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The Royal Air Force, Bomber Command and the use of Benzedrine Sulphate:
An Examination of Policy and Practice during the Second World War.

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In November 1942, Britain's Royal Air Force (RAF) approved the use of amphetamine sulphate, known by its brand name, Benzedrine, for use on operations by its aircrews. The substance, a powerful stimulant with the ability to promote both wakefulness and wellbeing, had been subject to a strict policy of prohibition in the RAF since September 1939. The decision to reverse this policy was the culmination of a lengthy process within the Service, driven by laboratory and operational testing in conjunction with scientific, medical and military debate. This shift in policy and the subsequent use of the drug on operations, while of historical significance in its own right – reflecting historical attitudes to drugs and drug culture – is also pertinent to ongoing debates relating to the use of drugs in the military context.¹

¹ For example, see J. A. Caldwell, 'Go Pills in Combat: Prejudice, Propriety, and Practicality', *Air and Space Power Journal*, 22, 3 (Fall 2008), 97–104. On the actions and science of amphetamines, see L. Iversen, *Speed, Ecstasy, Ritalin: The Science of Amphetamines* (Oxford 2006), chapter two.

The RAF's approach to Benzedrine policy and practice has been the subject of some discussion in the historiography. While no mention is made of Benzedrine use in the RAF's official medical history or Britain's official history of the strategic air offensive against Germany, it is evident that the RAF was concerned about the physical and psychological strain placed on its aircrew, and it expended considerable effort to support its human resources during operations. These conclusions are supported by the work of Mark Wells, Allan English and Nick Chapman who have emphasised that the RAF considered exercise, sleep, diet, rest and the provision of recreation facilities as vital in helping crews manage the strains of combat.²

In terms of the drivers for policy and the introduction of Benzedrine on operations, the British official history of medical research during the conflict, suggested that, '[a]lthough the drug was shown to have certain disadvantages, its use was recommended, under medical supervision, in situations of stress where sleep was a threat to performance'. Alternatively, Nicholas Rasmussen has argued that based around 'fuzzy medical logic' and the 'multiple,

² S. C. Rexford-Welch, *The Royal Air Force Medical Services, Vol.II: Commands* (London 1955), chapter one; C. Webster and N. Frankland, *The Strategic Air Offensive Against Germany (SAOG), 1939-1945, Vol.I* (London 1961), 11, 18-19; M. Wells, *Courage and Air Warfare: The Allied Aircrew Experience in the Second World War* (London 1995), 42, 76-7, 80-1; A. D. English, *The Cream of the Crop: Canadian Aircrew, 1939-1945* (Montreal 1996), 62, 87; N. Chapman, 'Bearing the Load: A Fresh Approach to Bomber Command' in C-C. W. Szejnmann (ed) *Rethinking Dictatorship, History and War: New Approaches and Interpretations* (London 2009), 171.

overlapping meanings' of fatigue, '... RAF Bomber Command ... adopted Benzedrine for its effects on optimism, aggressiveness, military comportment, and the other aspects of emotional condition that figure in morale'; an argument supported by Martin Francis.³ Thus, a narrative exists in which Benzedrine is framed as either a frontline 'psychiatric medication' or a substance to help personnel manage wakefulness on operations.

Moving into the operational sphere, debates focus on the manner in which the RAF governed access to the drug and the wider attitude of, and approaches to, the use of the substance by aircrew. For Francis, 'RAF medical officers regularly distributed "wakey wakey" pills to aircrew (and WAAFs) who were suffering from fatigue. For many flyers benzedrine became virtually addictive. Doctors were only supposed to allocate the pills for use on missions ... However, often little effort was made to regulate the supply of benzedrine'. Alternatively, Michael Gibson and Michael Harrison suggested that, 'the drug was never widely used, tending to be issued by squadron medical officers only for specific missions when fatigue was likely'.⁴ The unequivocal, yet contradictory nature of such conclusions is surprising given the absence of research conducted on the operational use of the drug, and as Rasmussen

³ F. H. J. Green & G. Covell, *Medical Research* (London 1953), 21–2, 38; N. Rasmussen, *On Speed: The Many Lives of Amphetamine* (New York, N.Y. 2008), 58, 61, 62–4, 63–6, 82; M. Francis, *The Flyer: British Culture and the Royal Air Force, 1939–1945* (Oxford 2008), 121.

⁴ Francis, *The Flyer*, 121; T. M. Gibson & M. H. Harrison, *Into Thin Air: A History of Aviation Medicine in the RAF* (London 1984), 252–3.

conceded, '[f]urther study of wartime documents written by the men and medics using Bzedrine will be needed to clarify the typical circumstances of the drug's use in combat, and the experience of its effects'.⁵

As such, the article seeks to explore how the RAF encountered Bzedrine and the processes by which it negotiated the medical, social, practical and operational landscapes that helped shape the evolution of policy and the motivations for utilising the drug. The article also examines the use of Bzedrine on operations, including a focus on oral history and new data gathered from interviews and questionnaires with former RAF aircrew. As Alan Derickson has observed, a trend for nocturnal operations coupled with technological advances during the Second World War led to 'exhausting battles and made human endurance a major concern'. Therefore, the article focuses on RAF Bomber Command, the organisation tasked with pursuing Britain's strategic bombing campaign against Germany, as the *modus operandi* of the Command was characterised by long-duration night-time operations in the face of intense German defences.⁶

⁵ Rasmussen, *On Speed*, 84.

⁶ A. Derickson, "No Such Thing as a Night's Sleep": The Embattled Sleep of American Fighting Men from World War II to Present', *Journal of Social History*, 41, 1 (Fall 2013), 2. On Bomber Command and the strategic air offensive against Germany, see C. Webster & N. Frankland, *SAOG, Vols. I-IV* (London 1961); T. Davis Biddle, *Rhetoric and Reality in Air Warfare: The Evolution of British and American Ideas about Strategic Bombing, 1914-1945* (Princeton, N.J. 2002); P. Gray, *The Leadership, Direction and Legitimacy of the RAF Bomber Offensive from Inception to 1945* (London 2012).

Benzedrine generated 'vivid interest' in both medical and press circles in Britain, seeing the drug 'engulfed in a wave of sensationalism', but as Richard DeGrandpre has suggested, a complicated and often polarising narrative exists around psychoactives, with drugs transitioning from pharmacological 'angels' to pharmacological 'demons'. While Benzedrine was a 'miracle drug' during this period, this depiction threatens to overshadow the RAF's cautious response to the drug, with the Service recognising both the value and limitations of the substance.⁷ In turn, while there are persuasive arguments that the context of total war 'relaxed the moral boundaries' that constrained scientific research, enabling such technologies to be deployed with 'potential downsides ... very much an afterthought', the RAF took the time to build a body of evidence that was specifically applicable to the use of Benzedrine in the operational air power context.⁸ Furthermore, given the subjective nature of such evidence, medical supervision and educational guidance — pragmatic and progressive efforts focused on harm reduction — were cornerstones of RAF policy. This included clear emphasis that Benzedrine was an imperfect, though useful, tool in the

⁷ W. R. Betts, 'Benzedrine Sulphate in Clinical Medicine: A Review of the Literature', *Postgraduate Medical Journal*, 22, 250 (Aug 1946), 205; R. DeGrandpre, *The Cult of Pharmacology: How America Became the World's Most Troubled Drug Culture* (Durham 2006), introduction and passim; Rasmussen, *On Speed*, 1–3.

⁸ M. Walker, 'The mobilisation of science and science-based technology during the Second World War: A comparative history' in A. Maas & H. Hooijmaijers (eds), *Scientific Research in World War II: What scientists did in the war* (London 2009), 20; P. Dimeo, *A History of Drug Use in Sport, 1876–1976: Beyond Good and Evil* (Abingdon 2007), 47.

struggle against aircrew fatigue; supporting Mark Harrison's suggestion that the use of new medical technologies helped protect Britain's limited human resource base.⁹

In challenging the conclusions of Rasmussen, the article acknowledges the ambiguous qualities of fatigue, but suggests that Benzedrine was utilised to help with a relatively narrow aspect of this problem. This captures the tendency to downplay the significance the RAF attached to the effect of Benzedrine on wakefulness and the organisation's concerns about the drug's effects on wellbeing. As Derickson suggested, '[d]rugs were especially helpful in dealing with the war's irregular and unpredictable sleeplessness'.¹⁰ Finally, the operational evidence suggests that there was a tension between the official Air Ministry guidelines for the use of Benzedrine and the practicalities of managing the utilisation of the substance at the Squadron level. By nuancing and expanding upon the existing 'top-down' organisational / policy driven narratives and stressing the significance of individual agency and non-pharmacological factors in governing the effects and experience of amphetamines, the article acknowledges that Benzedrine was viewed by some aircrew as a useful tool in

⁹ M. Harrison, *Medicine & Victory: British Military Medicine in the Second World War* (Oxford 2004), 5.

¹⁰ N. Rasmussen, 'Medical Science and the Military: The Allies' Use of Amphetamine during World War II', *Journal of Interdisciplinary History*, 42, 2 (Autumn 2011), 205–233; Rasmussen, *On Speed*, chapter three; Derickson, "No Such Thing as a Night's Sleep", 18.

sustaining wakefulness on operations.¹¹ Frustratingly, some of the oral testimonies may have been compromised by interviewer bias, indicating the importance of acknowledging and mitigating the effects of contemporary opinions and attitudes relating to the use of legal and illegal drugs.

In setting the wider context of the period, it should be noted that Benzedrine was one of the most high-profile drugs in Britain during the 1930s. Articles in *The Lancet* and the *British Medical Journal (BMJ)*, two of the leading medical journals in Britain, indicated that Benzedrine was useful in the treatment of narcolepsy, that it had some positive effects on wellbeing, and that it could increase confidence and the ability to concentrate. Such research was tempered by warnings relating to the subjective and potentially negative qualities of the drug, which included irritability, restlessness and an inability to sleep.¹² In speaking to the Royal Society of Medicine in October 1938, Dr H. Letheby Tidy, a figure who would go on to play an important role in the British Army's testing and use of Benzedrine during the Second World War, echoed

¹¹ S. Snelders and S. Pieters, 'Speed in the Third Reich, Metamphetamine (Pervitin) Use and a Drug History From Below', *Social History of Medicine*, 24, 3 (December 2011); N. Zinberg, *Drug, Set, and Setting* (London 1984); DeGrandpre, *The Cult of Pharmacology*.

¹² 'Benzedrine in Narcolepsy', *British Medical Journal (BMJ)*, 1 (15 February 1936), 27; S. A. Peoples and E. Guttmann, 'Hypertension Produced with Benzedrine', *The Lancet*, 227 (16 May 1936), 1107–1109; W. Sargant and J. M. Blackburn, 'The Effect of Benzedrine on Intelligence Scores', *The Lancet*, 22 (12 December 1936), 1385–7; 'Benzedrine', *The Lancet*, 229 (19 June 1937), 1475; 'Use and Abuse of Benzedrine', *BMJ*, 2 (25 September 1937), 625–6.

these sentiments when he noted that, 'Benzedrine was obviously a drug that did many different things to many different people, apparently also in different doses. A good deal of experience was clearly necessary for its use'.¹³

In turn, the medical evidence was complicated by the social and cultural response to Benzedrine; a reaction captured in schizophrenic media reporting, which in part mirrored the variable effects of the substance. Stories from the *Daily Express* demonstrated this trend, with initial articles hailing the drug's 'magical effects'. The enthusiastic tone of the *Daily Express* changed as concerns about unregulated access and the indiscriminate use of the drug developed; use promoted by the overexposure of Benzedrine in Britain's lay press.¹⁴ This prompted a legislative response, part of the British government's wider drug policy agenda of the 1920s and 1930s, which saw the addition of Benzedrine tablets to the Poisons List in January 1939 and access to drugs placed in the hands of medical and pharmaceutical professionals.¹⁵

¹³ 'Benzedrine Uses and Abuses', *The Lancet*, 232, 6010 (5 November 1938), 1062.

¹⁴ *Daily Express*, 30 June 1936, 10; 2 July 1936, 3; 3 July 1936, 3; 15 May 1937, 3; 17 May 1937, 7; 24 May 1937, 9; 13 July 1937, 6; 8 September 1938, 11; 23 December 1938, 6; 'Use and Abuse of Benzedrine', *BMJ*, 625–6.

¹⁵ On British drug policy during this period, see P. Bean, *The Social Control of Drugs* (London 1974), chapter four; T. M. Parssinen, *Secret Passions, Secret Remedies: Narcotic Drugs in British Society, 1820–1930* (Manchester 1983), chapters eight to twelve; J. H. Mills, *Cannabis Nation: Control and Consumption in Britain, 1928–2008* (Oxford 2012), chapters two and three; V. Berridge, *Demons: Our changing attitudes to alcohol, tobacco, & drugs* (Oxford 2013), chapters four to nine; V. Berridge, 'The Origins of the English Drug "Scene"', *Medical History*, 32, 1 (January 1988), 51–64.

Access to the sulfa drugs, which ‘carried the main therapeutic burden’ in terms of treating bacterial infections during the Second World War, were also restricted under this legislation, highlighting a similar process of cautious enthusiasm from scientific researchers about a substance, overenthusiasm from the lay press and widespread self-medication concluding in a process of ‘official intervention’. In practice the legislation did restrict access, but Bazedrine tablets were still available via medical prescription or if an individual was willing to sign the Poisons Register. Moreover, the legislation did not attach stigma (or the accompanying legal penalties) to amphetamine use in the same manner as drugs such as cocaine.¹⁶

For Richard Davenport-Hines, it was the German use of the stimulant drug Pervitin during the summer of 1940 that drew the attention of Britain’s armed forces to the potential of such substances, and it was during this period that the War Cabinet first discussed the use of stimulants in the military context. This process also involved the coordinating role of the Medical Research Council (MRC), a government funded body that had sponsored research into

¹⁶ The National Archives, Kew (TNA) Home Office Files (HO) 388/28 – Poisons Board Minutes, 3 March 1938, 8–9; TNA, HO 388/8 – Letter, Poisons Board to Home Office, 18 May 1938; TNA, HO 45/23066 – Letter, Home Office to Local Governments, 22 December 1938; *London Gazette*, 23 December 1938, 8175; ‘Proposed Changes to the Poison’s List: Sulphanilamide and Bazedrine Added’, *The Lancet*, 232, 6002 (10 September 1938), 647; J. E. Lesch, *The First Miracle Drugs: How the Sulfa Drugs Transformed Medicine* (Oxford 2007); chapters seven and eight; D. Courtwright, *Forces of Habit: Drugs and the Making of the Modern World* (Cambridge, M.A. 2001), 69, 81. On the implications of both the Pharmacy and Poisons Act (1933) and the Dangerous Drugs Acts (1920–32), see H. N. Linstead, *Poisons Law* (London 1936).

Benzedrine in the 1930s.¹⁷ However, the RAF's interest in the drug preceded these developments, and in August 1939 the Air Ministry's Director of Operational Requirements (DOR), Group Captain Robert Saundby, wrote to the Director General of the RAF's Medical Services (DGMS) seeking advice as to whether 'it might be possible to administer a harmless stimulant to aircraft crews to enable them to work without rest for an abnormally long time'.¹⁸ In response, staff for the DGMS noted that, of various stimulants, Benzedrine 'has probably the most powerful action ... in producing wakefulness', although caution was urged relating to its subjective effects.¹⁹

Such information had been obtained from Dr E. A. Carmichael, a researcher working for the RAF's Flying Personnel Research Committee (FPRC), who had been investigating the suitability of certain drugs 'for lessening the fatigue of aircrews'.²⁰ The FPRC, created in January 1939, was a body composed of military and civilian experts whose duty was 'to investigate

¹⁷ R. Davenport-Hines, *Pursuit of Oblivion: A Global History of Narcotics, 1500–2000* (London 2001), 243; TNA, Cabinet File (CAB) 79/7/2 – Minutes, Chiefs of Staff Committee, 27 September 1940, 7; TNA, CAB 80/19/31 – Memo, Joint Intelligence Committee, 25 September 1940; TNA, CAB 80/21/48 – Memo, Chief of the Imperial General Staff (CIGS), 30 October 1940; TNA, CAB 80/23/54 – Note, CIGS, 27 November 1940; TNA, Medical Research Council Files (FD) 1/1443 – Research by Dr J M Blackburn, London on the effect of drugs on psychological performance, correspondence, grant application, 1936–9. Also, see TNA, FD 1/2596 for further work by Blackburn on stimulants.

¹⁸ TNA, Air Ministry File (AIR) 2/4172 – Minute, Director of Operational Requirements (DOR) to Director General RAF Medical Services (DGMS), 30 August 1939.

¹⁹ TNA, AIR 2/4172 – Minute, DGMS to DOR, 1 September 1939.

²⁰ Wellcome Library, London (WL), Papers of H. E. Whittingham, PP/HEW/F1.1 – Report to the Secretary of State for Air on the Activities of the Flying Personnel Research Committee, 14 May 1940, 18.

and to advise ... [the Secretary of State for Air] on the medical aspect of all matters concerned with personnel which might affect safety and efficiency in flying'.²¹ This was funded by the Air Estimates of 1939, which allocated resources 'for the first time for medical research into matters affecting personnel which are related to safety and efficiency in flying'.²²

As the minutes of the FPRC indicate, by June 1939 a list of research priorities had been established, including an examination of the 'effects of fatigue and strain on flying personnel'.²³ Of course, the issue of aircrew fatigue had been highlighted in 1935, and in addressing the United Services Section of the Royal Society of Medicine, Air Commodore A. V. Richardson, who would become DGMS, stated that fatigue was affected by physical, physiological and psychological factors that would only be accentuated in wartime and by increasingly sophisticated aircraft technology.²⁴ The issue of aircrew fatigue was also raised at the same forum in December 1938 by Air Commodore H. E. Whittingham, who would succeed Richardson as DGMS. Whittingham also accepted the physical / physiological / psychological basis to fatigue and noted

²¹ Statement by Sir Kingsley Wood, Secretary of State for Air, 9 March 1939. *Hansard Parliamentary Debates*, 9th Series, Vol. 344, March 1939, Col.2387.

²² Air Ministry, *Air Estimates, 1939* (London 1939), 123. On the origins of the Committee, see FD 1/5350 – FPRC Correspondence, 1938–9.

²³ TNA, AIR 57/40 – Flying Personnel Research Committee (FPRC) Minutes, 7 June 1939, 37.

²⁴ A. V. Richardson, 'Efficiency of Personnel in the Services', *Proceedings of the Royal Society of Medicine*, 29, 1 (November 1935), 32–4. Richardson was Director of Medical Services at this point. The post of Director General was created later. However, in the interests of convenience, reference is made to the Director General post throughout.

that RAF medical staff worked to improve the efficiency and wellbeing of personnel.²⁵

It was in this organisational context that Saundby made his request to the FRPC. In turn, given the prominence of Benzedrine in the medical and lay press, it is unsurprising that a scientist of Carmichael's standing — Director of the MRC's Neurological Research Unit — was aware of the substance. In responding to Carmichael's 'very interesting' note, Saundby requested that the DGMS contact all RAF Commands to provide medical advice on the use of such substances. In the same minute, the DOR also reflected on the use of the word 'drug', noting that it 'might conceivably cause misunderstandings among our own people, or even serve as material for enemy propaganda ... [As such its use] should be avoided as far as possible'.²⁶

Here, in its most direct form, was evidence of the influence of the social and cultural sensitivities relating to drug use in Britain during this period. Saundby's concerns, driven by the media profile of Benzedrine, were particularly astute as the British press were quick to highlight the German use of stimulants during operations in France in May 1940, with words such as 'drugged' and 'doped' used on several occasions throughout the war to

²⁵ H. E. Whittingham, 'Preventative Medicine in Relation to Aviation', *Proceedings of the Royal Society of Medicine*, 32, 5 (March 1939), 465, 470–1.

²⁶ TNA, AIR 2/4172 – Minute, DOR to DGMS, 13 September 1939.

emphasise the unethical and immoral fashion in which German armed forces were making use of amphetamines.²⁷ While the pressures of conflict may have eroded some of these concerns, it is evident that such factors shaped the RAF's approach to the substance.

As a result of the DOR's minute, a letter was circulated to all Principal Medical Officers (PMOs) in the RAF in late September 1939 establishing the organisation's first policy relating to the use of Benzedrine, which was never to be issued to pilots while on duty because '[i]n susceptible individuals quite small quantities ... may produce alarming symptoms'.²⁸ The instructions also highlighted that stimulants were only to be utilised under 'exceptional circumstances' and only when an extended period of rest would be available after use. Nonetheless, some voices in the RAF questioned the complete prohibition on the use of Benzedrine by pilots on duty, and one MO emphasised that the substance could be a useful tool for prolonging the endurance of crews on long flights. Such comments were tempered by noting that Benzedrine

²⁷ For example, see *Evening Telegraph*, 24 August 1940, 1; *Yorkshire Evening Post*, 8 November 1941, 1; *The Times*, 12 January 1942, 3; *Edinburgh Evening News*, 19 March 1942, 3; *Evening Telegraph*, 24 September 1943, 4. On the German use of amphetamines, see P. Steinkamp, 'Pervitin (Metamphetamine) tests, use and misuse in the German Wehrmacht' in W. U. Eckart (ed) *Man, Medicine, and the State: The Human Body as an Object of Government Sponsored Medical Research in the 20th Century* (Stuttgart 2006), 68–71; S. Snelders and S. Pieters, 'Speed in the Third Reich'.

²⁸ TNA, AIR 2/4172 – Letter, DGMS to RAF Principal Medical Officers (PMOs), 28 September 1939.

should not be used on a regular basis as this would indicate that an individual was being 'repeatedly asked to do too much'.²⁹

Whittingham, then serving as Director of Hygiene, minuted a response to the staff of the DGMS, noting that the FPRC was already investigating the use of Benzedrine for aircrews and that it should not be utilised until it had been thoroughly tested in a decompression chamber. Thus, by the end of January 1940, the RAF had confirmed its cautious policy based largely upon the evidential ambiguity found in the medical research from the interwar period. Moreover, such caution reflected that there was absolutely no data available relating to the use of Benzedrine in an operational flying environment; an environment very different to a clinical medical setting. Whittingham's concluding comment that '[d]rugging against fatigue is to burn the candle at both ends' may have had some basis in the medical literature, but it also manifested aspects of British social and cultural attitudes to the use of drugs during this period.³⁰ Such attitudes continued to affect perceptions even after it had become clear that German armed forces were making use of the stimulant Pervitin during operations in the summer of 1940, and the Secretary of the MRC and Chairperson of the FPRC, Sir Edward Mellanby, commented that, 'we

²⁹ TNA, AIR 2/4172 – Letter, Wing Commander R. D. Gillespie to PMO RAF Reserve Command, 19 January 1940.

³⁰ TNA, AIR 2/4172 – Minute, Director of Hygiene to DMGS, 31 January 1940.

should have to think twice before we recommended drugging troops and, unless the advantages are very great or become great under certain specified conditions, our natural inclination would probably be to turn them down'.³¹

However, it was an MRC report of September 1940 that affirmed the advantages of Benzedrine in terms of both wakefulness and wellbeing, although only in emergency situations, as continuous use 'would be at best ineffective and might be seriously detrimental'. This paper, discussed and supported at the Chiefs of Staff Committee of the War Cabinet, also echoed the pre-war scientific and legislative conclusions regarding the use of the drug under medical supervision.³² Encouragement from a Cabinet level committee served to focus efforts, and the FPRC recommended further testing to establish the value of Benzedrine. Thus, two important batches of testing were conducted, with reports submitted to the FPRC in October 1940 and January 1941 confirming the MRC's findings.³³ Again, it was these dualistic strands of promise and caution that continued to influence the RAF's response and at no point was the

³¹ TNA, FD 1/6377 – Letter, Sir Edward Mellanby to Professor F. L. Golla, 5 September 1940. Also, see TNA, FD 1/6377 – Letter, Sir Henry Dale to Mellanby, 29 June 1940 and Letter, Dale to Mellanby, 2 July 1940.

³² TNA, CAB 80/19/31 – Memorandum, MRC to Joint Intelligence Sub-Committee, 21 September 1940; TNA, CAB 79/7/2 – Minutes, Chiefs of Staff Committee, 27 September 1940, 7.

³³ TNA, AIR 57/41 – FPRC Minutes, 11 September 1940, 6–7; TNA, AIR 57/2 – FPRC Report 195, 'Note on the Effect of Benzedrine on Height Tolerance', 22 October 1940; TNA, AIR 57/41 – FPRC Minutes, 30 October 1940, 4–5; TNA, AIR 57/3 – FPRC Report 234, 'The Use of Benzedrine in Normal Subjects', No date, and Report 237, 'Investigation into the Psychological Effects of Benzedrine on Normal Adults', January 1941.

organisation drawn into the 'wave of sensationalism' around the substance. It was no 'miracle drug' for the RAF, and data had to be gathered, including testing at simulated altitudes, which allowed the value of Benzedrine to be established.

Such data could only be of limited use without undertaking trials under genuine operational conditions; a recommendation put forward in an FPRC paper of April 1941.³⁴ With such trials in mind, an FPRC meeting in May 1941 tasked Professor Frederick Bartlett, a senior academic working with the MRC and FPRC and an expert in fatigue, to summarise the accumulated evidence relating to the use of stimulants with a view to providing some recommendations relating to dosage, safety measures and frequency of use.³⁵ While Bartlett's conclusions indicated that Benzedrine provided no boost in performance, Benzedrine had an important effect in terms of sustaining both wakefulness and interest in the task at hand (as the testing earlier in the year had indicated). Thus, while Benzedrine did not enhance performance, it had a role to play in preventing the degradation of performance. More generally, Bartlett provided guidelines as requested by the FPRC, noting that Benzedrine was not to be taken regularly, that it was not a substitute for sleep, and that it was only to be

³⁴ TNA, AIR 57/4 – FPRC Report 292, 'Benzedrine in Anoxæmia and Fatigue. Field Experiment. Experimental Control and Drug Presentation', 30 April 1941.

³⁵ TNA, AIR 57/42 – FPRC Minutes, 7 May 1941, 5–6; TNA, AIR 57/5 – FPRC Report 308, 'Benzedrine', 20 May 1941.

used if an adequate period of rest was available afterwards. For Bartlett, repeated use would not result in ‘an actual craving for [B]enzedrine ... [but individuals would] come to rely upon it more than upon their own internal resources’.³⁶

Bartlett also concluded that, wherever possible, the administration of the substance should be subject to strict medical control, and because of the subjectivity of action, individuals must be tested on the ground before making use of the substance on operations. These cautious and partially positive recommendations, which echoed and reinforced the wider legislative agenda of the era — concentrating the control of drugs in the hands of medical professionals — would form the cornerstone of RAF policy. Furthermore, Whittingham noted that, ‘irrespective of any improvement in performance, its use would be an advantage during long flights when aircrews were apt to become sleepy’.³⁷

Initial operational trials were scheduled to take place in Coastal Command, where maritime patrol operations of extreme range and endurance were commonplace. Dr Roland Winfield, an RAF MO who worked closely with the FPRC, undertook these initial trials, producing reports in August and

³⁶ TNA, AIR 57/5 – FPRC Report 308, 2–3.

³⁷ TNA, AIR 57/42 – FPRC Minutes, 4 June 1941, 6.

October 1941; the latter focused exclusively on Benzedrine.³⁸ While there are suggestions that Winfield saw pharmacological solutions as the ‘best antidote’ for the regulation of sleep and other fatigue related issues, his reports indicated that pharmacology was only a strand of his investigations into fatigue, and he also focused on diet, ergonomics, visual strain and the morale of crews.³⁹ Winfield recorded that in aircraft where rest was possible, sleep remained a crucial component in managing fatigue. Yet in aircraft where such facilities were not available, including aircraft types utilised by Coastal and Bomber Commands, the ‘intelligent use of this drug in selected cases to keep pilots alert and awake [was] justified’, as was its use in helping air gunners sustain concentration.⁴⁰ This was an important distinction and it was clear that while Winfield and the RAF understood fatigue as a multifaceted phenomenon, including psychological and physical components, Benzedrine was framed as a tool to assist only with the wakefulness / sleep related aspects of fatigue.

While it is possible to criticise the single-blind scientific basis of such tests, a methodology open to observer bias, Winfield noted his greatest strength as researcher lay in his ability to interact with aircrews under operational

³⁸ TNA, AIR 57/6 – FPRC Report 355, ‘Report on the Factors Influencing the Onset and Production of Fatigue in Catalina Flying Boat Crews’, 18 August 1941 and FPRC Report 361, ‘The use of benzedrine to overcome fatigue on operational flights in Coastal Command’, 13 October 1941. On Winfield, see R. Winfield, *The Sky Belongs to the Them* (London 1976).

³⁹ Francis, *The Flyer*, 114; Rasmussen, *On Speed*, 65; TNA, AIR 57/6 – FPRC Report 355.

⁴⁰ TNA, AIR 57/6 – FPRC Report 355, 8 and FPRC Report 361, 3–4.

conditions; vital given the limitations of post-operational interviews.⁴¹ As such, the process of collecting data from operational sorties had to balance the ability of the observer to gather intimate data against the bias that may follow as a result of this methodology and the obvious risk of losing a valuable researcher on operations.

In terms of practical recommendations, Winfield echoed the comments of Bartlett regarding test doses and medical supervision. Where possible, Winfield had given test doses to aircrew involved in these trials to mitigate the potentially subjective and negative effects of the drug. Winfield also remarked that the return from a mission was the stage when crews were highly prone to fatigue, particularly if they had experienced an arduous flight and / or contact with the enemy. As such, he offered optimal dosing and timing advice based upon this operational reality. Finally, he suggested that the issuing of Bensedrine should be kept under close control by squadron MOs, including careful records kept about the amount and frequency of use by each aircrew member.⁴² While the recommendations were discussed at the FPRC meeting in August 1941, and the RAF was also pushing forward with plans to provide the drug in survival kits,

⁴¹ Winfield, *The Sky Belongs to the Them*, 58.

⁴² TNA, AIR 57/6 – FPRC Report 361, 3–4.

no approval was given, and the RAF continued to prohibit the operational use of Benzedrine.⁴³

A potential driver for further experimentation and the need to revise policy was highlighted by Winfield's acknowledgement of the 'popularity' of Benzedrine and his suggestion that the 'surreptitious' use of the drug was 'beginning to be established'.⁴⁴ Shortly after Winfield's report was circulated news reached Whittingham of an enterprising junior officer seeking to create a chocolate bar infused with Benzedrine to help aircrew stay awake if forced to ditch at sea. This officer was instructed by Whittingham that the FPRC was undertaking research into the subject and it was this body to which such ideas and questions should be referred. This example helps demonstrate the awareness of Benzedrine at the lower levels of the RAF and the desire of Whittingham and the organisation to curtail unsanctioned experimentation and use.⁴⁵ Moreover, the RAF was clearly familiar with government legislation relating to the Poisons List, and it was concerned about its personnel self-

⁴³ TNA, AIR 57/42 – FPRC Minutes, 20 August 1941, 9–10; TNA, FD 1/5354 – Letter, DGMS to Mellanby, 26 August 1941; Rasmussen, *On Speed*, 61.

⁴⁴ TNA, AIR 57/4 – FPRC Report 292, 2; TNA, AIR 57/5 – FPRC Report 355, 9; Rasmussen, *On Speed*, 61

⁴⁵ TNA, FD 1/5354 – FPRC Correspondence, 1941. Letter, S. J. Hadfield to Dale, 22 August 1941; Letter, Dale to Mellanby, 25 August 1941; Letter, Mellanby to Dale, 25 August 1941; and Letter, DGMS to Mellanby, 26 August 1941.

medicating with potentially dangerous drugs. This included concerns about another 'miracle drug' of the era, M & B 639 of the sulfa group of drugs.⁴⁶

These situations also highlighted the problems of enforcing a policy of prohibition, and, while guidance was issued on the use of alcohol, tobacco and other drugs, it was not clear how commanders or MOs were to prevent the use of Benzedrine, particularly if, as Winfield noted, the latter was easily obtainable from civilian sources and subsequently utilised in a functional and controlled manner during operations.⁴⁷ While such concerns may have shaped RAF policy, the evidence of unofficial Benzedrine use is too limited to comment further on its scale or influence on this process.

The next stage, trials of Benzedrine with bomber crews, had been agreed by the FPRC in August 1941, but the results of such trials would not arrive with the RAF until late September 1942. In the absence of further operational testing, it would be left to the MRC, the Air Staff and Whittingham to drive policy. In particular, the Prime Minister, who had shown a close interest in research with Benzedrine, was provided with an overview of current policy and practice in August 1942. The overview began by noting that the MRC recommended the use of Benzedrine on operations under medical supervision

⁴⁶ TNA, HO 45/21113 – Letter, Air Ministry to Home Office, 25 October 1939, and Letter, Home Office to Air Ministry, 10 February 1940; Air Ministry, *AP1269: Manual for Medical and Dental Officers, Third Edition* (London 1938), 150–161; Lesch, *First Miracle Drugs*, chapters seven and eight.

⁴⁷ Air Ministry, *AP1269*, 12–14, 233–4; TNA, AIR 57/5 – FPRC Report 355, 9.

and ideally with the opportunity to provide a test dose to the individual before operational use.⁴⁸ While both Army and Navy policy followed the wider advice of the MRC, providing cautious approval for the use of Benzedrine, a minute from the Vice Chief of Air Staff (VCAS), Air Chief Marshal Sir Wilfrid Freeman, to the Prime Minister's office indicated that the RAF continued to recommend its prohibition on operations.⁴⁹

Due to the character of air power operations, particularly for bomber crews operating regularly over a two or three day period, adequate periods of rest would be required between operations, especially if Benzedrine had been utilised. Given the high-tempo nature of operations, such periods of rest were not always available to RAF aircrews, and use of the substance would be to 'whip the tired horse'; an example of VCAS borrowing a metaphor favoured by Whittingham. In addition, the subjective action of Benzedrine continued to worry the Air Staff, and VCAS observed that, given the varied effects on individuals, 'every pilot would have to be tested for his reactions to the drug'; a testing regime that would severely strain the RAF's medical function. In turn, far from

⁴⁸ TNA, CAB 120/784 – Memorandum, Office of the Minister of Defence to Prime Minister, 29 August 1942, 1. For the MRC recommendations, see TNA, AIR 2/4172 – Letter (and accompanying report), MRC to DGMS, 25 August 1942. For an example of Churchill's interest, see TNA, Prime Minister's Office Files (PREM) 3/103/2 – Use of Benzedrine, various papers, March 1941.

⁴⁹ On amphetamine use in the Royal Navy, see J. Pugh, "Not ... like a rum ration": Amphetamine Sulphate, the Royal Navy and the evolution of policy and medical research during the Second World War', *War in History* (forthcoming).

believing Benzedrine would improve wellbeing, VCAS was concerned that the regular use of the substance, even under medical supervision, would lead to 'pilots ... break[ing] down more quickly than under normal circumstances'.⁵⁰

Crucially, the RAF's policy would shift in a relatively rapid manner, driven by two key reports. First, the FPRC discussed the use of Benzedrine in light of the MRC's Army-specific recommendation that the substance should not be used by any individual 'required to make important decisions'.⁵¹ For the FPRC, this meant that Benzedrine would be unsuitable for pilots and navigators, yet, for Whittingham, the MRC's advice indicated Benzedrine was suitable for other aircrew members, especially air gunners, to 'keep them alert, particularly on the homeward journey'. Thus, the FPRC issued a strong statement in favour of Benzedrine use in this context, subject to the now standard safety caveats.⁵² This recommendation was given greater impetus as Winfield's long awaited report, based on twenty operational sorties with Bomber Command, reached the FRPC in late-September 1942.⁵³

⁵⁰ TNA, CAB 120/784 – Minute, Vice Chief of the Air Staff (VCAS) to Prime Minister, 28 July 1942; TNA, AIR 2/4172 – Minute, DGMS to Air Member for Personnel (AMP), 28 August 1942 and Minute, VCAS to DGMS, 2 September 1942.

⁵¹ TNA, AIR 2/4172 – Minute, DGMS to AMP, 29 September 1942.

⁵² TNA, AIR 57/42 – FPRC Minutes, 3 September 1942, 2.

⁵³ TNA, AIR 57/9 – FPRC Report 493, 'The use of Benzedrine to overcome fatigue on operational flights in Bomber Command'; TNA, AIR 20/8783 – Flying Personnel Medical Officers (FPMO) meeting minutes, 20 September 1942, 15.

Winfield's report was notable for the dramatic testimony about the determination and precision of Benzedrine fuelled aircrews, and some personnel did comment on the positive effects of Benzedrine in terms of wellbeing, but to suggest these were the major drivers for the RAF's introduction of the drug downplays the concerns of Winfield and the RAF about these very effects. While interested in effects relating to wellbeing and attitude, Winfield was also impressed, perhaps more so, with the ability of Benzedrine to promote wakefulness and to prevent the degradation of performance, particularly on the return journey.⁵⁴

Winfield highlighted that for bomber aircrews, the drivers of fatigue were feelings of tension (before the mission), excitement (on delivering the ordnance carried) and relief (on leaving the target area and heading home). Winfield's observations were perceptive, underlining the vulnerability of aircrews on the return leg, particularly as individuals experienced fatigue driven by the post-adrenal crash after attacking the target and the feeling that vigilance could be reduced as the mission neared completion. This vulnerability was of particular concern to Bomber Command, and 3 Group tactical notes issued in 1943 observed that fatigue and tiredness contributed to much higher loss rates on the homeward journey. As Winfield continued, his trials had indicated that

⁵⁴ TNA, AIR 57/9 – FPRC Report 493; Rasmussen, *On Speed*, 65; Rasmussen, 'Medical Science and the Military', 214.

Benzedrine was especially useful for air gunners due to fatigue induced by ergonomic factors.⁵⁵ Thus, while the RAF and Winfield acknowledged the complex nature of fatigue, Benzedrine use in the aircrew context was targeted in a narrow fashion at the tiredness / wakefulness related aspects of fatigue.

Importantly, Winfield's recommendations went beyond recent FPRC guidance, and he felt that Benzedrine was suitable for all crew members, including pilots and navigators. Winfield was also able to allay another fear of the Air Staff; that Benzedrine would affect the ability of crew members to sleep on return from a mission. Some evidence of prolonged wakefulness was indicated, but Winfield noted this could be countered by utilising a smaller dose of Benzedrine in the first instance or by the use of a small dose of barbiturates on return from operations. While Winfield did observe the subjective, and sometimes negative, effects of the substance for some individuals, he stressed that Benzedrine could be used regularly without ill-effects; in practice, on every operation over a six month tour, although the decision to utilise Benzedrine had to remain with individual aircrew. Winfield concluded with the now standard safety-related measures while offering guidance with regards to the logistics of

⁵⁵ TNA, AIR 57/9 – FPRC Report 493; TNA, AIR 14/4075 – 3 Group Tactical Notes, 4th Edition, November 1943, 11–12, 33.

administration, dosing and timing, which focused on the operationally vulnerable period of the return leg.⁵⁶

Winfield also noted that a significant driver for his experiments was that the standard pharmacological aid for assisting bomber crews with the wakefulness related aspects of fatigue, caffeine citrate, 'often ... [had] ... little effect'. In use from the beginning of the conflict, which demonstrated that aircrews felt the need for pharmacological support to sustain wakefulness on operations, there were examples of positive feedback about this substance from MOs with 3 and 4 Group, and evidence from 8 Group, the famous Pathfinders, which demonstrated an ongoing preference for caffeine over Benzedrine.⁵⁷ While Benzedrine produced wellbeing related effects not present with caffeine, and Winfield's crews commented favourably on these facets of the drug, a preference for Benzedrine was driven by the more 'noticeable and prolonged' action of the former, and there was wartime evidence that Benzedrine was a more powerful stimulant in terms of promoting wakefulness.⁵⁸

⁵⁶ Ibid.

⁵⁷ TNA, AIR 2/4172 – Letter, PMO Bomber Command to HQs 2, 3 and 5 Group, 25 December 1939; TNA, AIR 2/4172 – Letter, PMO Bomber Command to HQs 2, 3 and 5 Group, 25 December 1939; TNA, AIR 14/2821 – Letter, Station MO, RAF Wyton to Senior Medical Office (SMO) 3 Group, June 1942, 1; TNA, AIR 49/78 – 'Medical history of the Path Finder Force', 4 October 1945.

⁵⁸ TNA, AIR 57/9 – FPRC Report 493; Derickson, "No Such Thing as a Night's Sleep", 23, fn.27.

Thus, rather than a change of policy based on Benzedrine's effects in terms of wellbeing, a more persuasive explanation for the RAF's decision was that FPRC evidence since at least 1941 had indicated Benzedrine was useful for promoting wakefulness and helping to prevent the degradation of performance; two issues highlighted as causing problems on operations. It was along such lines that Whittingham recommended the approval of Benzedrine use in the operational context.⁵⁹ Such advice was enough to persuade the Air Council to approve the operational use of Benzedrine, and, as noted in the FPRC meeting of November 1942, Benzedrine was 'to be used by aircrews under skilled medical supervision'. While the drug was officially sanctioned to help aircrews 'ward off fatigue', it was evident that the substance was to target the aspect of fatigue related to tiredness and wakefulness as opposed to issues relating to wellbeing or morale.⁶⁰

While the existing narrative of Benzedrine policy in the RAF stops with the FPRC's minutes of November 1942, this was not the end of the matter, and the Air Council had requested, upon Whittingham's recommendation, that Winfield's findings were subject to verification during further operational flights.⁶¹ Subsequently, Whittingham wrote to Air Marshal Sir Arthur Harris, Air Officer

⁵⁹ TNA, AIR 2/4172 – Minute, DGMS to AMP and VCAS, 22 October 1942.

⁶⁰ TNA, AIR 57/42 – FPRC Minutes, 26 November 1942, 6.

⁶¹ TNA, AIR 57/42 – FPRC Minutes, 26 November 1942, 6; TNA, AIR 2/4172 – Minute, DGMS to AMP and VCAS, 22 October 1942; Minute, AMP to VCAS, 24 October 1942 and Minute, VCAS to AMP, 25 October 1942.

Commanding-in-Chief Bomber Command, to ascertain whether Winfield could undertake further trials with an operational Group. In writing to Harris, Whittingham concluded that, 'his personal feeling [was] that [B]enzedrine properly administered, would be beneficial to personnel engaged on long arduous flights'. This proposal, accepted by Bomber Command's PMO, saw Winfield deployed with 3 Group during the next round of testing.⁶²

Harris' decision to approve the use of the drug supports suggestions that the former (and the RAF more generally), 'devoted considerable energy to sustaining the mental and physical capabilities of combat airmen'; demonstrating the significance of medical technologies to support a limited base of human resources.⁶³ Losses and rates of attrition, always a feature of Bomber Command operations, moved in peaks and troughs. The winter of 1942 / 1943 was a period of great strain for Harris and his Command, with losses regularly threatening to limit operational effectiveness.⁶⁴ In turn, the decision to monitor operational use in 3 Group may have reflected concerns expressed about the

⁶² TNA, AIR 2/4172 – Letter, DGMS to Air Officer Commanding-in-Chief (AOC-in-C) Bomber Command, 27 October 1942; Letter, PMO Bomber Command to DGMS, 3 November 1942; Letter, PMO Bomber Command to HQ, 3 Group, 3 November 1942; Letter, DGMS to PMO, Bomber Command, 24 November 1942 and Letter, Air Ministry Stores to RAF Medical Stores Depot, Hartlebury, 25 November 1942.

⁶³ Wells, *Courage and Air Warfare*, 186; Harrison, *Medicine & Victory*, 5.

⁶⁴ TNA, AIR 41/42 – Air Historical Branch Narrative, *The RAF in the Bombing Offensive Against Germany, Volume IV: A Period of Expansion and Experiment, March 1942 to January 1943*, Appendix 13: 'Sorties Despatched, Aircraft Lost, Tonnage Dropped and Mines Laid (Monthly)'.

Group during summer 1942, in which a cyclic process of heavy losses led to an increase in inexperienced crews and further losses.⁶⁵

Such concerns were supported by MOs operating with the Group, and one MO expressed concern regarding the pace of operations and its fatiguing effect on crews.⁶⁶ Monthly summaries from 3 Group noted that a 'hard campaign' had been fought during 1942, including widespread failures to hit targets, technical and operational problems with aircraft, and a significant burden on squadrons relating to the use of non-operational flying time to complete the training of new aircrews.⁶⁷ Moreover, given the strain on the RAF's training establishment, a decision was made to abandon the inclusion of a second pilot in Bomber Command's heavy bombers from April 1942. As such, pilots were generally without respite during operations from this point, particularly on long flights. These operational contexts help to build a picture of an organisation under significant strain, and the RAF was compelled to make the most of its human resources.⁶⁸ Benzedrine use within these contexts, helping to keep valuable crews safe at their most vulnerable point, was clearly a

⁶⁵ TNA, AIR 14/3544 – Letter, Air Officer Commanding 3 Group to AOC-in-C Bomber Command, 19 September 1942.

⁶⁶ TNA, AIR 14/2821 – Letter, MO No.156 Squadron to SMO 3 Group, 24 June 1942.

⁶⁷ TNA, AIR 14/2634 – 3 Group Monthly Summary, December 1942, 1–2; TNA, AIR 14/2635 – 3 Group Monthly Summary, January 1943, 1–2.

⁶⁸ AIR 57/8 – FPRC Report 412, 'Investigation of Psychological Disorders in Flying Personnel: Section 4: Personal Investigation in Bomber Command,' August 1942, 19; Wells, *Courage and Air Warfare*, 126–7; English, *The Cream of the Crop*, 9, 51.

motivating factor for those at the operational and tactical levels within Bomber Command. Such contexts may have also helped the RAF overcome any lingering moral or medical concerns about the use of the drug.

Of course, it must be acknowledged that the mental health of aircrews was also a highly significant consideration for the RAF, illustrated by the organisation's infamous 'Lack of Moral Fibre' policy, and senior commanders within the RAF and Bomber Command had doubts about the ability of aircrews to 'withstand the strain of operations', particularly during periods of intense operations and high losses.⁶⁹ There is evidence that sedative-hypnotics formed a strand of the RAF's approach to the management of mental health, but there is no evidence that the RAF approved Benzedrine use to help crews bear the psychological load of operations, in spite of an understanding of fatigue that encompassed a strong psychological component.⁷⁰ As noted by VCAS and Bartlett, Benzedrine use in this context may have led to an increase in aircrew breakdowns, diminishing an individual's internal resources.⁷¹ Moreover, pre-war evidence had indicated that continuous use of Benzedrine led to the 'ecstasies'

⁶⁹ N. Chapman, 'Bearing the Load', 174 and passim. More generally, see E. Jones, "'LMF:.' The Use of Psychiatric Stigma in the Royal Air Force during the Second World War', *Journal of Military History*, 70, 2 (April 2006), 439–458.

⁷⁰ TNA, AIR 14/2830 – DGMS Staff Meeting minutes, 4 February 1942, 7; WL, Papers of H. E. Whittingham, PP/HEW/M.3/31 – Air Ministry Pamphlet 154, 'Notes of the Prevention of Fatigue in Flying Personnel', June 1943, 1–4.

⁷¹ TNA, CAB 120/784 – Minute, VCAS to Prime Minister, 28 July 1942; TNA, AIR 57/5 – FPRC Report 308, 2–3.

of the drug fading; in other words, a potential reduction in its wellbeing related effects with repeated use.⁷²

By mid-1943 the Air Ministry was ready to issue further guidance relating to the use of Benzedrine on operations. Included in a pamphlet on aircrew fatigue, which acknowledge the multifaceted nature of fatigue, the guidance was more cautious than the recommendations made by Winfield. For example, it was emphasised that Benzedrine could make an individual feel they were 'on top of things' when in reality they were 'making all sorts of mistakes'. Again, far from pushing the wellbeing agenda, the Air Ministry cautioned against the effects of the drug from this perspective, and sleep, diet and other non-pharmacological factors were stressed as being the most effective counters to fatigue. Thus, while the Air Ministry approved the use of Benzedrine, official guidance to crews contained an overwhelmingly cautious tone. It has been argued that the shifting tone reflected an accumulation of operational and scientific evidence that continued to show the limitations of Benzedrine. However, the tenor of the pamphlet seemed to be shaped by a genuine desire to educate crews that a pharmacological solution to fatigue, with a range of potentially unwanted subjective effects, was an imperfect weapon in the wider

⁷² J. Hill, 'Benzedrine in Sea-Sickness', *BMJ*, 2, 4013 (4 December 1937), 1112; D. L. Wilbur, A. R. MacLean & E. V. Allen, 'Clinical Observations on the Effect of Benzedrine Sulphate', *Journal of the American Medical Association*, 109, 8 (21 August 1937), 553.

battle against fatigue, that it was not a substitute for proper rest and that the drug had a limited function in terms of sustaining wakefulness.⁷³

Such advice offers further evidence to reevaluate historical narratives around Benzedrine, demonstrating the RAF's rational and cautious approach to the drug. This pamphlet was part of a wider effort, and guidance issued to MOs since 1938 indicated that the organisation clearly understood the importance of sleep and rest in countering the effects of fatigue. Whether or not crews followed the advice of their MOs and directives from the Air Ministry is another matter, and even if the organisation stressed the importance of sleep in the fight against fatigue, for some aircrews nocturnal operations and the uneven 'rhythm of existence [made] it impossible to obtain enough sleep'.⁷⁴

That Benzedrine should be issued under medical supervision was a key theme of the policy discussions of 1939 to 1943. Initial briefings had been provided to 3 Group station and squadron commanders involved in the post-November 1942 trials, and more widespread guidance was published in 1943.⁷⁵ In interpreting such advice, it was apparent that, for some squadrons, 'medical supervision' simply meant that MOs would be responsible for administering Benzedrine to aircrews as part of the final briefing before the operation. Miles

⁷³ WL, Papers of H. E. Whittingham, PP/HEW/M.3/31 – Air Ministry Pamphlet 154, 'Notes of the Prevention of Fatigue in Flying Personnel', June 1943, 4–5; Rasmussen, *On Speed*, 71; TNA, AIR 57/10 – FPRC Report 510, 'Benzedrine and the Beam Approach', December 1942.

⁷⁴ Air Ministry, *AP 1269*, 234; AIR 57/8 – FPRC Report 412, 20–1.

⁷⁵ TNA, AIR 14/2829 – Bomber Command Medical Notes, December 1942, 6.

Tripp, a bomb-aimer with No.218 Squadron, was aware of Air Ministry policy relating to Bensedrine, but he noted that, 'in practice, one could simply ask for one or two "wakey-wakey" pills after every briefing'. In other examples, it was clear that MOs took an active role in supervising the use of Bensedrine, and some MOs gave their crews clear instructions, which followed the FPRC's guidance: 'take these [Bensedrine tablets] about half an hour before you get to the target'.⁷⁶

A more proactive approach was undoubtedly what the RAF expected of its MOs, but it is clear that MOs serving on bomber stations had a very heavy workload, especially when squadrons suffered heavy losses and high turnover of personnel; factors aggravated by the rapid expansion of the RAF that left MOs responsible for the care of up to 2,000 individuals.⁷⁷ As such, it is likely that a cornerstone of the Air Ministry's Bensedrine policy, the pre-operational ground test, was simply too intensive in terms of working hours to be implemented in practice. There may have been local variations, as with wider

⁷⁶ M. Tripp, *The Eighth Passenger: A Flight of Recollection and Discovery* (Revised edn, London 1993), 173; Australians at War Archive, Interview 1165. J. Colpus. Tape 6. Recorded 26 November 2003; Interview with G. E. Fitt, Wireless Operator, No.467 Squadron. Conducted by A. Sutch, International Bomber Command Centre, Lincoln, 19 May 2015; Imperial War Museum Sound Archive (IWMSA), Interview 29049, F. Tolley, Reel 6. Recorded 08/2006.

⁷⁷ TNA, AIR 14/2830 – DGMS Staff Meeting minutes, 4 February 1942, 6–11; Rexford-Welch, *RAF Medical Services, Vol.II*, 43–5; English, *Cream of the Crop*, 86–7.

medical supervision, but there is no evidence from aircrew accounts that such testing took place, and new data indicates such testing did not take place.⁷⁸

Before turning to these aircrew accounts in detail it is important to note that while an estimated 72 amphetamine million tablets were purchased for Britain's armed forces, including orders for 3 million tablets by March 1942, and a further 28 million for the Royal Navy and Merchant Fleet between August 1942 and June 1943, it has proved impossible to locate figures for the scale of amphetamine use within the RAF. Evidence indicates it was used in Fighter, Coastal and Bomber Commands, including by aircrew and ground staff, and it should be acknowledged that use in these contexts can be a sensitive subject given the now toxic narratives around certain psychoactive substances.⁷⁹

As Lynn Abrams observed, 'the intersubjective dynamics within the interview situation should always be acknowledged honestly. We must be mindful that the resulting primary source, the interview, is shaped by perceptions on both sides'.⁸⁰ If an interviewer's pejorative feelings are not

⁷⁸ For example, see Author's Archive, Bomber Command Association Questionnaire (BCAQ), H. Evans, September 2015; Author's Archive, BCHQ, Anonymised response.

⁷⁹ Betts, 'Benzedrine Sulphate', 215; University of Pennsylvania Archives, Papers of Alfred Newton Richards, Box 12, Folder 6, Letter, A. N. Richards to J. Simmons, Office of Surgeon General, US Army, 16 March 1942; TNA, Admiralty Files (ADM) 116/5509 – Letter, Ministry of War Transport to Medical Director General, Royal Navy (MDG), 31 August 1942 and Note to MDG, 12 June 1943; Pugh, "'Not ... like a rum ration"; *Daily Mail*, 31 March 2011, 38.

⁸⁰ L. Abrams, *Oral History Theory* (London 2010), 62.

acknowledged / managed then the interviewee's response can be shaped to an unacceptable degree. In an interview with a Bomber Command veteran, for example, an IWM interviewer asked about 'those funny tablets', while in another interview, the same interviewer noted that amphetamines have got 'a dreadful reputation now'. On another occasion, the interviewer made it clear to a former air gunner that the substance he had taken on operations was what 'we'd call a drug now'.⁸¹ This is not to unduly criticise the interviewer, but it does highlight how contemporary attitudes to drugs can affect one's approach to a historical topic.

Perhaps the most striking aspect about the evidence from aircrew is that Benzedrine use in the operational context was framed almost exclusively in terms of wakefulness. Indeed, the aircrew nickname for Benzedrine, 'wakey-wakey' pills, reflected this reality, and as several veterans recorded, the substance was particularly useful for sustaining wakefulness on long-duration nocturnal operations; especially as such operations were 'in opposition to your bodies' clock'.⁸² Supporting the conclusions of Winfield, a pilot with No.50 Squadron noted that Benzedrine helped him keep awake during the vulnerable

⁸¹ IWMSA, Interview 30621, B. Cecil, Reel 2. Recorded 11/2007; IWMSA, Interview 22197, F. Smith, Reel 6. Recorded 09/2001; IWMSA, Interview 227796, H. Irons, Reel 3. Recorded 2005.

⁸² Author's Archive, BCAQ, C. E. Mears, 26 May 2015; Author's Archive, BCAQ, W. H. Thomas, September 2015; IWMSA, Interview 30621, B. Cecil, Reel 2; IWMSA, Interview 227796, H. Irons, Reel 3. Recorded 2005; IWMSA, Interview 27793, J. Goodwin, Reel 4. Recorded 2005; T. Redding, *Life and Death in Bomber Command* (Revised edn Stroud 2013), 85–6; Author's Archive, BCAQ, H. Rossiter, 23 September 2015.

period on the return leg as he experienced tiredness due to the post-adrenal crash, the general hazards of operating at night and the length to which sorties could run.⁸³ Such conclusions were very often accompanied by a pragmatic or positive attitude toward the drug, and as a wireless operator with No.115 Squadron recalled, there 'wasn't a wakey-wakey philosophy, you just took one if you were sleepy'. A similar sentiment was expressed by another wireless operator who noted that, Benzedrine tablets were 'like Aspirin, you took them if you felt you needed and we treated them like that'. For another veteran, '[a]ny aid to combat fatigue, and stimulate alertness was welcome [as it] ... [c]ould mean [the] difference between life and death'.⁸⁴

Pointing to the subjective and potentially negative effects of the drug, concerns that went some way to explaining the RAF's cautious policy to November 1942, not all experiences with Benzedrine were positive and some former aircrew complained of headaches, problems with sustaining wakefulness and feeling overstimulated and unable to sleep on the return from operations. Such problems could extend into the following day and a Navigator with No.50 Squadron noted that he experienced a 'hangover' from the drug.⁸⁵ In turn, these varying effects were a factor that helped shape the frequency with which the

⁸³ IWMSA, Interview 15479, D. A. R. Day, Reel 4. Recorded 6 June 1995.

⁸⁴ Author's Archive, BCAQ, H. Rossiter; Author's Archive, BCAQ, Anonymised response; Author's Archive, BCAQ, H. Evans.

⁸⁵ IWM Interview, 28676. J. Ball, Reel 7. Recorded 06/2006; IWMSA, Interview 29049, F. Tolley, Reel 6; IWMSA, Interview 30416, J. Taylor, Reel 7. Recorded November 2007.

drug was utilised by aircrew, a decision also affected by personal opinion, medical guidance and operational conditions. For example, two veterans noted that they took the drug infrequently and only on operations of long duration, including those to Eastern Germany. This decision was shaped by the RAF's policy and medical advice that cautioned aircrew against the regular use of the drug. However, for another veteran the drug was used on 'every trip' as advice from his MO persuaded him of the value of taking the substance.⁸⁶

Crucially, and in line with Winfield's recommendations, the evidence indicates that aircrew retained the choice over utilising the substance on operations and several veterans recorded a similar sentiment that the use of Benzedrine was always down to 'one's own decision'.⁸⁷ This provides a powerful corrective to the tendency to frame drug use as a top-down process, removing the role and agency of the individual user.⁸⁸ In many respects the RAF created an ethical policy, supported by clear educational guidelines, which afforded aircrew the opportunity to make an informed choice about the use of Benzedrine.

Exercising this choice, another group did not utilise Benzedrine on operations, reflecting feelings about their own robust constitution and deeper

⁸⁶ Author's Archive, BCAQ, H. Rossiter; IWMSA, Interview 29049, F. Tolley, Reel 6; Author's Archive, BCAQ, H. Evans; Author's Archive, BCAQ, W. H. Thomas.

⁸⁷ Author's Archive, BCAQ, H. Rossiter; Author's Archive, BCAQ, H. Evans; Author's Archive, BCAQ, W. H. Thomas; Author's Archive, BCAQ, R. Davey, July 2015.

⁸⁸ Snelders and Pieters, 'Speed in the Third Reich', 687.

moral concerns about the use of drugs.⁸⁹ As the work of Derickson suggested, an ability to sustain wakefulness became a measure of manliness during the conflict, and when combined with popular narratives of the era that framed drug use as an act demonstrating moral weakness and corruptibility, it is unsurprising that some aircrew, operating in the hyper-masculine environment that was the RAF, were emphatic in their attitudes to Benzedrine tablets: 'I've never taken one in me life. No'. Another veteran 'refused' to utilise Benzedrine on operations, noting that he 'wasn't interested ... [and] ... [n]ever thought about them'.⁹⁰ For a pilot with No.115 Squadron, the issue of Benzedrine use was a 'touchy subject ... for obvious reasons' and as an RAF researcher noted in the aftermath of the Second World War, '[p]ilots as a class, naturally, did not like being doped'.⁹¹ Paradoxically, attitudes to consuming other drugs, either caffeine citrate, caffeinated drinks or alcohol, used to help regulate wakefulness and wellbeing, did not cause such consternation to aircrew, and caffeinated drinks and alcohol have a long and synergistic history with military culture.⁹²

Thus, while some negative attitudes found in aircrew evidence were present at

⁸⁹ IWMSA, Interview 28650, G. Mellor, Reel 13. Recorded February 2006; IWM Interview, 23198. A. Watson, Reel 10 Continued. Recorded 06/2002; IWM Interview, 29529. T. Austin, Reel 7. Recorded January 2007.

⁹⁰ Derickson, "No Such Thing as a Night's Sleep", 3; E. Newlands, "They Even Gave Us Oranges on One Occasion": Human Experimentation in the British Army During the Second World War', *War & Society*, 32, 1 (March 2013), 58; IWMSA, Interview 27798, J. McGillivray, Reel 5. Recorded 2005; Author's Archive, BCAQ, J. Flowers, June 2015.

⁹¹ R. C. Browne, 'Amphetamine in the Air Force', *British Journal of Addiction*, 44, 2 (July 1947), 70.

⁹² Francis, *The Flyer*, 35–6; Derickson, "No Such Thing as a Night's Sleep", 7–9.

the time, others have been retrospectively influenced by the toxic narratives around drugs, including those shaped by oral history interviewers.

Yet, irrespective of the attitudes displayed in the aircrew evidence, the one common thread to almost all accounts is the framing of Benzedrine use in terms of wakefulness and no mention of the drug's wellbeing related effects – euphoria, confidence, determination and aggression. From a theoretical perspective, evidence indicates that oral history participants tend to struggle to remember emotions and Benzedrine's effects on wellbeing may well fall into this category.⁹³ It could also be that the sensitive nature of the subject compelled individuals to unconsciously medicalise aspects of recollections so as to downplay reference to confidence or euphoria. The need to take a tablet to provide a boost to stamina or endurance may have been a difficult issue to confront for some veterans. For others, it may be that descriptors such as 'euphoric' were not used as they were too closely bound with the narrative of recreational drug use. More simply, such language may not have been part of the lexicon of some aircrews, and cultural factors shaped the manner in which individuals understood their experience of Benzedrine.⁹⁴

⁹³ Abrams, *Oral History*, 87–8, 94–5. The author is grateful to Thomas Cheetham of the University of Wolverhampton for this reference.

⁹⁴ Rasmussen, *On Speed*, 88; DeGrandpre, *Cult of Pharmacology*, 174.

Importantly, the focus on wakefulness also reflected the influence of the RAF's own policy and the advice and guidance issued to crews. As Bartlett observed, the 'maximal suggestion effect' can be obtained by 'linking its [Benzedrine] use with the efficient performance of the job at hand'; a factor demonstrated in operational testing.⁹⁵ Acknowledged by German researchers of the era as the *Toxische Gleichung*, the 'toxic equation' of individual biology, psychology and the circumstances in which the drug was utilised, Bartlett was illustrating a sophisticated point relating to what would become known as the 'set' and 'setting' of drug use; what Ido Hartogsohn has called 'extra-pharmacological factors'.⁹⁶ As Norman Zinberg observed, 'set' is 'the attitude of the person at the time of use, including ... personality' and 'setting' is 'the influence of the physical and social setting within which the use occurs'. These factors, combined with the pharmacological action of the drug, have a profound effect on the experience of those using the substance. Taking the time to provide guidance and education on the use of drugs, including issues relating to the effects and effectiveness of a substance, can affect both personal mind-set and operational setting or context, helping to manage expectation while promoting safe and efficient use. By creating a functional 'script' around the

⁹⁵ TNA, AIR 57/5 – FPRC Report 308, 3–4.

⁹⁶ Snelders and Pieters, 'Speed in the Third Reich', 688–9; I. Hartogsohn, 'The Psycho-Social Construction of LSD: How Set and Setting Shaped the American Psychedelic Experience 1950–1970' (PhD Thesis, Bar Ilan University, 2014), 184.

drug, which emphasised the wakefulness related effects of the substance while actively cautioning against its use in terms of wellbeing, RAF policy and subsequent guidance from MOs helped set the personal and operational tone for the experience of utilising Benzedrine for aircrews.⁹⁷

Understanding these extra pharmacological factors helps explain why Benzedrine use appeared to be calculated and functional for most aircrew. Of course, the diary of Joan Wyndham, an officer with the Women's Auxiliary Air Force, and the memoir of Miles Tripp, provides details of the recreational use of Benzedrine within the RAF. These recollections are supported by Mears, who noted that, 'chatter among crews suggested they [Benzedrine tablets] were useful for short leave passes'.⁹⁸ However, to say that Benzedrine was 'virtually addictive' and used by 'many flyers', either as a form of quasi-psychiatric medicine or as a recreational drug, stretches the available evidence beyond the point of breaking. In turn, it is unwise to be too critical of RAF policy and practice in this regard, as in spite of the regulatory steps, the drug was prominent in a social and cultural sense and remained widely available. As such, efforts to restrict use of the substance could have had only a limited effect in practice, and a decision to focus on educating aircrews was sensible. This is

⁹⁷ Zinberg, *Drug, Set, and Setting*, 5; DeGrandpre, *Cult of Pharmacology*, 174.

⁹⁸ Francis, *The Flyer*, 121–2; J. Wyndham, *Love is Blue: A Wartime Diary* (London 1987 [1986]); Tripp, *Eighth Passenger*, 92, 172–3; Author's Archive, BCAQ, C. E. Mears. For other examples of 'recreational' use, see Author's Archive, BCAQ, R. Davey; IWMSA, Interview 27793, J. Goodwin, Reel 4.

not to deny or downplay the recreational or possibly dysfunctional use of Benzedrine, but it highlights the complex range of logistical, moral and pragmatic forces that helped shape Air Ministry policy.

After several years of investigations, the RAF ended 1942 with a policy that approved the use of Benzedrine on operations; the result of a lengthy and complex process shaped by the media profile of the drug, concerns about the effects and effectiveness of the substance and wider moral considerations. While acknowledging the ambiguous and overlapping meanings of fatigue, Benzedrine was introduced to assist aircrew with the wakefulness related aspects of this phenomenon. This conclusion, supported by the operational evidence, points to individuals utilising the drug based on a desire to prevent sleep and maintain alertness during the part of a sortie where aircrew were at greatest risk. This process was overtly shaped by the RAF's own policy, which stressed the value of the wakefulness related effects of Benzedrine while cautioning against those relating to wellbeing. Nuancing existing perspectives, at no point did the RAF see Benzedrine as a miracle solution to the challenge of aircrew fatigue, a point emphasised in educational material for aircrew. Throughout the process of testing, the organisation had a clear understanding that, at most, Benzedrine would be an imperfect weapon in the fatigue

countermeasure armoury. The drug was neither an 'angel' nor a 'demon' for the RAF.