploitation, though perhaps not with the alarmism or opprobrium which the officials had anticipated and feared. On 29 June 1945, *The Times* printed a lengthy article from their military correspondent in Germany, headlined 'Germany's Secret Weapons', which contained information on seven categories of German military research which had been discovered at the end of the war, including chemical warfare, radio and optical equipment, and jet aircraft. It also detailed the actions of the British operatives responsible for uncovering this research, who had 'entered Germany with machinery organised to prevent the destruction or concealment of research work or plants of special kinds', adding that they had been 'more successful than they had dared to hope'.[970] Then, at the end of August, most of Britain's leading papers reported on the work of CIOS, following a statement made by President Truman on the subject. The *Manchester Guardian* wrote that British and American experts, following closely behind the Allied armies, had unearthed 'German war secrets which had value not only in relation to the war against Japan but also … as a contributing factor in post-war scientific and industrial development'.[971] In all the articles, as with the two mentioned here, the emphasis was on the admirable boldness of the agents involved, and the value of the material which they had gathered.

[966] TNA, FO 1031/75, 8 October 1946.
[967] TNA, FO 1031/68, 'EPES Standing Instructions', 24 October 1945.
[968] TNA, FO 1031/19, 'Sample Contract for German Visitors', 14 March 1947.
[969] Schmidt, *Secret Science*, 168-9.
[970] 'Germany's Secret Weapons', *The Times*, 29 June 1945, 5.
[971] 'Nazi War Secrets Useful in Peace', *Manchester Guardian*, 27 August 1945, 2.

Much greater opposition was deployed by the press, in reflection of the public mood, when the first group of German scientists arrived in Britain in January 1946.[972] These 23 submarine experts arrived by ship in Barrow-in-Furness, on the Cumbrian coast, and were to work in the shipyards of Vickers-Armstrong. The *Daily Mail* announced their arrival with typical aplomb, running a front-page splash with the headline 'Hush-Hush Germans Land in Britain', and describing their entrance as being 'behind a security curtain of wartime rigidity'.[973] It also reported that a 'wave of anger' was sweeping the town of Barrow, and that the shipyard workers resented 'the arrival of former enemies, who are said to be still pro-Nazi'. The intrepid reporter recounted how that very night he had proceeded to Rock Lea, the 'double-fronted, three-storeyed, red-bricked building' where the scientists were being housed, discovering, to his evident shock, that 'there was no guard on duty and the wrought iron gates were wide open'. Furthermore, he continued in his tone of thinly-veiled suspicion, when he rang the doorbell, the door was opened by a senior WRNS officer, who 'would not allow me near the glass-panelled door, through which peals of laughter could be heard'.[974] Naturally, the sense of outrage simmering below the surface of this article has to be attributed, to at least some degree, to journalistic flair and the quest for a good story. However, as it turned out, this *Daily Mail* reporter was not the only one scandalised by the arrival of these German experts, and their accommodation at Rock Lea.

On 11 January, the *Manchester Guardian* reported that there had been protests by both the Co-operative Youth Club and the Townswomen's Guild in Barrow against the accommodation of the scientists in Rock Lea, and that the latter had written to the local MP to register their disapproval.[975] Four days later, the *Daily Mail* printed a letter from an anonymous correspondent in Glasgow, writing under the *nom de plume* 'Veritas', who congratulated the newspaper for its exposé on the 'unnecessary pampering of the German scientists', attributing it to Britain's 'age-old custom' of 'forgive and forget' and lamenting that this very attitude was responsible for the failed policy of appeasement before 1939. He went on:

[972] Lasby, *Project Paperclip*, 169-70.
[973] 'Hush-Hush Germans Land in Britain', *Daily Mail*, 5 January 1946, 1.
[974] Ibid.
[975] 'German Scientists at Barrow', *Manchester Guardian*, 11 January 1946, 8.

> Less than a year ago these same German scientists were racking their brains to invent means of exterminating us and now we bring them safely to our island and give them the finest housing accommodation, while any old thing will do for Britain's workers, soldiers, sailors and airmen.[976]

In fact, it rapidly became clear that the major grievance the British public, both local and national, had about the scientists in Barrow, was the apparently luxurious lodgings which they had been given. As a result, following the protests from local groups, Walter Monslow, visited Rock Lea and reported back that the scientists 'were not living in luxury', even deigning to describe the 'coconut matting on the floor' and pointing out that the men 'did all their own work except making beds and cooking'. He concluded that he was 'satisfied that their work here … must obviously be to the best interests of Barrow in the ultimate'.[977]

In retrospect, the Barrow incident appears to have been little more than a storm in a teacup. After this initial flurry of indignation, it vanished from the papers and the public consciousness, and later developments were met with no such censure. This supports John Ramsden's suggestion that a predisposition towards pragmatism in the medium term is an integral part of the British psyche and one which decisively coloured British perceptions and treatment of the German people after the war.[978] Indeed, in March, when *The Times* reported that 200 German scientists and technicians were being brought over by the Board of Trade to work in 'a purely advisory capacity for a limited period', in order to 'secure for British industry the best industrial intelligence from Germany', the focus was once again on the scheme's value and not on its questionable propriety.[979] Certainly, not all members of the British public shared the sentiments of 'Veritas'. William Proctor, the Labour MP for Eccles in Manchester, received a letter from a constituent in February 1946 which showed concern that 'the secrecy surrounding the fate of these scientists … [is] not only fettering scientific progress, but bedevilling international relations'.[980] John Hynd, the Minister for Germany and Austria, instructed MPs to soothe their constituents' concerns on this matter by assuring them that the German detainees were not being mistreated, that they were returned to Germany and released as soon as the interrogation was complete, and that 'the

[976] 'Letters to the Editor', *Daily Mail*, 15 January 1946, 5.
[977] 'German Scientists at Barrow', *Manchester Guardian*, 15 January 1946, 6.
[978] Ramsden, *Don't Mention the War*, 219.
[979] 'Research Workers from Germany', *The Times*, 9 March 1946, 4.
[980] TNA, PREM 8/373, Dr J.W. Jeffery to Mr W.J. Proctor, MP, 1 February 1946.

question of the detainee's political affiliations does not arise in connection with these interrogations.'[981] Comparisons with other countries also drove public critiques: in March, the *Daily Express* printed a letter from W. Steed, of north London, which referred to the employment of Wernher von Braun by the United States, then asked, with evident reproach, 'are we in Britain doing nothing with German secret inventions?'[982]

This changing discourse can, in part, be ascribed to the growing fear of the Soviet Union and concerns about their recruitment of German scientists. On 29 October 1945, the *Manchester Guardian*, *Daily Mail*, and *Daily Express* all published a story, citing statements made by Günther Hillmann, acting director of the Kaiser Wilhelm Institute in Berlin, which noted that 'Soviet research on the atom bomb is being actively pursued with the assistance of German scientists and with German equipment and data.' Hillmann predicted that 'the Russians might develop their own atomic bomb within two years', and used this platform as an opportunity to condemn harsh restrictions on science in the western zones as the reason so many German experts were going over to the Soviet Union.[983] One year later, *The Times* reported on Operation Osoaviakhim, and made four distinctions between the Soviet and the British-American exploitation programmes – one, that the Western Allies favoured interrogation over recruitment; two, that the German experts in Britain and America were all there willingly; three, that the numbers in the West were far fewer than those taken by the Soviets; and four, that these latest deportations were 'new both in method and degree'.[984] Despite some general criticism of British involvement in exploitation, the press were quick to demonstrate how much worse and more dangerous the Soviet approach was. However, in an uncharacteristic example of strongly-expressed opinion, in October 1946 *The Times* described 'the whole business of competition between allies for German military secrets' as 'distasteful and disturbing'.[985]

The public domain was not just a potential source of criticism for the exploitation programme, it was also somewhat necessary for its ultimate success. The reports filed by CIOS and BIOS investigators were of no value if they were not adequately circulated to the

[981] TNA, AVIA 54/1294, John Hynd, MP to A.M.F. Palmer, MP, 13 February 1946.
[982] 'Letters to the Editor', *Daily Express*, 8 March 1946, 2.
[983] 'Germans Working for Russians', *Manchester Guardian*, 29 October 1945, 5.
[984] 'Deported German Workers', *The Times*, 29 October 1946, 5.
[985] Ibid.

firms and individuals who could best make use of them. In Britain, the publication of all reports was handled by His Majesty's Stationery Office (HMSO), from whence all non-classified reports were then sent to libraries, trade associations and HMSO's own sales offices.[986] By July 1947, the Board of Trade noted that some 2 million copies of the 2,000 different reports prepared by British and American agencies had been sold or distributed.[987] For those looking to buy reports outright, the costs varied hugely, from 2d. (roughly 38 pence today) for 'Technical Developments in German Margarine Industry' to 42s. (roughly £48) for 'A Survey of the German Can Industry during the Second World War'.[988]

However, direct sales of the reports were never intended to represent the bulk of circulation; instead, the greater part of the burden was to be shouldered by libraries. In early 1946, the Board of Trade developed a template letter to be sent to all public libraries across the country, which began by saying that the government was 'faced with the problem of making the Technical Intelligence that our industrialists have obtained from Germany available to the business community of England'. The letter continued by asserting that libraries could 'play a conspicuous part in bringing this information to the notice of the small man'.[989] By the spring of 1948, 66 libraries and eleven Chambers of Commerce held a collection of reports for reference; these were located across the country, from Aberdeen to Plymouth, and from Ipswich to Swansea, with twelve locations in London alone.[990] It is interesting to note that the security classification of certain material could vary depending on its eventual use – two reports on the same piece of technology or scientific research could be classified completely differently, for example as Top Secret for a military application, but as unrestricted for any peaceful, civilian use.[991]

Despite all this publicity, insufficient awareness of the scheme and its benefits was perceived as a significant issue throughout 1946, at least in Parliament. In February, Thomas Moore, MP for Ayr Burghs, accused the Board of Trade of disadvantaging British businesses by withholding reports from them, while there was wide circulation in the US; President of

[986] TNA, BT 211/23, 'CIOS, BIOS and FIAT Reports', 1946.
[987] TNA, AVIA 54/1403, 'The Exploitation by British Industry of German Scientific and Industrial Knowledge', 29 July 1947.
[988] IWM, 'Reports on German and Japanese Industry – Classified List No. 18', 31 March 1948. Price adjustments calculated on: http://apps.nationalarchives.gov.uk/currency/ (accessed 28/10/2014).
[989] TNA, BT 211/23.
[990] IWM, 'Reports on German and Japanese Industry'.
[991] Balmer, *Secrecy and Science*, 66.

the Board, Stafford Cripps, responded by rejecting the very premise of this complaint.[992] Then, in June, Parliamentary Secretary to the Board of Trade, John Belcher, was challenged on the subject by Frederick Erroll, MP for Altrincham and Sale, and Leslie Solley, MP for Thurrock. Erroll stated that 'the fact remains that a large number of manufacturers are not receiving this information', and Solley asked whether there was 'any reason at all why the Government should not advertise to the people in the various industries that this information is available'. Belcher replied that the Board of Trade was doing exactly that, revealing that arguably the problem was not the ignorance of British business to the information on offer, but rather the ignorance of Members of Parliament to the true breadth of its dissemination.[993] Nonetheless, new methods were sought to expand publicity and, on 10 December 1946, an exhibition of the work carried out by BIOS opened at the Board of Trade on Millbank, with the aim of allowing 'British industry to make the fullest use of the information now available about Germany's wartime advances in science and heavy industry'.[994] In opening the exhibition, Stafford Cripps appealed to 'smaller firms without their own research departments' to allow the BIOS information 'to help them to introduce the latest manufacturing methods and processes'.[995] The exhibition then moved on to visit 'the most important provincial industrial centres of Britain';[996] during its run, this touring exhibition attracted representatives from 20,000 firms.[997]

As a point of comparison, it is worth briefly examining public reaction in the United States. The American people had no real objection to the short-term utilisation of a few German experts on military topics, but opposition grew considerably when it was suggested that some German experts would be employed in the long-term, and rose even further when the idea of these German specialists receiving US citizenship was mooted. A Gallup poll taken in December 1946 put the following question: 'It has been suggested that we bring over to America one thousand German scientists who used to work for the Nazis and have them work with our own scientists on scientific problems. Do you think this is a good

[992] Hansard, HC Deb, 25 February 1946, vol. 419, c. 1554.
[993] Hansard, HC Deb, 3 June 1946, vol. 423, c. 1589-90.
[994] 'German Advances in Science', *The Times*, 10 December 1946, 2.
[995] Ibid.
[996] 'Reports on German Industrial and Scientific Progress', *Nature*, 158 (1946), 867-8.
[997] Farquharson, 'Governed or Exploited?', 37.

or bad idea?' The respondents considered it a bad idea at a ratio of 10:7.[998] The press in the USA took an even more inflammatory approach than in Britain and, instead of emphasising the technical and financial benefits to the US of Paperclip, the newspapers preferred to scrutinise the nature of the immigrants themselves, describing them as 'the former pets of Hitler' and one as looking 'remarkably like a youthful Hermann Goering'.[999] As in Britain, however, much of this opposition melted away once the harsh realities of the Cold War and the possibilities of future conflict became increasingly apparent.[1000]

Generally speaking, public reaction to the exploitation programme in Britain followed a fairly familiar trajectory. Initially, as early discussions by policy-makers had predicted, there was a certain degree of uproar, fuelled in no small part by sensationalist reporting in the press. However, the primary source of the outrage was not that these men were scientists who may have played some part in the war effort against Britain, but rather that they presented added competition for jobs and homes, and because they were Germans, who were often viewed with mistrust and hostility in Britain at this time.[1001] As time went on, what little opposition there was dissipated swiftly and harmlessly on account of two main factors: firstly because of growing evidence of how much value could be derived from these men and their expertise (a cause advanced by the exploitation officials themselves); and secondly because of the growing threat of the Soviet Union. In this latter respect, the trend in public opinion mirrors very neatly those which can be observed in demilitarisation and denazification, reparations policy, and Anglo-German relations as a whole.

The End of Exploitation

As we have seen, throughout the relatively short period during which exploitation was a key policy aim of the British occupation authorities, it was regularly driven into conflict with other concurrent initiatives, many of which were concerned with the rebuilding and rehabilitation of western Germany in the face of changing international and domestic

[998] Lasby, *Project Paperclip*, 191-2.
[999] Laney, *German Rocketeers in the Heart of Dixie*, 40.
[1000] Lasby, *Project Paperclip*, 213.
[1001] Weber-Newth and Steinert, *German Migrants in Post-War Britain*, 152.

pressures. Both John Gimbel and John Farquharson have characterised this as a dispute between governors and exploiters, though Farquharson convincingly challenges the more adversarial connotations of this, when applied to the British zone.[1002] Ultimately, it was this dispute, and the somewhat inexorable triumph of the governors, which led to the eventual demise of the exploitation programme. In Britain, the governors were led by the Foreign Office, with support from the British Element of the Control Commission for Germany in Berlin, while the exploiters were able to count on support from the Board of Trade (which was ostensibly representing the interests of large swathes of British industry) and the Treasury, led by the staunchly anti-German Chancellor, Hugh Dalton.[1003]

Unsurprisingly, these debates were not confined to the domestic politics of Whitehall, and the international dimension played an important role too. The departments which sought an end to exploitation in both Britain and the US looked to each other to advance their own cause, in the hope that if one country decided to curtail or terminate exploitation missions then the other would have to follow suit, especially as the movement towards a bizonal economic merger gained momentum.[1004] As bizonal fusion began in 1947, pressure to reduce the burdensome costs of the occupation mounted, and the most likely solution was to facilitate the economic reconstruction of the western portion of Germany.[1005] In February, E.G. Lewin of Research Branch wrote to the Economic Sub-Commission of the CCG to inform them that the Control Office in London were 'anxious that we should try to reach agreement with the Americans and French that technical investigations such as BIOS and FIAT teams should be wound up simultaneously in all three western zones' – the given date for this conclusion was 31 March 1947.[1006]

One month later, the three Western Allies issued a joint proclamation which confirmed that technical investigations had been taking place in Germany since June 1945 (though, as we have seen, they actually began long before that) and acknowledged that 'many Allied Governments have sent in teams of investigators who have profited from facilities offered them by zone authorities', and that the results of the investigations were

[1002] Gimbel, *Science, Technology, and Reparations*, 133; Farquharson, 'Governed or Exploited?', 24.
[1003] Farquharson, 'Governed or Exploited?', 40.
[1004] Gimbel, *Science, Technology, and Reparations*, 130.
[1005] Robert W. Carden, 'Before Bizonia: Britain's Economic Dilemma in Germany, 1945-6', *Journal of Contemporary History*, 14 (1979), 538.
[1006] TNA, FO 1031/7, E.G. Lewin to ECOSC, 28 February 1947.

'public and available to all'. The main message of this proclamation was about the future, however, and ran thus:

> British and US and French authorities, having regard to the current German economic situation in the western zones and to increasing difficulties of providing accommodation etc., have decided to bring all technical investigations in field under BIOS and FIAT auspices to a close after 15 May 1947. No industrial technical investigators of the above organisations will be permitted to enter British, US and French zones of Germany and all these industrial technical investigations will be terminated by 30 June 1947.[1007]

The dissolution of BIOS followed this proclamation fairly swiftly. By the beginning of November, it had been incorporated with the Technical Intelligence Section and the Board of Trade Documents Unit, all subsumed into the Technical Information and Documents Unit.[1008] However, the reality did not always match so closely the lines laid down in the inter-Allied statement, which had been offered mainly for public consumption, in Germany and elsewhere.

T-Force, the logistics arm of the exploitation programme, continued to operate long after June 1947. This continuation was justified in a number of ways. One main line of argument was that T-Force was simply collecting documents from German firms which had been included on lists of requirements before the deadline for the end of technical investigations. In fact they published further such lists on 16 October, 22 October and 8 December 1947, and frankly admitted that some of the firms concerned may not know they still had materials to deliver, but asserted that this would not be accepted as a satisfactory excuse for non-compliance.[1009] T-Force also argued that it had numerous other responsibilities to attend to in Germany – these included the removal of equipment earmarked as reparations or booty by BIOS investigators, the chaperoning of reparations teams throughout the British zone, and the facilitating of visits of property owners wishing to inspect their interests in Germany.[1010] Additionally, T-Force felt it had a part to play in denial policy, acting as a 'coordinating agency … in Germany for identifying, locating, security clearing, and movement' of selected German scientists, and warning that failure to

[1007] Ibid., 'Joint British-US-French Statement', 27 March 1947.
[1008] TNA, FO 1031/9, 'BIOS papers: general', 22 October 1947.
[1009] Gimbel, *Science, Technology, and Reparations*, 132.
[1010] TNA, FO 1031/4, 'The Future of T-Force/Organisation', 2 April 1947.

sustain these efforts would entail 'probable loss to the UK of Germans that we can ill afford to spare'.[1011] Despite all these excuses, T-Force was disbanded on 1 August 1948, and its remaining responsibilities handed over to Regional Administrative Offices and the Joint Export Import Agency.[1012]

As suggested by the mention made of it by T-Force when trying to justify their continued existence, denial policy had the greatest lasting power of any element of the exploitation initiative. In fact, it ended up outlasting the programme from which it had originally emerged – the DCOS scheme was not terminated until July 1949,[1013] and Matchbox continued to operate until February 1951, after the establishment of the Federal Republic of Germany and the German Democratic Republic as nation states.[1014] The unnaturally long life of the denial policy is attributable, almost entirely, to the increasing fear and suspicion of the Soviet Union and its intentions towards the West. In March 1949, it was considered important to 'guard against the possibility of German scientists having to be left in Germany and therefore assisting an invading power' and so a 'mobilisation plan' was drawn up, which essentially consisted of a continually updated list of 'German scientists who would have a real value to a hostile power', with the idea that as many as possible of these scientists should be evacuated to Western countries 'in the event of an emergency threatening'.[1015] This 'Critical List of German Scientists' contained some 30 atomic specialists, as well as approximately 20 experts in other key subjects, such as aerodynamics and biological warfare.[1016] Despite the intention to keep this list up-to-date, this did not always translate into reality. Bertie Blount, Director of Research Branch, highlighted the inclusion of one aeronautical expert who had been 'working on his own farm for the last three years and presumably has become less valuable as an aerodynamicist in the process'. Blount questioned whether men such as this were really 'worthy of special treatment in an emergency'.[1017]

[1011] TNA, FO 1065/12, Derek Wood to T. Mackay, 28 July 1947.
[1012] TNA, FO 1031/4, 'T-Force Disbandment', 2 June 1948.
[1013] TNA, AVIA 54/1295, 'DCOS Scheme', July 1949.
[1014] Maddrell, *Spying on Science*, 34.
[1015] TNA, AVIA 54/1295, E.E. Haddon to DRP, 4 March 1949.
[1016] TNA, AVIA 54/1403, I. Worsfold to B. Lockspeiser, 11 April 1949. On the continued (perceived) threat of biological warfare attacks after the Second World War, see Balmer, *Britain and Biological Warfare*, 55ff.
[1017] TNA, AVIA 54/1403, B.K. Blount to B. Lockspeiser, 5 April 1949.

Another reason for the continuing viability of denial policy was that Britain's aim was not just to prevent Soviet utilisation of German scientific and technical expertise but also to learn what German experts knew about science and technology in the USSR, particularly with links to military use. Therefore, the third category of individual to be included in Matchbox was: 'scientists and technicians who are valuable, not for their professional competence, but because they can give intelligence of value to us about Russian sponsored research and development.'[1018] In time, this evolved into a major part of British scientific and technical intelligence-gathering on the USSR, largely through Operation Dragon Return, which was operated by the Scientific and Technical Intelligence Branch and which questioned defectors, refugees, and ex-POWs returning to the western half of Germany from the Soviet Union. As Paul Maddrell has written, 'the first post-war penetration of Soviet military capability by British intelligence was a by-product of its effort to complete the victory over Germany.'[1019] These efforts allowed the British to fill in several 'black holes' in intelligence coverage of the Soviet weapons programmes.[1020] One shortcoming of this approach though was that the British and American intelligence services became overly reliant on German experts as sources of information on major Soviet military-scientific projects which led them to believe that the Soviets would not be able to successfully detonate an atomic bomb before 1955 at the earliest. When they actually managed to do so in August 1949, it came as a huge shock to the West.[1021] Denial policy also eventually drew to a close, in part because of the changing attitudes of German scientists. The benefits of the Anglo-American reconstruction of science in Germany, coupled with fear of the USSR and another war, drove the German experts to actively seek closer ties with the West – the Soviet Union had become a dangerous threat, not a desirable alternative, and therefore there was no longer any need for Britain and the USA to forcibly deny these men to the Soviets.[1022]

[1018] TNA, FO 1032/1231A, Lt-Col. W.H.A. Bishop to COGA, 12 April 1947.
[1019] Maddrell, *Spying on Science*, 17.
[1020] Goodman, *Official History of the JIC*, 279-80; Dylan, *Defence Intelligence and the Cold War*, 112.
[1021] Aldrich, *Hidden Hand*, 224-6.
[1022] Krige, *American Hegemony*, 53-4.

In conclusion, the narrative of exploitation within the political debates surrounding the British occupation of Germany is one of both conflict and co-operation, evident both in the formulation of policy and the discourse in the public domain. The primary British aim in their zone of occupation was to maintain European peace and security, firstly by minimising the potential for a resurgence of German militarism and then by defending against any future aggression from the Soviet Union. In the first phase, principled policies of demilitarisation and denazification, as well as a punitive approach to the extraction of reparations, were in high favour and, with these, the exploitation programme was either able to coexist comfortably or ensure a higher priority. In the second phase, it soon became clear that the best way to protect against Soviet belligerence was not to strip Germany of all of its military-scientific resources and expertise for Britain's own use, but rather to pragmatically rebuild Germany as a strong ally in a crucial strategic location in Europe, which would have the beneficial side-effect of German self-sufficiency, thus alleviating a major financial burden on the British Exchequer. In comparison with this new approach, exploitation seemed outdated and counter-productive and, in accordance with the other Allies, the British exploitation programme was gradually shut down. The only vestiges which remained were those which offered direct contribution to the defence strategy against the Soviet Union, such as denial policy, but these soon became unnecessary as well. Ultimately, this reaffirms the point that exploitation was just one single thread in the fabric of British occupation policy, which itself changed considerably throughout the immediate post-war period, in part because of the swing in priority from moral mandate to pragmatic necessity, and that it therefore can only be fully understood within this context.

CONCLUSION

Defining the exact moment when exploitation came to an end is difficult. If it is viewed as simply a particularly intensive chapter in a longer narrative of technology transfer between Germany and Britain, as posited by Volker Berghahn, then it can be seen to gradually evolve from the enforced process of scientific and technical utilisation which this thesis has examined to a more equitable exchange of ideas between two sovereign nations.[1023] Similarly, if it is understood, as Paul Maddrell suggests, only in terms of its relationship to the worsening East-West relations of the nascent Cold War then, as the last chapter showed, many of its techniques and procedures were simply co-opted into serving the rapidly swelling demand for intelligence on the Soviet Union, and denial policy simply became an early form of scientific non-proliferation.[1024] For the purposes of this study, however, exploitation concluded with the end of true British occupation and the formation of the Federal Republic of Germany in May 1949; this is therefore coterminous with the period of transition (as discussed in the introduction) which began in 1943 and places exploitation as part of the shift Britain made from the Second World War into the Cold War, and from its position as a world leader to a second-tier power. Exploitation had changed considerably from its inception to its denouement and would have been almost unrecognisable to those who had instigated its first activities, in vastly different conditions, during the war. Building upon the earlier work done in this area by John Gimbel, this thesis offers new insight into this understudied phenomenon, itself part of the historiographically neglected British occupation, and presents five main areas of new understanding on this subject.[1025]

Firstly, that the relationship between exploitation and the post-war geopolitical landscape is deeply intimate, and that the programme can therefore only be understood within this Cold War context. While the exact start date of the Cold War and the point at which Anglo-Soviet relations sunk to a position of hostility both remain subjects of ongoing historical debate, what is clear is that exploitation was a central element of this worsening relationship. Exploitation was shaped by, and to some extent shaped, Cold War hostilities. In

[1023] Berghahn, 'Technology, Reparations, and the Export of Industrial Culture', 4.
[1024] Maddrell, *Spying on Science*, 5.
[1025] Gimbel, *Science, Technology, and Reparations*.

terms of the latter, although there were a great number of factors which drove the increasing polarisation of the Cold War, exploitation certainly exerted some influence. British and American actions to remove German specialists and equipment from the parts of Germany which they temporarily occupied at the immediate end of the war, before the official zonal boundaries were adhered to, came under particularly pronounced criticism from the Soviet representatives at the Potsdam Conference. Similarly, Soviet deportations of German experts, particularly those which took place *en masse* under the auspices of Operation Osoaviakhim in October 1946, provoked strong protest from Western officials, and reinforced their belief that the Soviets were not to be trusted and would be relentless in their pursuit of greater power.

In terms of the former, a policy which began with the wartime intention of ensuring that Nazi Germany possessed no weapon with which they could attack Britain without equal retaliation retained its chief goal but changed its target to the Soviet Union, Britain's important wartime ally. This was of course indicative of wider changes but, put simply, the USSR had been substituted for Germany in British perceptions and, echoing Julian Lewis' interpretation of British planning more generally, exploitation responded to this change swiftly and sensitively.[1026] It soon coloured nearly every aspect of the exploitation programme, wherein all assessments of targets, especially expert personnel, focused on their potential benefit to the Soviet Union rather than to Britain. Denial policy was the most obvious manifestation of this transformation as it operated on the assumption that it was more valuable to deny German scientific and technical expertise to the Soviet Union than it was to use it to augment Britain's own armouries and industries. In this way, the story of the Cold War arms race, which is arguably one of the defining features of the period, necessarily begins in the contest for the scientific spoils of Nazi Germany which took place under the aegis of exploitation. Overall, this thesis concurs with Norman Naimark's argument that the Anglo-American exploitation programmes can only be understood in terms of the deepening rivalry between East and West which became the Cold War.[1027]

Secondly, that exploitation must be further contextualised within the complexities of British occupation policy, which was largely characterised by a struggle between moral and

[1026] Lewis, *Changing Direction*, xcvii.
[1027] Naimark, *Russians in Germany*, 206.

ideological aims on the one hand, and pragmatism and necessity on the other. Britain entered the post-war period as an occupier on German soil, determined to decisively restrict Germany's capacity to wage aggressive war and to ensure that social, cultural and political changes took place within Germany which would ensure that Britain would never need to enforce these restrictions militarily. Within this mindset, exploitation was able to thrive. Not only did it provide a clear method of demilitarisation, and one that allowed Britain to directly benefit from the reduction of Germany's war potential, but it also provided the most reliable source of financial recompense for the costs of the war – a genuinely viable form of reparations – critical as the British occupation proved a costly affair, creating a financial burden which neither the Treasury nor the British taxpayers were able or willing to shoulder. Furthermore, the practical and economic value of exploitation meant that it triumphed over other, more morally-driven and less profitable initiatives with which it came into conflict, such as denazification or the implementation of post-war justice. This was reinforced further by the contest with the Soviets and the attendant fear that an 'alliance of German brainpower and Russian resources may well prove to be the most important outcome of the occupation of Germany'.[1028]

However, as with any project which is valued primarily for its pragmatic benefits, it can quickly fall from favour if priorities and objectives change. In this instance, it was the drastic deterioration in Anglo-Soviet relations which proved pivotal. As this decline was mirrored by a similarly rapid and necessary rapprochement between Britain and Germany, wartime animosity and post-war commitments to comprehensively demilitarise and extract reparations were abandoned remarkably quickly in favour of building Germany up both as a buffer to potential Soviet territorial ambitions in Europe and as a self-sufficient nation which would no longer need to rely on subsidies which Britain could ill afford to provide. While the increased fear of Soviet intentions had provided a short-term boon to British exploitation, by fuelling denial policy and widening the criteria for recruitment of German experts, it soon became clear that exploitation was an obstacle which was preventing Germany from rebuilding. Not only would the financial benefit of an independent, self-sufficient Germany be far greater to Britain than that derived from a relatively small number of dismantled factories and recruited specialists but, as a prosperous, rehabilitated nation, Germany could

[1028] TNA, CAB 81/133, 'JIC(46)51(0)', 24 May 1946.

help resist the magnetic attraction of recruitment which many German scientists and technicians felt towards the USSR, without too much British involvement. In pragmatic terms, by late 1947, exploitation had become more of a hindrance than a help to Britain's broader strategy in occupied Germany – an opinion shared by Ian Turner in his wider assessment of British policy towards German industry.[1029] As such, exploitation must be understood as a product of its time, specifically the aforementioned period of transition, wherein the exact and unique conditions existed to allow this programme to arise, survive, and often triumph among numerous other concomitant and sometimes conflicting endeavours, but which also ultimately led to its demise.

Thirdly, that exploitation, despite its aura of controversy, should not be seen purely through a sensationalist lens but should instead be examined as a deliberate policy, entered into soberly and with due consideration of the wider ramifications, and characterised not by intense government secrecy but rather by the usual hallmarks of civil service control – an overreliance on bureaucracy and a plurality of opinionated input – both of which do little to support the idea that exploitation was conducted as part of some great conspiracy. It is worth acknowledging here that exploitation was indeed often carried out under a shroud of secrecy though the significance of this should not be overestimated. After all, it was a mission tasked with strengthening Britain at the expense of its enemies (first Germany and then later the Soviet Union) and was supervised, at least initially, by the Joint Intelligence Sub-Committee, the most senior body in the British intelligence community – a modicum of concealment and obfuscation was to be expected. Nonetheless, the available records show that nearly all major government departments – the Home Office, the Ministry of Supply, the Foreign Office, and many others – were both aware of its existence and, to some extent, involved in its operation, and it was authorised and directed by a command structure extending to the uppermost levels of British government, including the Cabinet and the office of the Prime Minister. This hardly suggests some sinister conspiracy.

However, there are other reasons why a sensationalist approach has been adopted by many lurid journalistic accounts of exploitation. For one, the act of utilising an enemy's secrets has inherent connotations of deception and espionage, particularly when observed from a viewpoint either during or since the Cold War. The difficult experiences which

[1029] Turner, 'British Policy towards German Industry', 67.

exploitation officials had with an often hostile contemporary press, with whom they were instructed not to discuss their work, has further worsened the public image of the scheme. In addition, the nature of the Third Reich has played a role in crafting a particularly unsavoury depiction of post-war exploitation. As we have seen, the political records of the specialists recruited by Britain after the war were often ignored and many of the most ferocious critiques of exploitation focus on the idea that Nazi scientists, implicated in various crimes, were offered jobs rather than being prosecuted, and were praised rather than denounced. Prominent figures such as Wernher von Braun have contributed to this narrative immeasurably. Certainly this selective blindness towards political pasts is a significant part of the story of exploitation, but it ignores the many instances where proven Nazis were deliberately not offered post-war jobs in the West, irrespective of their utility,[1030] not to mention the co-operation, including the sharing of evidence, shown between exploitation agents and war crimes investigators.[1031] Generally speaking, in order to present a fair and accurate picture of exploitation, it is necessary both to recognise these clandestine and insalubrious portrayals of the programme – perhaps as part of its subsequent cultural history – but also to debunk them by showing that exploitation was a generally legitimate, if somewhat ethically dubious, element of British post-war policy.

Fourthly, that Britain's exploitation programme, despite being arguably the smallest of the four occupying powers' efforts, is no less worthy of study than its American, Soviet or French counterparts. As with the third point above, this is essentially a case of dispensing with a misconception while still acknowledging the reasoning behind it. That the British emerged from the Second World War in a weaker position than when they entered it is a fairly well-established fact and it is clear that Britain lacked the financial resources to pursue an exploitation programme on a scale to match the Americans or Soviets. The French efforts were perhaps more equally-sized in terms of resources but outstripped the British with regard to avarice and the range of tactics (many rather underhand) which they were willing to utilise in order to achieve their aims. So while Britain's exploitation programme may have been the least extensive, it justifies closer examination as part of a wider historiographical trend on the subject, as evinced most clearly by Michael Neufeld in what he describes as a

[1030] Gimbel, 'German Scientists', 464.
[1031] Schmidt, *Justice at Nuremberg*, 124-5.

'transnational' approach. While Neufeld looks at the exploitation efforts of less powerful nations, such as Brazil, India and Mexico, as well as Britain and France, his core idea – that it is necessary to move past the simplistic representation of exploitation as merely the movement of German rocketry experts to the USA and USSR and challenge the idea that Project Paperclip is synonymous with the programme as a whole – holds true for this thesis too.[1032]

In addition, the British initiative is also worth examining on its own merits because it is unique. The organisations charged with its execution, primarily the British Intelligence Objectives Sub-Committee and the T-Forces, have no exact parallels in any other national programme, and the sheer volume of investigators sent from Britain to Germany, including many drawn directly from private industry, was far greater than those deployed by the United States. Moreover, Britain's post-war situation differed from that of any of its wartime allies in a more general sense. While the USA and the Soviet Union were adjusting to new positions at the top of the geopolitical power structure, Britain was forced to come to terms with its 'loss of global pre-eminence' and demotion to the role of junior partner in the increasingly unsteady Anglo-American partnership, while still seeking ways to exert influence.[1033] Furthermore, the British economy went through a period of particular weakness directly after the end of the war and therefore needed to stimulate innovation while being in no position to invest in costly original research. Exploitation offered a solution, of sorts, to both these problems – it gave Britain access to new science and technology with no need to fund large-scale domestic research projects, and these new developments, particularly with regards to rocketry and atomic power, offered a way to reassert British authority and maintain a place at the top table of international politics. In fact, it is perhaps Britain's relative weakness at the end of the war which makes understanding its exploitation programme all the more important.

And finally, that exploitation was not simply a one-way street, in which Britain profited at Germany's expense, but rather that the degree to which Britain benefited, and Germany suffered, from exploitation has been considerably exaggerated. To be sure, the British exploitation programme was both large and comprehensive, covering a wide range of

[1032] Neufeld, 'The German Aerospace Exodus', 49-50.
[1033] McKercher, *Transition of Power*, 339.

topics in both the military and civil-industrial spheres, and certain new techniques or pieces of equipment were adopted as a result. As has been shown, Britain was not able to secure the services of a huge number of German specialists on a long-term basis and so this did not constitute an especially fruitful channel of exploitation. There were only a handful of areas – most notably chemical warfare and rocketry – where Britain learnt a significant amount from German expertise. True assessments of the financial value of British exploitation of German science and technology have been attempted on numerous occasions since the programme began to wind down and have generated remarkably scattered results, not least because in most cases an ideological or political agenda has muddied the data. For example, in 1948, Gustav Harmssen, Bremen's Senator for Economic Affairs and Foreign Trade, prepared a report on reparations in which he estimated the total value of the patents, industrial secrets, and similar assets removed from Germany by all the occupation forces to be about $5 billion.[1034] Michael Howard, who served with T-Force in Germany, recalled being told that the figure of British spoils alone was close to £2 billion.[1035] More recent appraisals put the figure more in the region of £30 million but this is probably a serious underestimation.[1036] Ultimately, a correct valuation is very difficult, if not impossible, to arrive at on account of several complicating factors, not least political motives, the blurred distinction between booty and reparations, and the near-unquantifiable worth of so-called 'intellectual reparations' – that is, the futility of attaching financial value to an idea.

In reality, the total economic worth of the material, information, and brainpower which Britain extracted from Germany after the war is almost irrelevant. What matters is that the officials involved obviously felt that the process was beneficial enough to pursue to the extent which they did, perhaps because financial gain was actually of secondary importance to the more urgent needs of strategic defence – using Germany's secrets to bolster British arsenals while simultaneously denying them to the Soviets. Furthermore, the other element of this debate is that, as convincingly argued by John Farquharson, irrespective of the actual amount of removals conducted by Britain, Germany gained more from the occupation than it lost. Indeed, British payments to its own zone in Germany totalled some £140 million by April 1947, far in excess of any realistic estimations of the

[1034] TNA, FO 1036/13, 'Reparations: the Harmssen report', 1948.
[1035] Howard, *Otherwise Occupied*, 205.
[1036] Farquharson, 'Governed or Exploited?', 41.

receipts from reparations.[1037] Werner Abelshauser has even argued, quite believably, that the dismantling of industrial capacity involved in exploitation was a virtual prerequisite for the West German 'economic miracle' of the 1950s because the material reparations opened the way for rapid renovation and streamlining of the industrial capital stock.[1038] Although it is important to remember that exploitation was embarked upon with a desire to punish and restrict Germany, and later continued with little regard for its potentially negative effects on the German economy, its ultimate legacy was perhaps more mutually beneficial than initial assumptions suggest.

Overall, the British exploitation of German science and technology in the years surrounding the end of the Second World War was a substantial and important aspect of British occupation policy, despite what the paucity of existing research would suggest. As a subject, it sits at several intersections: between various nations – Britain, Germany, the Soviet Union, the USA and France; between different periods – the Second World War, the occupation, the Cold War; and between several historiographical approaches – histories of international relations, science and technology, intelligence, and defence. As such it is able to shed light on a number of different phenomena while remaining an interesting and complex subject in its own right. This thesis provides a history of British exploitation from its primitive and nebulous origins, through its period of greatest and most fervent activity, to its gradual but inexorable decline as the occupation itself came to an end. In addition, it contributes one slender but revealing strand to the multifaceted history of the immediate post-war period, which was a critical transitional phase for not only Germany and Britain, but also for Europe and the wider world, and one which it is vital to appreciate in order to understand the broader historical trends of the twentieth century.

[1037] Ibid., 42.
[1038] Abelshauser, 'Immaterial Reparations', 107.

GLOSSARY

All abbreviations, acronyms and codenames are as they appear in the original source material.

30 Assault Unit *Also known as: 30 Commando, 30 Advanced Unit, 30AU* – Admiralty-sponsored intelligence commando unit. Brainchild of Ian Fleming, assistant to the Director of Naval Intelligence. Active in North Africa, the Mediterranean, Operation Overlord, and the invasion of Germany. Precursor to exploitation by way of technique and objectives. Had a reputation as piratical and careless – ironically nicknamed '30 Indecent Assault Unit'.

Abwehrkommando – Advance intelligence commando unit of the German *Abwehr* (military intelligence). Used often during the early stages of the war, a component of Blitzkrieg tactics. Served as an inspiration for 30 Assault Unit and other exploitation operations.

Alsos *from the classical Greek word for 'sacred grove', a play on the name of its initiator, Leslie Groves* – Anglo-American (but US-led) scientific intelligence mission, with a particular focus on nuclear physics and the German atomic bomb project. Brainchild of Brigadier-General Leslie Groves, head of the Manhattan Project, and led by Professor Samuel Goudsmit and Colonel Boris T. Pash. Active in Italy, France, and Germany; disbanded in late 1945. One of the first iterations of the exploitation programme and a main inspiration for later, expanded efforts.

British Intelligence Objectives Sub-Committee (BIOS) – Whitehall committee responsible for co-ordinating the British scientific and exploitation efforts after the war. Emerged from the disbanded Anglo-American CIOS (see below) in July 1945. Comprised of representatives from the Admiralty, the War Office, the Air Ministry, the Foreign Office, the Ministry of Supply, the Ministry of Aircraft Production, the Board of Trade, the Ministry of Fuel and Power, the Department for Scientific and Industrial Research, and the Government of the Dominion of Canada. Chaired initially by Professor R.P. Linstead. Did not have its own pool of investigators but was tasked with developing lists of targets, making arrangements for investigators to visit the sites in Germany, and for collating and making available their final reports.

Combined Intelligence Objectives Sub-Committee (CIOS) *Briefly initially known as the Combined Intelligence Priorities Committee (CIPC)* – Anglo-American committee responsible for co-ordinating the British and US scientific and exploitation efforts during the latter part of the war. Comprised of representatives from seven British and seven American departments: (British) Foreign Office, Ministries of Economic Warfare, Supply, and Aircraft Production, and the Intelligence sections of all three Armed Services; (US) State Department, Foreign Economic Administration, Office of Strategic Services, OSRD and the three Forces' Intelligence divisions. Chaired by Brigadier T.J. Betts (US Army), with Professor R.P. Linstead (British civilian) as vice-chair. Did not have its own pool of investigators but was tasked with developing lists of targets, making arrangements for investigators to visit the sites in liberated Europe and Germany, and for collating and making available their final reports. Disbanded, with SHAEF, in July 1945.

Control Commission for Germany (British Element) (CCG(BE)) – British component of the Allied Control Commission; responsible for administering the British zone of Occupied Germany. Headquartered in Bad Oeynhausen, near Hannover. Worked in concert with the administrations of the other main Allies (USA, France, Soviet Union) through the Control Council in Berlin.

Control Office for Germany and Austria (COGA) – British government office responsible for the British occupation of Germany (and, briefly, Austria), based in Whitehall. Enacted policy through the CCG(BE) (see above) and the British Army of the Rhine (BAOR).

Darwin Panel – British committee tasked with facilitating the recruitment of German experts in civilian fields in Britain, and later responsible for 'exclusive exploitation' – the employment of German specialists directly by private firms. Comprised of representatives from the Department of Scientific and Industrial Research, Board of Trade, Control Commission for Germany, Home Office, Treasury, German Economic Division, Admiralty, Security Services and the Ministries of Supply, Labour, Health, Agriculture & Fisheries, Aircraft Production, and Fuel & Power. Chaired by Sir Charles Darwin, director of the National Physical Laboratory.

Denial policy – Efforts by both the British and the Americans to minimise the benefits which the Soviet Union was able to derive through exploitation, often by preventing them from

securing the services of German experts who were deemed valuable. This approach came to define much of the Anglo-American exploitation programme in its latter years of operation.

Deputy Chiefs of Staff (DCOS) – British committee comprised of the deputy chiefs of staff from the armed forces. Responsible for many matters but, in terms of exploitation, their largest contribution was the so-called 'DCOS scheme' which provided for the British recruitment of German experts in military fields.

Dustbin – Detention centre located at Schloß Kransberg, near Frankfurt-am-Main. Initially operated on an Anglo-American basis, but later migrated to exclusive American control. Detainees were primarily German scientific and technical experts who the Allies wished to interrogate and potentially recruit; among the most eminent was Albert Speer.

Enemy Personnel Exploitation Section (EPES) – Component of FIAT (see below) specifically tasked with the detention, interrogation, and recruitment of German scientists and technicians. Its forward section was particularly active in Berlin and the Soviet zone, and responsible for securing the services of German specialists located in these areas.

Field Information Agency, Technical (FIAT) – Anglo-American organisation responsible for many of the logistical demands of exploitation on the ground in Germany. With the dissolution of SHAEF, it was split into separate but co-operative British and American elements. Crucially, it facilitated the visits of British investigators to the American zone and vice versa. The British element was headed up by Brigadier R.J. Maunsell.

Inkpot – British detention centre for German scientists and technicians, based at the Beltane School in Wimbledon, London.

Operation Backfire – Anglo-American, but overwhelmingly British-led, project to assemble and test-fire V-2 rockets off the coast of northern Germany at Cuxhaven. Conducted primarily by German personnel with British supervision and observation. Achieved three launchings, two of which were successful. Considered a great achievement within the British military.

Operation Matchbox – Key element of British denial policy (see above), based around a transit hotel where German scientists and technicians could stay in order to prevent their recruitment by the Soviets.

Operation Osoaviakhim – Major Soviet operation which saw approximately 2,300 German scientists and technicians (along with their families) deported, often forcefully, from the Soviet zones of Germany and Berlin to the USSR. It took place in the early hours of 22 October 1946 and was conducted by the Soviet security service, the NKVD. It had largely positive implications for the British (and Americans) as it scared many German experts and encouraged them to actively seek employment in Britain or the USA.

Operation Paperclip – The United States' major policy of recruitment of German scientists and technicians. Co-ordinated primarily by the Joint Intelligence Objectives Agency (JIOA). Estimates suggest some 1,500 German experts were recruited under this scheme, dwarfing the parallel British efforts.

Operation Surgeon – British scheme to exploit German aeronautical expertise after the war, both through the examination and evacuation of equipment and facilities and through the interrogation and recruitment of scientists and technicians.

Research Branch – Component of the CCG(BE) (see above) which was responsible both for controlling German science after the war as well as enacting elements of denial policy. Had a close relationship with exploitation, which could be both complimentary and conflicting.

T-Force – The British military element responsible for most of the logistical workload of exploitation. They travelled with the Allied advance across Europe after D-Day and were tasked with seizing and securing key facilities so that they could subsequently be visited by CIOS or BIOS (see above) investigators. They also played some part in the detention of key German individuals, the evacuation of German equipment, and the provision of transport and accommodation for investigators.

BIBLIOGRAPHY

ARCHIVAL SOURCES

The National Archives, Kew

UK Atomic Energy Authority papers

AB 1/110	Investigation of nuclear physics developments in Germany	1945

Admiralty papers

ADM 202/308	30 Assault Unit	1944-1945
ADM 223/349	No 30 Assault Unit: target lists for operations in Germany	1944
ADM 223/500	30 Assault Unit and 30 Commando: papers.	1942-1945
ADM 223/501	30 Assault Unit: targets	1944-1945

Air Ministry papers

AIR 19/434	British Bombing Research Mission	1945-1947
AIR 20/1715	Future of German Scientists: paper	1945
AIR 20/1722	Exercise "Post Mortem"	1945
AIR 20/4818	British Bombing Survey Unit	1945-1953
AIR 40/1178	A.D.I.(K) periodical progress reports 1-5	1945
AIR 40/1779	Joint "Crossbow" Working Committee and Joint "Crossbow" Committee	1944

Ministry of Aviation papers

AVIA 9/83	Sir Roy Fedden's mission to Germany	1945
AVIA 10/70	Alsos Mission: report	1943-1944
AVIA 12/82	Operation Surgeon: memorandum	1946
AVIA 12/191	Reparations from Germany	1943-1947
AVIA 54/1294	Employment of Germans in UK under DCOS scheme: general	1946-1949
AVIA 54/1295	Employment of Germans in UK under DCOS scheme: general	1946-1953
AVIA 54/1403	Employment of German scientists and technicians: denial policy	1946-1950
AVIA 54/1404	Halstead Exploiting Centre: review of activities and eventual closure	1946-1950

Board of Trade papers

BT 211/23	Lists of BIOS, CIOS, FIAT and JIOA reports	1946
BT 211/62	'Operation Bottleneck': policy and arrangements	1946-1947
BT 211/116	Reparations assessment teams: policy	1945-1946
BT 211/117	Disposal of British Intelligence Objectives Sub-Committee equipment	1946-1947

Cabinet Office papers

CAB 21/1421	Co-ordination of scientific intelligence	1940
CAB 69/7	Papers DO (45) 7 – DO (45) 12.	1945
CAB 79/37	Minutes of Meetings nos. 182-202	1945
CAB 79/68	Minutes of Meetings (O) nos. 291-323	1943

CAB 81/24	Papers 1 - 10 (1943); Papers 1 - 45 (1944)	1943-1944
CAB 81/47	Meetings 1 - 8, Papers 1 - 27 (1944); Meetings 1 - 3, Papers 1 - 18 (1945)	1944-1945
CAB 81/92	Meetings 1(0)-75(0)	1944
CAB 81/93	Meetings 1(0)-83(0)	1945
CAB 81/133	Papers: 41-75(0)	1946
CAB 82/3	Deputy Chiefs of Staff Committee: minutes of meetings 1-24	1945
CAB 82/6	Deputy Chiefs of Staff Committee: papers 1-66	1945
CAB 82/8	Deputy Chiefs of Staff Committee: minutes of meetings 1-39	1946
CAB 122/342	Handling of German science and technology	1945-1946
CAB 122/343	Exploitation of German scientists and technicians	1945
CAB 122/349	Exploitation of German scientists and technicians	1946-1947
CAB 122/357	German scientists (Civil)	1945-1946
CAB 122/360	German scientists (Civil)	1947-1948
CAB 122/363	Allocation policy on samples of secret weapons	1945
CAB 124/544	Proposed Advisory Committee on the Control of Scientific Research and Development in Germany	1945-1946
CAB 124/1924	Scientific Committee for Germany	1946-1951
CAB 124/1928	Scientific Committee for Germany: minutes of meetings	1946-1949
CAB 126/333	Operation “Epsilon”: discussions between Professor Blackett and German scientists detained at Farm Hall Godmanchester	1945
CAB 131/1	Meetings: 1-35	1946
CAB 158/2	Joint Intelligence Sub-Committee: memoranda 51-85	1947
CAB 176/8	Secretariat Minutes (1945) 1457-1910	1945

Ministry of Defence papers

DEFE 2/1107	30 Assault Unit: mobilisation, control, disbandment, Honours and Awards	1943-1945

Foreign Office papers

FO 371/71038	Disbandment of Unterluss Works Centre.	1948
FO 935/1	Research and Development Centres in Germany	1944-1945
FO 935/25	General correspondence	1944-1945
FO 935/140	British Bombing Survey Unit	1944-1946
FO 936/39	Field Information Agency (Technical)	1945
FO 942/8	Draft Armistice Terms: 1 Article 21(a)	1944
FO 942/27	Enemy Research and Development Sub-Committee	1944
FO 942/79	Combined Intelligence Sub-Committee	1944
FO 942/425	Reparation: urgent requirements of scientific apparatus	1946
FO 942/426	Operation “Surgeon”	1946-1947
FO 943/42	Reparations: dismantling policy	1947
FO 1010/20	Reparations: deliveries and restitutions	1945-1949
FO 1012/420	Reparations Operation “Trademark”: vol. I	1945-1946
FO 1012/421	Reparations Operation “Trademark”: vol. II	1946-1947
FO 1013/373	Operation ‘Matchbox’: accommodation for German “consultants”	1948-1950

FO 1031/2	Reactivation of the hotel industry: vol. I	1947-1948
FO 1031/4	Termination and transfer of 'T' Force commitments	1947-1948
FO 1031/5	Liaison with Russians, French and other Allies: policy	1945-1946
FO 1031/6	Liaison with Russians, French and other Allies: individual cases	1945-1947
FO 1031/7	BIOS investigators; policy: vol. III	1946-1947
FO 1031/9	BIOS papers: general	1947
FO 1031/10	Visits, business interests and policy: vol. I	1945-1946
FO 1031/12	Operation "Abstract": interrogation of Prof. Dr Wernher von Braun, guided missiles, etc.	1947
FO 1031/19	Exploitation of German scientists and technicians: Policy	1946-1947
FO 1031/20	Exploitation of German scientists and technicians: Policy	1945-1949
FO 1031/22	Export of technicians	1947
FO 1031/25	Reports on EPES/FIAT activities	1947
FO 1031/49	History of 'T' Force	1945-1946
FO 1031/50	BIOS – Minutes of Meetings	1945-1946
FO 1031/51	British Intelligence Objectives Sub-Committee – general	1945
FO 1031/53	Quadripartite policy	1945-1946
FO 1031/59	Intelligence reports from Berlin: vol. I	1946
FO 1031/65	Personnel to be denied to Russians and establishments operated by them	1945-1946
FO 1031/67	German scientists and technicians from Soviet zones	1945-1947
FO 1031/68	EPES	1946-1948
FO 1031/69	DUSTBIN: policy	1946
FO 1031/74	Scientific and Technological Branch policy on unethical medicine and medical war crimes	1945-1946
FO 1031/75	EPES: policy	1945-1946
FO 1031/83	DUSTBIN: bacteriological warfare	1945
FO 1031/85	V Weapon personnel agreement to share	1945
FO 1031/86	Poison gas: interrogation and reports	1945
FO 1031/138	Russian affairs: recruitment of scientists	1946
FO 1032/35	Disarmament: directive on information required on German war material	1944-1945
FO 1032/164	Employment of scientists in UK on Darwin Panel scheme	1945-1947
FO 1032/166	Evacuation of equipment to UK; reparations: general	1945-1947
FO 1032/167	Evacuation of equipment to UK; reparations: clearances by RB	1945-1946
FO 1032/169	Liquidation, industrial disarmament: policy and procedure	1945-1947
FO 1032/170	Denazification: policy	1945-1947
FO 1032/176	British Intelligence Objectives Sub-Committee policy	1945-1947
FO 1032/177	British Intelligence Objectives Sub-Committee: organisation	1945-1947
FO 1032/179	British Intelligence Objectives Sub-Committee instructions and information on captured documents	1945-1947
FO 1032/247	Bacteriological research	1945-1947
FO 1032/297	Employment of German scientists in UK on Darwin Panel scheme: interrogation and detention policy	1945-1946
FO 1032/300	Employment of German scientists in UK on Darwin Panel	1945-1947

	scheme: defence research scheme; policy applicable to both schemes	
FO 1032/302	Employment of German scientists in UK on Darwin Panel scheme: defence research scheme; policy for families	1946-1947
FO 1032/470	Organisation and functions of Combined Intelligence Objectives Sub-Committee teams	1945
FO 1032/475	Organisation and functions of Combined Intelligence Objectives Sub-Committee	1945
FO 1032/1231A	Intelligence: operation “Matchbox”	1947
FO 1032/1231B	Intelligence: operation “Matchbox”	1948
FO 1032/1459	Field Information Agency Technical	1945-1948
FO 1032/1470A	Field Information Agency Technical/T Force policy regarding access to technical targets in Allied zones: vol. I	1945-1947
FO 1036/13	Reparations: the Harmssen report	1948
FO 1039/672	Reports from Scientific and Technical Intelligence Branch	1946
FO 1050/67	Intelligence Division: formation of Scientific and Technical Intelligence Branch	1946
FO 1050/1419	Combined Intelligence Objectives Sub-Committee black list: geographically arranged. Processed.	1944
FO 1050/1421	Combined Intelligence Objectives Sub-Committee grey list	1944-1945
FO 1062/114	Operation “Surgeon”	1945-1948
FO 1062/149	Scientific and Technical Research Board minutes and correspondence: vol. I	1946
FO 1062/396	Industrial disarmament: policy	1945-1947
FO 1065/12	Organisation and future of Field Information Agency Technical and ‘T’ Force	1945-1948

GCHQ papers

HW 8/104	History of 30 Commando	1942-1946

Ministry of Labour papers

LAB 8/1198	Darwin Panel: employment of German Scientists, specialists and technicians for civil purposes in the United Kingdom.	1945-1947

Office of the Prime Minister papers

PREM 3/21/3	British Bombing Research Mission	1944-1945
PREM 8/373	Interrogation of German Scientists in United Kingdom and their subsequent return to Germany	1945-1946

War Office papers

WO 193/432	Combined Intelligence Priorities Committee	1944-1945
WO 204/12455	Marine Einsatz Kommando 80	1944-1945
WO 204/12911	Abwehrkommandos: activities, staffing, accommodation etc.	1945
WO 208/2174	Field technical assessment by Porton group	1944-1945
WO 208/2183	Reports on phosphorus-nitrogen compounds Tabun and Sarin	1945

WO 208/3974	Interrogation of Dr K Blome Director of German Biological Warfare Activities	1945
WO 208/4280	Reports on potential bacteriological targets visited	1945
WO 208/4969	ASHCAN: interrogation etc. reports	1945
WO 219/1630A	T Force Planning: intelligence targets to be captured by a special force during and advance	1944-1945
WO 219/1668	30 Advanced Unit: supply of information to Combined Intelligence Objectives Sub-Committee of Joint Intelligence Committee	1945
WO 219/1669	Collection of economic intelligence: policy and organisation	1944-1945
WO 219/1986	Field Information Agency, Technical: T Force organisation.	1944-1945
WO 219/1987	Field Information Agency, Technical: reports on T Force operations and activities, special technical investigations, lessons learned, etc.	1944-1945
WO 219/2165	Operation Backfire	1945

Imperial War Museum, London/Duxford

Private Papers

05/48/1	Private Papers of Edward C. Aspden.	1945
06/27/1	Private Papers of Major P.A. Chittenden.	1945
09/21/1	Private Papers of Mr Gilbert A. Hunter.	1946
99/76/1	Private Papers of Lieutenant-Commander John Bradley, RNVR.	1945
99/36/1	Private Papers of Brigadier W.P.T. Roberts CBE.	1945
10/7/1	Private Papers of Monica Maurice.	1947

CIOS Reports

Overall Report.	'The Intelligence Exploitation of Germany'.	1945
XXVI-37.	'The Treatment of Shock from Prolonged Exposure to Cold, Especially in Water'.	1945
XXVIII-56.	'Rockets and Guided Missiles'.	1945
XXIX-21.	'Miscellaneous Aviation Medical Matters'.	1945
XXXI-86.	'Chemical Warfare Installations in the Munsterlager Area'.	1945
XXXII-125.	'German Guided Missile Research'.	1945

Miscellaneous Reports

Misc. 21/382	'Report on Operation Backfire'.	1945
Official Report	'German Organisation and Personalities Engaged in Research and Development of Armaments during the Second World War'.	1948
Official Report	'Reports on German and Japanese Industry – Classified List No. 18'.	1948

Churchill College, Cambridge

Metals Society (METL.2) – CIOS Reports

I-1.	'Radar and Controlled Missiles'.	1944
X-13.	'Visit to Eindhoven, Holland'.	1944

PUBLISHED PRIMARY SOURCES

Press

Hansard

House of Commons debates.
House of Lords debates.
Written Questions and Responses.

Newspapers

Daily Express.
Daily Mail.
Daily Telegraph.
Manchester Guardian.
Nature.
The Times.

Journal Articles

Morrison, Philip, 'Alsos: The Story of German Science', *Bulletin of the Atomic Scientists*, 3:12 (1947), 354-365.

Von Laue, Max, 'The Wartime Activities of German Scientists', *Bulletin of the Atomic Scientists*, 4:4 (1948), 103.

Films/TV

Kaufman, Philip (director), *The Right Stuff* (USA: Warner Bros., 1983).

Kubrick, Stanley (director), *Dr Strangelove or: How I Learned to Stop Worrying and Love the Bomb* (USA: Columbia Pictures, 1964).

Poliakoff, Stephen (screenwriter), *Close to the Enemy* (UK: BBC, 2016).

Websites

Churchill, Winston. 'MIT Mid-Century Convocation'. Speech delivered on 31 March 1949. http://libraries.mit.edu/archives/exhibits/midcentury/mid-cent-churchill.html [accessed 22 January 2016].

Lehrer, Tom. 'Wernher von Braun'. Song recorded in 1965. https://www.youtube.com/watch?v=QEJ9HrZq7Ro [accessed 13 January 2016].

Novels

Kanon, Joseph, *The Good German.* (London: Sphere, 2004).

Published Documents, Memoirs and Autobiography

British Bombing Survey Unit, *The Strategic Air War against Germany* (London: Frank Cass, 1988).

Bush, Vannevar, *Pieces of the Action* (New York: Morrow, 1970).

Eisenhower, Dwight D., *The Papers of Dwight David Eisenhower,* Vol. VI (Baltimore: Johns Hopkins University Press, 1978).

Foreign Office, *Instructions for British Servicemen in Germany 1944* (London: Foreign Office, 1944).

Foreign Relations of the United States (FRUS). Accessed online: http://digital.library.wisc.edu/1711.dl/FRUS.

Frank, Charles (ed.), *Operation Epsilon: The Farm Hall Transcripts* (Bristol: Institute of Physics Publishing, 1993).

Gallup, George H., *The Gallup International Public Opinion Polls: Great Britain, 1937-1975* (New York: Random House, 1976).

Goudsmit, Samuel A., *Alsos* (New York: American Institute of Physics Press, 1996).

Groves, Leslie R., *Now It Can Be Told: The Story of the Manhattan Project* (London: Andre Deutsch, 1963).

Howard, Michael, *Otherwise Occupied: Letters Home from the Ruins of Nazi Germany* (Tiverton, Devon: Old Street, 2010).

Huzel, Dieter K., *From Peenemünde to Canaveral* (Westport: Greenwood, 1962).

Jones, R.V., *Most Secret War: British Scientific Intelligence, 1939-1945* (London: Coronet, 1978).

— *Reflections on Intelligence* (London: Heinemann, 1989).

Kennan, George F., *Memoirs 1925-1950* (London: Hutchinson, 1968).

Neitzel, Sönke (ed.), *Tapping Hitler's Generals: Transcripts of Secret Conversations, 1942-45,* Translated by Geoffrey Brooks (London: Frontline Books, 2013).

Nutting, David, (ed.), *Attain by Surprise: The Story of 30 Assault Unit* (Chichester: David Colver, 1997).

Pash, Boris T., *The Alsos Mission* (New York: Charter Books, 1980).

Ruhm von Oppen, Beate (compiler), *Documents on Germany under Occupation, 1945-54* (Oxford: OUP, 1955).

Speer, Albert, *Inside the Third Reich* (London: Sphere, 1971).

SECONDARY LITERATURE

Abelshauser, Werner, 'Immaterial Reparations and the Reintegration of West Germany into the World Market', in Matthias Judt and Burghard Ciesla (eds.), *Technology Transfer out of Germany after 1945* (Amsterdam, Harwood, 1996), 107-118.

Adler, K.H., 'Selling France to the French: The French Zone of Occupation in Western Germany, 1945-c.1955', *Contemporary European History*, 21 (2012), 575-595.

Agar, Jon and Brian Balmer, 'British Scientists and the Cold War: The Defence Research Policy Committee and Information Networks, 1947-1963', *Historical Studies in the Physical and Biological Sciences*, 28 (1998), 209-252.

Ahrens, Michael, *Die Briten in Hamburg: Besatzerleben, 1945-1958* (Munich: Dölling und Galitz, 2011).

Albrecht, Ulrich, 'Military Technology and National Socialist Ideology', in Monika Renneberg and Mark Walker (eds.), *Science, Technology and National Socialism* (Cambridge: CUP, 2003), 88-125.

Aldrich, Richard J., 'British intelligence and the Anglo-American "Special Relationship" during the Cold War', *Review of International Studies*, 24 (1998), 331-351.

— *The Hidden Hand: Britain, America and Cold War Secret Intelligence* (London: John Murray, 2001).

Annan, Noel, *Changing Enemies: The Defeat and Regeneration of Germany* (London: Harper Collins, 1995).

Annas, George J. and Michael A. Grodin (eds.), *The Nazi Doctors and the Nuremberg Code: Human Rights in Human Experimentation* (Oxford: OUP, 1992).

Augustine, Dolores L., *Red Prometheus: Engineering and Dictatorship in East Germany, 1945-1990* (Cambridge, MA: MIT Press, 2007).

Backer, John H., *Priming the German Economy: American Occupational Policies, 1945-8* (Durham, N.C.: Duke University Press, 1971).

Balmer, Brian, *Britain and Biological Warfare: Expert Advice and Science Policy*, 1930-65 (Basingstoke: Palgrave, 2001).

— 'The UK Biological Weapons Program', in Mark Wheelis, Lajos Rosza and Malcolm Dando (eds.), *Deadly Cultures: Biological Weapons since 1945* (Cambridge, MA: Harvard University Press, 2006).

— *Secrecy and Science: A Historical Sociology of Biological and Chemical Warfare* (London: Routledge, 2012).

Bar-Zohar, Michel, *The Hunt for the German Scientists* (London: Arthur Barker, 1967).

Barrett, A.G.M. and D.H.R. Barton, 'Darwin, Sir Charles Galton (1887–1962)', in *Oxford Dictionary of National Biography* (Oxford: OUP, 2004) [accessed online 6 August 2015, http://www.oxforddnb.com/view/article/32716].

— 'Linstead, Sir (Reginald) Patrick (1902–1966)', in *Oxford Dictionary of National Biography*, (Oxford: OUP, 2004) [accessed online 21 July 2015, http://www.oxforddnb.com/view/article/34549].

Bauman, Zygmunt, *Modernity and the Holocaust* (Cambridge: Polity, 2000).

Baylis, John, *Anglo-American Relations since 1939: The Enduring Alliance* (Manchester: Manchester University Press, 1997).

Beevor, Antony, *Berlin: The Downfall 1945* (London: Penguin, 2003).

Berghahn, Volker, 'Technology, Reparations, and the Export of Industrial Culture. Problems of the German-American Relationship, 1900-1950', in Matthias Judt and Burghard Ciesla (eds.), *Technology Transfer out of Germany after 1945* (Amsterdam, Harwood, 1996), 1-10.

Bessel, Richard, *Germany after the First World War* (Oxford: OUP, 1993).

— and Dirk Schumann, 'Introduction: Violence, Normality, and the Construction of Postwar Europe', in Richard Bessel and Dirk Schumann (eds.), *Life after Death: Approaches to a Cultural and Social History of Europe during the 1940s and 1950s* (Cambridge: CUP, 2003), 1-14.

— *Nazism and War* (London: Weidenfeld & Nicolson, 2004).

— *Germany 1945: From War to Peace* (London: Pocket Books, 2010).

Beyerchen, Alan D., *Scientists under Hitler: Politics and the Physics Community in the Third Reich* (New Haven, CT: Yale University Press, 1977).

— 'German Scientists and Research Institutions in Allied Occupation Policy', *History of Education Quarterly*, 22 (1982), 289-299.

Biddiscombe, Perry, *Werwolf! The History of the National Socialist Guerrilla Movement, 1944-6* (Toronto: University of Toronto Press, 1998).

— *The Denazification of Germany: A History, 1945-1950* (Stroud: Tempus, 2007).

Biddle, Wayne, *Dark Side of the Moon: Wernher von Braun, the Third Reich and the Space Race* (London: W.W. Norton, 2009).

Bird, Kai, and Martin J. Sherwin, *American Prometheus: The Triumph and Tragedy of J. Robert Oppenheimer* (New York: Vintage, 2006).

Bloxham, Donald, 'British War Crimes Policy in Germany, 1945-1959: Implementation and Collapse', *Journal of British Studies*, 42 (2003), 91-118.

Boehling, Rebecca, *A Question of Priorities: Democratic Reform and Economic Recovery in Postwar Germany* (Oxford: Berghahn, 1996).

Bower, Tom, *Blind Eye to Murder: Britain, America and the Purging of Nazi Germany – A Pledge Betrayed* (London: Andre Deutsch, 1981).

— *The Paperclip Conspiracy: The Battle for the Spoils and Secrets of Nazi Germany* (London: Grafton, 1988).

Breitman, Richard, *Official Secrets: What the Nazis Planned, What the British and Americans Knew* (New York: Hill & Wang, 1998).

Broadberry, Stephen and Peter Howlett, 'Blood, Sweat and Tears: British Mobilisation for World War II', in Roger Chickering, Stig Förster and Bernd Greiner, *A World at Total War: Global Conflict and the Politics of Destruction, 1937-1945* (Cambridge: CUP, 2005), 157-176.

Bud, Robert and Philip Gummett (eds.), *Cold War, Hot Science: Applied Research in Britain's Defence Laboratories, 1945-1990* (London: Science Museum, 2002).

Budiansky, Stephen, *Battle of Wits: The Complete Story of Codebreaking in World War II* (New York: Touchstone, 2000).

Buruma, Ian, *Year Zero: 1945 – A History* (London: Atlantic, 2013).

Cairncross, Alec, *The Price of War: British Policy on German Reparations, 1941-1949* (Oxford: Blackwell, 1986).

Carden, Robert W., 'Before Bizonia: Britain's Economic Dilemma in Germany, 1945-6', *Journal of Contemporary History*, 14 (1979), 535-555.

Carruthers, Susan L., *The Good Occupation: American Soldiers and the Hazards of Peace* (Cambridge, MA: Harvard University Press, 2016).

Carson, Cathryn, 'Knowledge Economies: Toward a New Technological Age', in Michael Geyer and Adam Tooze (eds.), *The Cambridge History of the Second World War,* vol. III (Cambridge: CUP, 2015), 196-219.

Carter, Gradon P., *Porton Down: 75 Years of Chemical & Biological Research* (London: HMSO, 1992).

— and Graham S. Pearson, 'British biological warfare and biological defence, 1925-1945', in Erhard Giessler and John Ellis van Courtland Moon (eds.), *Biological and Toxin Weapons: Research, Development and Use from the Middle Ages to 1945* (Oxford: OUP, 2009), 168-189.

Cassidy, David, *Uncertainty: The Life and Science of Werner Heisenberg* (New York: W.H. Freeman, 1991).

— 'Controlling German Science I: US and Allied Forces in Germany, 1945-1947', *Historical Studies in the Physical and Biological Sciences*, 24 (1994), 197-235.

— 'Controlling German Science II: Bizonal Occupation and the Struggle over West German Science Policy, 1946-1949', *Historical Studies in the Physical and Biological Sciences*, 26 (1996), 197-239.

Christopher, John, *The Race for Hitler's X-Planes* (Stroud: The History Press, 2012).

Clark, Ronald W., *Tizard* (London: Methuen, 1965).

Coast, David and Jo Fox, 'Rumour and Politics', *History Compass*, 13 (2015), 222-234.

Collier, Basil, *The Battle of the V-Weapons, 1944-5* (London: Hodder & Stoughton, 1964).

Confino, Alon, 'Dissonance, Normality, and the Historical Method: Why did some Germans Think of Tourism after May 8, 1945?', in Richard Bessel and Dirk Schumann (eds.), *Life*

after Death: Approaches to a Cultural and Social History of Europe during the 1940s and 1950s (Cambridge: CUP, 2003), 323-348.

Connelly, Mark, *Reaching for the Stars: A History of Bomber Command* (London: I.B. Tauris, 2014).

Cooter, Roger, Mark Harrison and Steve Sturdy (eds.), *War, Medicine and Modernity* (Stroud: Sutton, 1998).

Cornwell, John, *Hitler's Scientists: Science, War and the Devil's Pact* (London: Penguin, 2013).

Creswell, Michael and Marc Trachtenberg, 'France and the German Question, 1945-55', *Journal of Cold War Studies*, 5:3 (2003), 5-28.

Daniels, Mario, 'Brain Drain, innerwestliche Weltmarktkonkurrenz und nationale Sicherheit. Die Kampagne der westdeutschen Chemieindustrie gegen Wissenstransfers in die USA in den 1950er Jahren', *Vierteljahrshefte für Zeitgeschichte,* 64 (2016), 491-516.

Deighton, Anne, 'Cold War Diplomacy: British Policy Towards Germany's Role in Europe, 1945-9', in Ian Turner (ed.), *Reconstruction in Post-War Germany: British Occupation Policy and the Western Zones, 1945-55* (Oxford: Berg, 1989), 15-34.

— *The Impossible Peace: Britain, the Division of Germany and the Origins of the Cold War* (Oxford: Clarendon, 1990).

— 'Britain and the Cold War, 1945-1955', in Mervyn P. Leffler and Odd Arne Westad (eds.), *The Cambridge History of the Cold War,* vol. I (Cambridge: CUP, 2012), 112-132.

Donnison, F.S.V., *Civil Affairs and Military Government North West Europe 1944-6* (London: HMSO, 1961).

Dylan, Huw, *Defence Intelligence and the Cold War: Britain's Joint Intelligence Bureau, 1945-64* (Oxford: OUP, 2014).

Eckert, Astrid M., *The Struggle for the Files: The Western Allies and the Return of German Archives after the Second World War* (Cambridge: CUP, 2012).

Edgerton, David, *Warfare State: Britain, 1920-1970* (Cambridge: CUP, 2005).

— *Britain's War Machine: Weapons, Resources and Experts in the Second World War* (London: Allen Lane, 2011).

— *The Shock of the Old: Technology and Global History since 1900* (Oxford: OUP, 2011).

Evans, Rob, *Gassed: British Chemical Warfare Experiments on Humans at Porton Down* (London: Stratus, 2000).

Farquharson, John, *The Western Allies and the Politics of Food: Agrarian Management in Post-War Germany* (Oxford: Berg, 1985).

— 'Governed or Exploited? The British Acquisition of German Technology, 1945-48', *Journal of Contemporary History*, 32 (1997), 23-42.

— 'Anglo-American Policy on German Reparations from Yalta to Potsdam', *English Historical Review*, 112 (1997), 904-926.

Feigel, Lara, *The Bitter Taste of Victory: In the Ruins of the Reich* (London: Bloomsbury, 2016).

Feiveson, Harold A., Alexander Glaser, Zia Mian and Frank N. von Hippel, *Unmaking the Bomb: A Fissile Material Approach to Nuclear Disarmament and Non-Proliferation* (Cambridge, MA: MIT Press, 2014).

Fisch, Jörg, 'Reparations and Intellectual Property', in Matthias Judt and Burghard Ciesla (eds.), *Technology Transfer out of Germany after 1945* (Amsterdam, Harwood, 1996), 11-26.

Folly, Martin, '"The impression is growing … that the United States is hard when dealing with us": Ernest Bevin and Anglo-American relations at the dawn of the Cold War', *Journal of Transatlantic Studies*, 10 (2012), 150-166.

Ford, Roger, *Germany's Secret Weapons in World War II* (Staplehurst: Spellmount, 2000).

Fort, Adrian, *Prof: The Life and Times of Frederick Lindemann* (London: Jonathan Cape, 2003).

Foschepoth, Josef and Rolf Steininger (eds.), *Die britische Deutschland- und Besatzungspolitik, 1945-1949* (Paderborn: Ferdinand Schöningh, 1985).

Fry, Helen, *The M Room: Secret Listeners Who Bugged the Nazis in World War 2* (London: Marranos Press, 2012).

Fulbrook, Mary, *Dissonant Lives: Generations and Violence through the German Dictatorships* (Oxford: OUP, 2011).

Giessler, Erhard, 'Biological warfare activities in Germany, 1934-1945', in Erhard Giessler and John Ellis van Courtland Moon (eds.), *Biological and Toxin Weapons: Research, Development and Use from the Middle Ages to 1945* (Oxford: OUP, 2009), 91-126.

Giffard, Hermione, 'Engines of Desperation: Jet Engines, Production and New Weapons in the Third Reich', *Journal of Contemporary History*, 48 (2013), 821-844.

Gimbel, John, *The American Occupation of Germany: Politics and the Military, 1945-1949* (Stanford, CA: Stanford University Press, 1968).

— 'US Policy and German Scientists: The Early Cold War', *Political Science Quarterly,* 101 (1986), 433-451.

— 'German Scientists, US Denazification Policy and the "Paperclip Conspiracy"', *International History Review*, 12 (1990), 441-465.

— 'The American Exploitation of German Technical Know-How after World War II', *Political Science Quarterly*, 105 (1990), 295-309.

— *Science, Technology, and Reparations: Exploitation and Plunder in Postwar Germany* (Stanford: Stanford University Press, 1990).

— 'Science, Technology & Reparations in Postwar Germany', in Jeffrey Diefendorf, Axel Frohn and Hermann-Josef Rupieper (eds.), *American Policy and the Reconstruction of West Germany, 1945-55* (Cambridge: CUP, 1993), 175-196.

Givens, Seth A., 'Liberating the Germans: The US Army and Looting in Germany during the Second World War', *War in History*, 21 (2013), 33-54.

Glatt, Carl, 'Reparations and the Transfer of Scientific and Industrial Technology from Germany: A Case Study of the Roots of British Industrial Policy and of Aspects of British

Occupation Policy in Germany between Post-World War II Reconstruction and the Korean War', Ph.D. dissertation, European University Institute, Florence, 1994.

Glees, Anthony, 'The Making of British Policy on War Crimes: History as Politics in the UK', *Contemporary European History*, 1 (1992), 171-197.

Goda, Norman J.W., 'The Gehlen Organisation and the Heinz Felfe Case', in David A. Messenger and Katrin Paehler (eds.), *The Nazi Past: Recasting German Identity in Postwar Europe* (Lexington, KY: University Press of Kentucky, 2015), 271-294.

Goodchild, James, 'R.V. Jones and the Birth of Scientific Intelligence', Ph.D. dissertation, University of Exeter, 2013.

Goodman, Michael S., 'Jones' Paradigm: The How, Why, and Wherefore of Scientific Intelligence', *Intelligence and National Security*, 24 (2009), 236-256.

— *The Official History of the JIC,* vol. I (Abingdon: Routledge, 2014).

Goschler, Constantin and Michael Wala, *Keine Neue Gestapo: Das Bundesamt für Verfassungsschutz und die NS-Vergangenheit* (Berlin: Rowohlt, 2015).

Gossel, Daniel, *Briten, Deutsche und Europa. Die Deutsche Frage in der britischen Außenpolitik, 1945–1962* (Stuttgart: Franz Steiner, 1999).

Graebner, Norman A., and Edward M. Bennett, *The Versailles Treaty and its Legacy: The Failure of the Wilsonian Vision* (Cambridge: CUP, 2011).

Graham-Dixon, Francis, *The Allied Occupation of Germany: The Refugee Crisis, Denazification and the Path to Reconstruction* (London: IB Tauris, 2013).

Grossmann, Atina, *Jews, Germans and Allies: Close Encounters in Occupied Germany* (Princeton, NJ: Princeton University Press, 2009).

Haddon, Catherine, 'Union Jacks and Red Stars on Them: UK Intelligence, the Soviet Nuclear Threat and British Nuclear Weapons Policy, 1945-1970', Ph.D. dissertation, Queen Mary, University of London, 2008.

Haggith, Toby, 'Great Britain: Remembering a Just War (1945-1950)', in Lothar Kettenacker and Torsten Riotte (eds.), *The Legacies of Two World Wars: European Societies in the Twentieth Century* (Oxford: Berghahn, 2011), 225-256.

Hall, Charlie, 'A Conflict of Interests? British Efforts in the Pursuit of Post-War Justice and Technical Intelligence in Occupied Germany', M.A. dissertation, University of Kent, 2013.

Hampshire, A. Cecil, *The Secret Navies* (London: William Kimber, 1978).

Harris, Robert and Jeremy Paxman, *A Higher Form of Killing: The Secret History of Chemical and Biological Warfare* (London: Arrow, 2002).

Hart, John D., 'The Alsos Mission, 1943–1945: A Secret U.S. Scientific Intelligence Unit', *International Journal of Intelligence and Counter-Intelligence*, 18 (2005), 508-537.

Hartcup, Guy, *The Effect of Science on the Second World War* (Basingstoke: Macmillan, 2000).

Hastings, Max, *The Secret War* (London: William Collins, 2016).

Hathaway, Robert, *Ambiguous Partnership: Britain and America, 1944-47* (New York: Columbia University Press, 1981).

— *Great Britain and the United States: Special Relations since World War II* (Boston, MA: Twayne's, 1990).

Henke, Klaus-Dietmar, *Die amerikanische Besetzung Deutschlands* (Munich: Oldenbourg, 1995).

Hinsley, F.H., *British Intelligence in the Second World War* (London: HMSO, 1984).

Hitchcock, William I., *France Restored : Cold War Diplomacy and the Quest for Leadership in Europe, 1944-1954* (Chapel Hill, NC: UNC Press, 1998).

Hoffmann, Stefan-Ludwig, 'Germany is No More: Defeat, Occupation and the Postwar Order', in Helmut Walser Smith (ed.), *The Oxford Handbook to Modern German History* (Oxford: OUP, 2011), 593-614.

Hogg, Ian V., *German Secret Weapons of the Second World War: The Missiles, Rockets, Weapons and New Technology of the Third Reich* (London: Greenhill Books, 1999).

Hohne, Heinrich, *Canaris*, translated by J. Maxwell Brownjohn (London: Secker & Warburg, 1979).

Holloway, David, *Stalin and the Bomb: The Soviet Union and Atomic Energy, 1939 – 1956* (New Haven, CT: Yale University Press, 1994).

Home, R.W. and Morris F. Low, 'Postwar Scientific Intelligence Missions to Japan', *Isis*, 84 (1993), 527-537.

Hooper, H.O., 'Weeks, Ronald Morce, Baron Weeks (1890–1960)', *Oxford Dictionary of National Biography* (Oxford: OUP, 2004) [accessed online 28 April 2016, http://www.oxforddnb.com/view/article/36814].

Hunt, Linda, *Project Paperclip: The United States Government, Nazi Scientists and Project Paperclip, 1945-1990* (New York: St Martin's Press, 1991).

Jacobsen, Annie, *Operation Paperclip: The Secret Intelligence Program that Brought Nazi Scientists to America* (Paris: Hachette, 2014).

Jeffery, Keith, *MI6: The History of the Secret Intelligence Service, 1909-1949* (London: Bloomsbury, 2011).

Jeffreys, Diarmuid, *Hell's Cartel: IG Farben and the Making of Hitler's War Machine* (London: Bloomsbury, 2008).

Johnson, Brian, *The Secret War* (London: Pen & Sword, 2004).

Jones, Evan, 'The Employment of German Scientists in Australia after World War II', *Prometheus: Critical Studies in Innovation*, 20 (2002), 305-321.

Joubert de la Ferté, Philip, *Rocket* (London: Hutchinson, 1957).

Judt, Matthias and Burghard Ciesla (eds.), *Technology Transfer out of Germany after 1945* (Amsterdam, Harwood, 1996).

Judt, Tony, *Postwar: A History of Europe since 1945* (London: Pimlico, 2007).

Junker, Detlef (ed.), *The United States and Germany in the Era of the Cold War*, vol. I (Cambridge: CUP, 2004).

Kershaw, Ian, *Hitler, 1889-1936: Hubris* (London: Penguin, 1998).

— *Hitler, 1936-1945: Nemesis* (London: Penguin, 2000).

— *The End: Germany, 1944-1945* (London: Penguin, 2012).

Kettenacker, Lothar, *Germany since 1945* (Oxford: OUP, 1997).

Killick, John, *The United States and European Reconstruction, 1945-60* (New York: Routledge, 2013).

Knowles, Christopher, *Winning the Peace: The British in Occupied Germany, 1945-1948* (London: Bloomsbury, 2017)

Koerner, Steven T, 'Technology Transfer from Germany to Canada after 1945: A Study in Failure?', *Comparative Technology Transfer and Society,* 2 (2004), 99-124.

Koop, Volker, *Besetzt. Britische Besatzungspolitik in Deutschland* (Berlin: be.bra, 2007).

Kramer, Alan, 'Demontagepolitik in Hamburg', in Josef Foschepoth and Rolf Steininger (eds.), *Die britische Deutschland- und Besatzungspolitik, 1945-1949* (Paderborn: Ferdinand Schöningh, 1985), 165-180.

— 'British Dismantling Politics, 1945-9: A Reassessment', in Ian Turner (ed.), *Reconstruction in Post-War Germany: British Occupation Policy and the Western Zones, 1945-55* (Oxford: Berg, 1989), 125-154.

Krammer, Arnold, 'Technology Transfer as War Booty: The US Technical Oil Mission to Germany, 1945', *Technology and Culture*, 22 (1981), 68-103.

Krige, John, *American Hegemony and the Postwar Reconstruction of Science in Europe* (Cambridge, MA: MIT Press, 2008).

Kurowski, Franz, *The Brandenburger Commandos: Germany's Elite Warrior Spies in World War II* (Mechanicsburg, PA: Stackpole Books, 2005).

Kurtz, Michael J., *America and the Return of Nazi Contraband: The Recovery of Europe's Cultural Treasures* (Cambridge: CUP, 2006).

Laney, Monique, *German Rocketeers in the Heart of Dixie: Making Sense of the Nazi Past in the Civil Rights Era* (New Haven, CT: Yale University Press, 2015).

Lasby, Clarence G., *Project Paperclip: German Scientists and the Cold War* (New York: Atheneum, 1971).

Le Tissier, Tony, *Race for the Reichstag: The 1945 Battle for Berlin* (London: Frank Cass, 1999).

Leggett, Don and Charlotte Sleigh (eds.), *Scientific Governance in Britain, 1914-1979* (Manchester: MUP, 2016).

Lewis, Julian, *Changing Direction: British Military Planning for Post-War Strategic Defence, 1942-47* (London: Sherwood, 1988).

Lichtblau, Eric, *The Nazis Next Door: How America Became a Safe Haven for Hitler's Men* (Charlottesville, VA: Mariner, 2014).

Lindee, Susan, 'The Repatriation of Atomic Bomb Victim Body Parts to Japan: Natural Objects and Diplomacy', *Osiris*, 13 (1999), 379-409.

Longden, Sean, *T-Force: The Forgotten Heroes of 1945* (London: Constable, 2010).

Lowenhaupt, Henry S., 'On the Soviet Nuclear Scent', *Studies in Intelligence*, 11 (1967), 13-29.

Ludvigsen, Karl, *Battle for the Beetle* (Cambridge, MA: Robert Bentley, 2000).

Maas, Ad and Hans Hooijmaijers (eds.), *Scientific Research in World War II: What Scientists did in the War* (London: Routledge, 2009).

MacDonogh, Giles, *After the Reich: From the Liberation of Vienna to the Berlin Airlift* (London: John Murray, 2007).

MacIsaac, David, *Strategic Bombing in World War Two: The Story of the USSBS* (New York: Garland, 1976).

MacLeod, Roy (ed.), *Science and the Pacific War: Science and Survival in the Pacific, 1939-45* (Dordrecht, Holland: Kluwer, 2000).

— 'Scientists', in Jay Winter (ed.), *The Cambridge History of the First World War,* vol. II (Cambridge: CUP, 2014), 434-459.

Macrakis, Kristie, *Surviving the Swastika: Scientific Research in Nazi Germany* (Oxford: OUP, 1993).

Maddrell, Paul, 'Operation Matchbox and the Scientific Containment of the USSR', in Peter Jackson and Jennifer Siegel (eds.), *Intelligence and Statecraft: The Use and Limits of Intelligence in International Society* (Westport: Greenwood, 2005), 173-206.

— *Spying on Science: Western Intelligence in Divided Germany, 1945-61* (Oxford: OUP, 2006).

— 'British-American Scientific Intelligence Collaboration during the Occupation of Germany', *Intelligence and National Security,* 15 (2008), 74-94.

Maguire, G., *Anglo-American Policy towards the Free French* (Basingstoke: Macmillan, 1995).

Mahnken, Thomas, Joseph Maiolo and David Stevenson (eds.), *Arms Races in International Politics: From the Nineteenth to the Twenty-First Century* (Oxford: OUP, 2016).

Mahoney, Leo J., 'A History of the War Department Scientific Intelligence Mission (Alsos), 1943-1945', Ph.D. dissertation, Kent State University, 1981.

Maulucci Jr., Thomas W. and Detlef Junker (eds.), *G.I.s in Germany* (Cambridge: CUP, 2013).

May, Alex, *Britain and Europe since 1945* (London: Routledge, 2014).

McGovern, James, *Crossbow and Overcast* (London: Arrow, 1968).

McKercher, B.J.C., *Transition of Power: Britain's Loss of Global Pre-eminence to the United States, 1930-1945* (Cambridge: CUP, 1999).

McKitrick, Frederick L., *From Craftsmen to Capitalists: German Artisans from the Third Reich to the Federal Republic, 1939-1953* (Oxford: Berghahn, 2016).

McNeill, William H., *The Pursuit of Power: Technology, Armed Force and Society since AD1000* (Oxford: Blackwell, 1983).

McPartland, Mary A., 'The Farm Hall Scientists: The United States, Britain and Germany in the New Atomic Age, 1945-6', Ph.D. dissertation, George Washington University, 2013.

Meehan, Patricia, *A Strange Enemy People: Germans Under the British, 1945-50* (London: Peter Owen, 2001).

Messenger, David A. and Katrin Paehler (eds.), *The Nazi Past: Recasting German Identity in Postwar Europe* (Lexington, KY: University Press of Kentucky, 2015).

Michail, Evgenios, 'After the War and After the Wall: British Perceptions of Germany following 1945 and 1989', *University of Sussex Journal of Contemporary History*, 3 (2001), 1-12.

Millar, George, *The Bruneval Raid: Stealing Hitler's Radar* (London: Cassell, 2002).

Moreno, Jonathan D., *Undue Risk: Secret State Experiments on Humans* (New York: Routledge, 2001).

Naimark, Norman, *The Russians in Germany: A History of the Soviet Zone of Occupation, 1945-1949* (Cambridge, MA: Harvard University Press, 1995).

Nettl, J.P., *The Eastern Zone and Soviet Policy in Germany, 1945-50* (New York: Octagon, 1977).

Nahum, Andrew, '"I believe the Americans have not yet taken them all!": The Exploitation of German Aeronautical Science in Post-War Britain', in Helmuth Trischler and Stefan Zeilinger (eds.), *Tackling Transport* (London: Science Museum, 2003), 99-138.

Neufeld, Michael J., *The Rocket and the Reich: Peenemunde and the Coming of the Ballistic Missile Era* (Cambridge, MA: Harvard University Press, 1995).

— *Von Braun: Dreamer of Space, Engineer of War* (New York: A.A. Knopf, 2007).

— 'The Nazi Aerospace Exodus: Towards a Global, Transnational History', *History and Technology*, 28 (2012), 49-67.

O'Reagan, Douglas, 'Science, Technology, and Know-How: Exploitation of German Science and the Challenges of Technology Transfer in the Postwar World', Ph.D. dissertation, University of California, Berkeley, 2014.

— 'French Scientific Exploitation and Technology Transfer from Germany in the Diplomatic Context of the Early Cold War', *International History Review*, 37 (2014), 366-385.

Oleynikov, Pavel V., 'German Scientists in the Soviet Atomic Project', *The Non-Proliferation Review*, 7:2 (2000), 1-30.

Olick, Jeffrey K., *In the House of the Hangman: The Agonies of German Defeat, 1943-1949* (Chicago: University of Chicago Press, 2005).

Overy, Richard, *Why the Allies Won* (London: Jonathan Cape, 1995).

— *Russia's War* (London: Penguin, 1998).

— *The Bombing War: Europe, 1939-1945* (London: Penguin, 2013).

Pearson, John, *The Life of Ian Fleming* (London: Jonathan Cape, 1966).

Peltzer, Lilli, *Die Demontage deutscher naturwissenschaftlicher Intelligenz nach dem Zweiten Weltkrieg: Die Physikalisch-Technische Reichsanstalt, 1945-1948* (Berlin: ERS, 1995).

Priemel, Kim C. and Alexa Stiller (eds.), *Reassessing the Nuremberg Military Tribunals: Transitional Justice, Trial Narratives, and Historiography* (Oxford: Berghahn, 2012).

Proctor, Robert, 'Nazi Doctors, Racial Medicine, and Human Experimentation', in George J. Annas and Michael A. Grodin (eds.), *The Nazi Doctors and the Nuremberg Code: Human Rights in Human Experimentation* (Oxford: OUP, 1992), 17-31.

Raim, Edith, *Nazi Crimes against Jews and German Post-War Justice: The West German Judicial System during Allied Occupation, 1945-1949* (Oldenbourg: De Gruyter, 2015).

Ramsden, John, *Don't Mention the War: The British and the Germans since 1890* (London: Little, Brown, 2006).

Rankin, Nicholas, *Ian Fleming's Commandos: The Story of 30 Assault Unit in WWII* (London: Faber & Faber, 2011).

Reinisch, Jessica, *The Perils of Peace: The Public Health Crisis in Occupied Germany* (Oxford: OUP, 2013).

Renneberg, Monika and Mark Walker (eds.), *Science, Technology and National Socialism* (Cambridge: CUP, 2003).

Reynolds, David, *Britannia Overruled: British Policy and World Power in the 20th Century* (Harlow: Longman, 1991).

— 'Great Britain', in David Reynolds (ed.), *The Origins of the Cold War in Europe: International Perspectives* (New Haven, CT: Yale University Press, 2004), 77-95.

Richards, Pamela, *Scientific Information in Wartime: The Allied-German Rivalry, 1939-45* (Westport, CT: Greenwood, 1994).

Richelson, Jeffrey T., *Spying on the Bomb: American Nuclear Intelligence from Nazi Germany to Iran and North Korea* (New York: W.W. Norton, 2006).

Rieger, Bernhard, *The People's Car: A Global History of the Volkswagen Beetle* (Cambridge, MA: Harvard University Press, 2013).

Roberts, Geoffrey, *Stalin's Wars: From World War to Cold War, 1939-53* (New Haven, CT: Yale University Press, 2006).

Rüger, Jan, 'OXO: Or, the Challenges of Transnational History', *European History Quarterly*, 40 (2010), 656-668.

Schaller, Michael, *The American Occupation of Japan: The Origins of the Cold War in Asia* (Oxford: OUP, 1985).

Schmaltz, Florian, *Kampfstoff-Forschung im Nationalsozialismus: zur Kooperation von Kaiser-Wilhelm-Instituten, Militär und Industrie* (Göttingen: Wallstein, 2005).

Schmidt, Ulf, *Justice at Nuremberg: Leo Alexander and the Nazi Doctors' Trial* (Basingstoke: Palgrave Macmillan, 2004).

— 'Scars of Ravensbrück: Medical Experiments and British War Crimes Policy, 1945-1950', *German History*, 23 (2005), 20-49.

— *Karl Brandt, the Nazi Doctor: Medicine and Power in the Third Reich* (London: Continuum, 2007).

— 'Accidents and Experiments: Nazi Chemical Warfare Research and Medical Ethics during the Second World War', in Don Carrick and Michael Gross (eds.), *Military Medical Ethics for the 21st Century* (Farnham: Ashgate, 2013), 225-244.

— *Secret Science: A Century of Poison Warfare and Human Experiments* (Oxford: OUP, 2015).

— and Jo Fox, 'Deadly Gases: Rumour, Fear, and Poison Warfare, 1925-1955' (forthcoming, 2017).

Schwarz, Hans-Peter, 'The Division of Germany, 1945-1949', in Mervyn P. Leffler and Odd Arne Westad (eds.), *The Cambridge History of the Cold War,* vol. I (Cambridge: CUP, 2012), 133-153.

Sears, William R., 'Project Paperclip' book review, *Bulletin of the Atomic Scientists*, 28:6, (1972), 55-6.

Sereny, Gitta, *Albert Speer: His Battle with Truth* (London: Picador, 1996).

Siddiqi, Asif, 'Germans in Russia: Cold War, Technology Transfer, and National Identity', *Osiris*, 24 (2009), 120-143.

Simpson, Christopher, *Blowback: America's Recruitment of Nazis and its Impact on the Cold War* (London: Weidenfeld & Nicolson, 1988).

Šimůnek, Michal and Miloš Hořejš, 'Exploatace (okupovaného) spojence. Aktivity tzv. Sdruženého podvýboru pro zpravodajské úkoly (C.I.O.S.) a Britského podvýboru pro zpravodajské úkoly (B.I.O.S.) v Československu na příkladě Škodových závodů v Plzni, 1945–47' [Exploiting an (Occupied) Ally: The Activities of CIOS and BIOS in Post-war Czechoslovakia as Exemplified by the Škoda Pilsen Company, 1945-1947], in I. Janovský, J. Kleinová, H. Stříteský (eds), Věda a technika v Československu v letech 1945-1960 (Prague: NTM, 2010), 385-406.

Slaveski, Filip, *The Soviet Occupation of Germany: Hunger, Mass Violence and the Struggle for Peace* (Cambridge: CUP, 2013).

Smith, Frederick, 2nd Earl of Birkenhead, *The Prof in Two Worlds: The Official Life of Professor F.A. Lindemann, Viscount Cherwell* (London: Collins, 1961).

Steff, Reuben, *Strategic Thinking, Deterrence and the US Ballistic Missile Defence Project: From Truman to Obama* (Farnham: Ashgate, 2013).

Stewart, Irvin, *Organising Scientific Research for War: The Administrative History of the Office of Scientific Research and Development* (Boston, MA: Little Brown, 1948).

Stocker, Jeremy, *Britain and Ballistic Missile Defence, 1942-2002* (London: Frank Cass, 2004).

Stokes, Raymond, *Divide and Prosper: The Heirs of I.G. Farben under Allied Authority, 1945-1951* (Berkeley, CA: University of California Press, 1988).

— 'Intellectual Spoils', *Science*, 248 (1990), 1241.

Süss, Dietmar, *Death from the Skies: How the British and Germans Survived Bombing in World War Two* (Oxford: OUP, 2014).

Thacker, Toby, *The End of the Third Reich: Defeat, Denazification and Nuremberg* (Stroud: Tempus, 2006).

Thorpe, Charles, *Oppenheimer: The Tragic Intellect* (Chicago: University of Chicago Press, 2006).

Tooze, Adam, *The Wages of Destruction: The Making and Breaking of the Nazi Economy* (London: Penguin, 2008).

— 'Reassessing the Moral Economy of Post-War Reconstruction: The Terms of the West German Settlement in 1952', in Mark Mazower, Jessica Reinisch and David Feldman (eds.), *Post-War Reconstruction in Europe: International Perspectives, 1945-49* (Oxford: OUP, 2011), 47-69.

Trachtenberg, Marc, *A Constructed Peace: The Making of the European Settlement, 1945-63* (Princeton, NJ: Princeton University Press, 1999).

Tucker, Jonathan B., *War of Nerves: Chemical Warfare from World War I to Al-Qaeda* (New York: Anchor, 2006).

Turner, Ian, 'British Occupation Policy and its Effects on the Town of Wolfsburg and the *Volkswagenwerk*: 1945-1949', Ph.D. dissertation, University of Manchester, 1984.

— (ed.), *Reconstruction in Post-War Germany: British Occupation Policy and the Western Zones, 1945-55* (Oxford: Berg, 1989).

— 'British Policy towards German Industry, 1945-9: Reconstruction, Restriction or Exploitation?', in Ian Turner (ed.), *Reconstruction in Post-War Germany: British Occupation Policy and the Western Zones, 1945-55* (Oxford: Berg, 1989), 67-92.

— 'Denazification in the British Zone', in Ian Turner (ed.), *Reconstruction in Post-War Germany: British Occupation Policy and the Western Zones, 1945-55* (Oxford: Berg, 1989), 239-268.

Tusa, Ann and John Tusa, *The Nuremberg Trial* (New York: Skyhorse, 2010).

Uttley, Matthew, 'Operation Surgeon and Britain's post-war exploitation of Nazi German aeronautics', *Intelligence and National Security*, 17 (2002), 1-26.

Vogt, Timothy, *Denazification in Soviet-Occupied Germany: Brandenburg, 1945-8* (Cambridge, MA: Harvard University Press, 2000).

Wachsmann, Nikolaus, *KL: A History of the Nazi Concentration Camps* (London: Abacus, 2016).

Walker, Mark, *Nazi Science: Myth, Truth, and the German Atomic Bomb* (New York: Plenum, 1995).

— 'The Nazification and Denazification of Physics', in Matthias Judt and Burghard Ciesla (eds.), *Technology Transfer out of Germany after 1945* (Amsterdam, Harwood, 1996), 49-60.

Weber-Newth, Inge and Johannes-Dieter Steinert, *German Migrants in Post-War Britain: An Enemy Embrace* (Abingdon: Routledge, 2006).

Weindling, Paul Julian, *Nazi Medicine and the Nuremberg Trials: From Medical War Crimes to Informed Consent* (Basingstoke: Palgrave Macmillan, 2004).

— *Victims and Survivors of Nazi Human Experiments: Science and Suffering in the Holocaust* (London: Bloomsbury, 2014).

Welch, David, 'Priming the Pump of German Democracy: British Re-Education Policy in Germany after the Second World War', in Ian Turner (ed.), *Reconstruction in Post-War Germany: British Occupation Policy and the Western Zones, 1945-55* (Oxford: Berg, 1989), 215-238.

— and Jo Fox (eds.), *Justifying War: Propaganda, Politics and the Modern Age* (Basingstoke: Palgrave Macmillan, 2012).

Whalen, Robert Weldon, *Bitter Wounds: German Victims of the Great War, 1914-1939* (Ithaca, NY: Cornell University Press, 1984).

Willis, Roy F., *The French in Germany, 1945-1949* (Stanford, CA: Stanford University Press, 1962).

Winter, Jay, 'From War Talk to Rights Talk: War Aims and Human Rights in the Second World War', in David Welch and Jo Fox (eds.), *Justifying War: Propaganda, Politics and the Modern Age* (Basingstoke: Palgrave Macmillan, 2012), 236-249.

Wolfe, Audra, *Competing with the Soviets: Science, Technology, and the State in Cold War America* (Baltimore, MD: Johns Hopkins University Press, 2013).

Wrigley, Chris (ed.), *British Trade Unions, 1945-1995* (Manchester: Manchester University Press, 1997).

Zallen, Doris T., 'Louis Rapkine and the Restoration of French Science after the Second World War', *French Historical Studies*, 17 (1991), 6-37.

Zimmerman, David, *Top Secret Exchange: The Tizard Mission and the Scientific War* (Stroud: Alan Sutton, 1996).