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DOI:
10.1177/0968344516643348

Document Version
Peer reviewed version

Citation for published version (Harvard):
Pugh, J 2017, ‘‘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*. https://doi.org/10.1177/0968344516643348

‘Not … like a rum-ration’: Amphetamine Sulphate, the Royal Navy and the evolution of policy and medical research during the Second World War.[1]

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In September 1941, the Admiralty issued Confidential Booklet (C.B.) 3062, ‘Handbook on the Use of Benzedrine’, which provided guidance for Medical Officers (MOs) and ship’s captains on the use of amphetamine sulphate, a potent stimulant known by its brand name Benzedrine. In so doing, the Royal Navy (RN) became the first of Britain’s armed forces to approve the use of the drug on operations.[2] An exploration of the operational use of Benzedrine across Britain’s armed forces will be the subject of a separate article, but in the case of the RN, the evidence indicates that the substance was used throughout the Service, and across a range of operational settings including convoy work, surface engagements, and by submariners, naval aviators and special forces personnel.[3] It was also used by shipwrecked personnel, and the drug, which

[1] Admiralty, C.B.3062: Handbook on the Use of Benzedrine (London 1941), p.8. Copy held in the Admiralty Library, Portsmouth.
[2] C.B.3062.
[3] For example, see Imperial War Museum Sound Archive, London, Interview 13650. A. P. Morrow, Reel 2. Recorded, 11/12/1993; Interview 11769. C. L. Berey, Reel 2. Recorded

had effects in terms of both wakefulness and wellbeing, was included in survival kits found in lifeboats and rafts.[4] Although it is impossible to comment accurately on the scale of use, in the latter role alone, Admiralty figures indicate that some 28 million tablets were ordered for the Merchant Navy and RN between August 1942 and June 1943.[5] As Leslie Iversen, the noted scholar of amphetamines has observed, during his time as a conscript in the RN during the 1950s, amphetamine was still 'freely available', and Benzedrine use in the naval context even featured in the climactic scenes of Nicholas Monsarrat's 1951 novel, *The Cruel Sea*.[6]

While a relatively niche subject within the history of the RN of the Second World War era, it is surprising that so little has been written on Benzedrine policy and practice, especially as John Reeve highlighted the 'naval evidence that the ancient link between war and narcotics—epitomised in the age of sail

17/01/1991; Interview 12097. P. D. Gick, Reel 2. Recorded 20/06/1991; Interview 18574. L. D. Sayer, Reel 2. Recorded 05/11/1998; Interview 10180. J. P. Hatfield, Reel 10. Recorded 1988.

[4] Medical Research Council (MRC), *A Guide to the Preservation of Life at Sea after Shipwreck* (London: HMSO, 1943), pp.11–12. Also, see The National Archives, Kew (TNA), Admiralty Files (ADM) 116/5509 – Papers of the MRC Committee on the Care of Shipwrecked Personnel.

[5] TNA, ADM 116/5509 – Letter, Ministry of War Transport (MoWT) to Medical Director General, Royal Navy (MDG), 31 August 1942 and Note to MDG, 12 June 1943. The exact figures were 20,160,000 and 8,120,000 tablets respectively.

[6] L. Iversen, *A Very Short Introduction to Drugs* (Oxford: OUP 2001), p.9; N. Monsarrat, *The Cruel Sea* (London: Penguin Books, 2002 [1951]), pp.390–392. On amphetamines more generally, see L. Iversen, *Speed, Ecstasy, Ritalin: The Science of Amphetamines* (Oxford: OUP, 2006), chapter two.

by the Royal Navy's issuing of "grog" — survived into modern times'.[7] Of course, the relationship between drugs and alcohol is complex, and while the cultural acceptability of consuming various psychoactive substances has varied over time, alcohol enjoys a prominent place in the history and culture of the Royal Navy.[8] Thus, it is telling that in developing policy for the use of stimulant drugs during the Second World War, researchers declared that Benzedrine 'must not be taken … daily like a rum-ration'.[9]

The absence of research into naval amphetamine policy is also surprising given the renewed interest in the history of drug use in the military context and ongoing debates about current use on operations.[10] Apart from occasional references to the use of amphetamines in the context of survival at sea, the issue is discussed in only two sources and these take diametrically

[7] J. Reeve, 'An Anatomy of the Face of Naval Battle', in J. Reeve & D. Stevens, eds., *The Face of Naval Battle* (Crows Nest, NSW: Allen & Unwin, 2003), p.34.
[8] A. Finlan, *The Royal Navy in the Falklands Conflict and the Gulf War: Culture and Strategy* (London: Frank Cass, 2004), p.16. On the changing cultural acceptability of drug use, see V. Berridge, *Demons: Our changing attitudes to alcohol, tobacco, & drugs* (Oxford: OUP, 2013).
[9] C.B.3062, p.8.
[10] For a recent example, see J. Lewy, 'The Army Disease: Drug Addiction and the Civil War,' *War in History,* 21 (January 2014), pp.102–119. On amphetamines specifically, see N. Rasmussen, *On Speed: The Many Lives of Amphetamines* (New York, N.Y.: NYU Press, 2008), chapter three; N. Rasmussen, 'Medical Science and the Military: The Allies' Use of Amphetamine during World War II', *Journal of Interdisciplinary History*, 42 (Autumn 2011), pp.205–233; 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), pp.1 – 26; P. Steinkamp, 'Pervitin (Metamphetamine) tests, use and misuse in the German Wehrmacht' in *Man, Medicine, and the State: The Human Body as an Object of Government Sponsored Medical Research in the 20th Century*, in W. U. Eckart, ed., (Stuttgart: Franz Steiner Verlag, 2006), pp.61–71. In the modern context, see J. A. Caldwell, 'Go Pills in Combat: Prejudice, Propriety, and Practicality', *Air and Space Power Journal*, 22 (Fall 2008), pp.97–104.

opposed viewpoints.[11] Nicholas Rasmussen, a historian of amphetamines and science, noted that, amphetamines were 'useful for situations such as long, high alert watches on convoy escort missions and that objectionable side effects were rare'. In contrast, the Navy's official history stressed the variable opinion of RN MOs about the drug based upon its potentially negative effects, which included insomnia and the physical and mental strain it could place on individuals after use.[12] It is also unclear from the historiography if the RN utilised the drug to help manage wakefulness or, as Rasmussen and Martin Francis have argued in the case of the Royal Air Force (RAF) and British Army, as a frontline 'psychiatric medication' or a 'mood enhancer' to help with the psychological strains of combat.[13]

Pointing to wider themes, John Reeve has observed that cultural bias, operational factors and practical challenges have limited the historical focus on the 'human factor' in naval warfare during the modern era.[14] While naval historians have made great strides addressing this subject, including the work of

[11] J. Coulter, *The Royal Naval Medical Service (RNMS), Vol.I: Administration* (London: HMSO, 1954), p.177; J Coulter, *RNMS, Vol.II: Operations* (London: HMSO, 1957), p.362 and fn; G. H. Bennett & R. Bennett, *Survivors: British Merchant Seaman in the Second World War* (London: Hambledon Press, 1999), pp.186–187; T. Carter, *Merchant Seamen's Health, 1860 – 1960: Medicine Technology, Shipowners and the State* (Martlesham: Boydell Press, 2014), p.142; N. Rasmussen, *On Speed*, p.66; N. Rasmussen, 'Medical Science and the Military', pp.215–216.
[12] Rasmussen, *On Speed*, p.66; Coulter, *RNMS, Vol.II*, p.362.
[13] Rasmussen, 'Medical Science and the Military', p.212; Rasmussen, *On Speed*, pp.58, 61, 62–64, 63–66, 71, 82; M. Francis, *The Flyer: British Culture and the Royal Air Force, 1939 – 1945* (Oxford: OUP 2008), p.121.
[14] J. Reeve, 'Anatomy', pp.6–9.

Ronald Spector, Christopher McKee, Brian Lavery and Glyn Prysor, relatively little is known about the RN's medical or psychologically focused activities during the Second World War; with the obvious exceptions of work by Edgar Jones and Neil Greenberg and by Alastair Goddard.[15] While data about Benzedrine use in the operational sphere is lacking, including restrictions on sensitive medical data, there is significant material available relating to the Navy's internal policy / medical discussions and there is some limited evidence available from the experimental operational context.[16]

As such, the article, while building what is an unknown narrative, seeks to illuminate an aspect of the medical / human dimension to naval warfare by examining the evolution of the RN's policy governing the use of amphetamines. This process is placed in the wider context of medical research within the Service, including the creation of the Royal Naval Personnel Research Committee (RNPRC). Indeed, the RN was the last of the three Services to establish a personnel research committee, and the organisation's medical

[15] R. H. Spector, *At War at Sea: Sailors and Naval Combat in the Twentieth Century* (London: Viking 2001); C. McKee, *Sober Men and True: Sailor Lives in the Royal Navy, 1900 – 1945* (London: HUP, 2002); B. Lavery, *In Which They Served: The Royal Navy Officer Experience in the Second World War* (London: Conway, 2009); B. Lavery, *All Hands: The Lower Deck of the Royal Navy Since 1939* (London: Conway 2012); G. Prysor, *Citizen Sailors: The Royal Navy in the Second World War* (London: Penguin 2011), pp.3–7; E. Jones & N. Greenberg, 'Royal Naval Psychiatry: Organization, Methods and Outcomes, 1900 – 1945', *The Mariner's Mirror,* 92 (May 2006), pp.190–203; A. H. Goddard, 'Operational Fatigue: The Air Branch of the Royal Navy's Experience during the Second World War', *The Mariner's Mirror*, 91 (February 2005), pp.52–66.

[16] The restricted files are found in TNA, ADM 101.

research efforts during the first two years of the conflict were described by its own Medical Director General (MDG), Surgeon Vice-Admiral Sheldon Dudley, as 'haphazard'.[17] The article investigates why the Navy was able to push ahead of the other services in terms of drug policy, arguing that cultural, medical and operational factors affected this process. These included the Navy's independent organisational culture, the presence of MOs on ships to provide direct control and supervision over the drug and the nature of naval warfare in which crews could operate for days at a time without any prospect of respite.

In turn, the article considers the effect of the RNPRC on the evolution of amphetamine policy, which included recommendations to loosen control of the drug, reflecting what was seen as the Navy's overly restrictive policy. Finally, the article demonstrates how the Navy's approach serves to support or challenge wider historiographical perspectives about the British use of amphetamines during the conflict, indicating that the RN approved Benzedrine for use on operations to help personnel sustain wakefulness during lengthy operations. Researchers were impressed with Benzedrine's wellbeing related effects, especially in the context of survival at sea, but there were genuine

[17] TNA, ADM 1/12150 – Minute, Medical Director General, Royal Navy (MDG) to Director of Scientific Research, Royal Navy, 12 February 1942.

concerns over the drug's negative and subjective effects, and its use was to be restricted to 'exceptional circumstances'.[18]

Rasmussen provided a US-centric early history of amphetamines, including Benzedrine Sulphate, the brand marketed and sold by the US pharmaceutical company, Smith, Kline and French.[19] In Britain, the appearance of Benzedrine was met with genuine enthusiasm in two leading medical publications, *The Lancet* and the *British Medical Journal*. This included articles that focused on the drug's value as an aid to wakefulness, particularly in the treatment of narcolepsy, and further evidence relating to the drug's effects on wellbeing, including a positive impact on both confidence and concentration. In spite of initial enthusiasm, the medical press was careful to stress the novelty of the drug, its subjective qualities and the importance of retaining close professional (medical and pharmaceutical) control over the substance.[20] Given the over-enthusiastic and at times hysterical response of the British lay press to Benzedrine, typified by the *Daily Express* stressing its risks and values in a self-sustaining double-helix-like narrative, a political response to the drug was

[18] C.B.3062, p.3.
[19] Rasmussen, *On Speed,* chapters one and two.
[20] 'Benzedrine in Narcolepsy', *British Medical Journal (BMJ)*, 1 (15 February 1936), p.27; W. Sargant and J. M. Blackburn, 'The Effect of Benzedrine on Intelligence Scores', *The Lancet*, 22 (12 December 1936), pp.1385–1387; 'Use and Abuse of Benzedrine', *BMJ*, 2 (25 September 1937), pp.625–626.

inevitable and the substance came to be controlled under an Amendment (1938) to the Poisons List.[21] By placing access to the drug in the hands of both medical and pharmaceutical professionals, such legislation served to further the British government's drug-related policy objectives during this period by helping to strengthen and legitimise both professions.[22]

In the case of the RN, Benzedrine's potential for use in the treatment of seasickness had been highlighted in several reports since 1937, including an article in the *Journal of the Royal Naval Medical Service* (*JRNMS*).[23] While repeating the warnings found in mainstream medical journals, including the drug's variable effects, the *JRNMS* article was important because it demonstrated the promise of Benzedrine while appearing in a RN specific source with which MOs within the Navy were encouraged to engage.[24] Further

[21] *Daily Express,* 30 June 1936, p.10; *Daily Express*, 2 July 1936, p.3; *Daily Express*, 3 July 1936, p.3; *Daily Express*, 15 May 1937, p.3; *Daily Express*, 17 May 1937, p.7; *Daily Express*, 24 May 1937, p.9; TNA, Home Office Files (HO) 388/8 – Letter, Poisons Board to Home Office, 18 May 1938; *Daily Express*, 8 September 1938, p.11; TNA, HO 45/23066 – Letter, Home Office to Local Governments, 22 December 1938; *London Gazette*, 23 December 1938, p.8175.

[22] On British drug policy during this period, see P. Bean, *The Social Control of Drugs* (London: Wiley-Blackwell, 1974), chapter four; T. M. Parssinen, *Secret Passions, Secret Remedies: Narcotic Drugs in British Society, 1820–1930* (Manchester: Manchester University Press, 1983), chapters eight to twelve; J. H. Mills, *Cannabis Nation: Control and Consumption in Britain, 1928–2008* (Oxford: OUP, 2012), chapters two and three; Berridge, *Demons*, chapters four to nine.

[23] J. Hill, 'Benzedrine in Sea-Sickness', *BMJ*, 2 (4 December 1937), pp.1109–1112; 'Benzedrine for Sea-Sickness', *The Lancet*, 232 (29 October 1938), p.1101; J. J. Keevil, 'Benzedrine in Sea-Sickness', *Journal of the Royal Naval Medical Service* (*JRNMS*), 24 (July 1938), pp.219–222; 'Benzedrine', *BMJ,* 2 (1 July 1939), p.25; R. J. Blackham, 'Sea-Sickness', *BMJ*, 2 (22 July 1939), pp.166–167.

[24] TNA, ADM 182/102 – Admiralty Fleet Orders (AFO) 431/40, 'Journal of the Royal Naval Medical Service – Articles for Publication', 8 January 1940.

mention of the drug occurred in July 1940 when Surgeon Captain Macdonald Critchley, who would investigate Benzedrine use in the context of survival and convoy operations later in the war, noted the use of the substance in helping those with narcolepsy.[25] Thus, by mid-1940, RN MOs were likely aware of Benzedrine and the polarising narrative that engulfed the substance, stressing both the potential and pitfalls of the drug.

Both Richard Davenport-Hines and Rasmussen suggested that it was the German use of the amphetamine 'Pervitin' during the summer of 1940, which helped stimulate the interest of Britain's armed forces in the use of amphetamines in the operational context; a contention confirmed in the case of the RN.[26] For example, on 5 November 1940, Sir Edward Mellanby, Secretary of the MRC, wrote to Surgeon Vice-Admiral Sir Percival Nicholls, then serving as MDG, to highlight the potential of Benzedrine and its 'allies for war purposes'. Mellanby noted that the psychological and physiological reaction to such drugs was being explored by both the Air Ministry and researchers at Cambridge, and he invited the MDG to consider undertaking similar research to investigate the drug in relation to specific 'naval problems'. Mellanby took a

[25] M. Critchley, 'Disorders of Nocturnal Sleep in Narcoleptics', *JRNMS*, 26 (July 1940), p.247.
[26] R. Davenport-Hines, *The Pursuit of Oblivion: A Global History of Narcotics, 1500 – 2000* (London: Weidenfeld & Nicolson, 2001), p.243; Rasmussen, 'Medical Science and the Military', p.212. Also, see TNA, Medical Research Council (MRC) Files (FD) 1/6377 – Letter, Sir Henry Dale to Sir Edward Mellanby, 29 June 1940 and Letter, Dale to Mellanby, 2 July 1940.

cautious tone and acknowledged that Nicholls felt the whole subject 'bristled with difficulties'.[27] While no evidence exists of what Nicholls meant by such difficulties, it is possible to highlight three issues that surrounded drug research in the RN. In the first instance, practical difficulties were evident in the testing of drugs, including developing exercises by which the effects of the Benzedrine, a drug with extremely subjective effects, could be measured and quantified in a laboratory setting. Such difficulties were only exacerbated when attempting to obtain scientific data during operational testing, and Rasmussen questioned the rigour and objectivity of the testing that took place in both the British Army and RAF.[28]

These difficulties also encompassed wider ethical and moral considerations relating to the use of drugs, concerns highlighted by the RAF in September 1939 and by the MRC 12 months later. For example, Mellanby observed that, 'we 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'.[29] Similar sensitivities were raised by the RAF, and its Director of

[27] TNA, FD 1/6377 – Letter, Mellanby to Royal Navy Medical Director General (MDG), 5 November 1940. Benzedrine's 'allies' included other stimulant drugs such as methedrine and ephedrine. On comparisons between these substances, see TNA, FD 1/2596 for work conducted by the MRC between 1936 and 1939.
[28] For example, see Rasmussen, 'Medical Science and the Military', p.214.
[29] TNA, FD 1/6377 – Letter, Sir Edward Mellanby to Professor F. L. Golla, 5 September 1940

Operational Requirements, Group Captain Robert Saundby, urged caution over the use of the word 'drug' fearing it 'might conceivably cause misunderstandings among our own people, or even serve as material for enemy propaganda'.[30] No evidence appears to exist of such concerns in the Navy, at least not from policy makers, but it was clear that the use of drugs in the operational context was a contentious issue.

Difficulties also existed in the organisational sphere and there were debates about the conduct and coordination of personnel / medical research in the Service. Lord Hankey, writing to the Vice Chief of the Naval Staff (VCNS), Vice-Admiral Sir Tom Phillips, in his capacity as Chairperson of the Scientific Advisory Committee, suggested an expansion of the Air Ministry's FPRC to encompass research for all three Services. This would include a joint committee to investigate issues relevant to all Services and specific sub-committees to explore those unique to each Service. The wider goal included a desire to pool resources and to avoid duplication of effort, and senior officers within the Navy, including Nicholls, were seemingly enthusiastic about Hankey's ideas.[31] Other minutes submitted to the VCNS indicated a more reticent attitude, and it was felt that a separate research committee was unnecessary given both the existing

[30] TNA, Air Ministry Files (AIR) 2/4172 – Minute, Director of Operational Requirements to Director of the RAF's Medical Services, 13 September 1939.
[31] TNA, ADM 1/11912 – Letter, Lord Hankey to Vice Chief of the Naval Staff (VCNS), 30 October 1940, and Minute, MDG, 28 November 1940.

medical and psychological research being undertaken in the RN.[32] However, the idea to seek an expansion of the FPRC to include naval matters gained favour with the Admiralty, and the First Lord, A. V. Alexander, approached the Secretary of State for Air, Sir Archibald Sinclair, along such lines in early 1941. While Sinclair was happy to expand the efforts of the FPRC to include naval matters, the Air Ministry made clear its desire to retain sole-control over the FPRC. Although this move fell short of Hankey's desire to see a tri-service 'Defence Services Personnel Committee' and a naval sub-committee, cooperation with Army and RAF-specific committees provided access to ongoing research into the use of stimulant drugs, with papers reaching VCNS that referenced the FPRC's work on 'certain drugs … for lessening the fatigue of aircrews'.[33]

Prior to this agreement, the RN had a representative on the FRPC, Surgeon Commander J. Graff, and in his letter to Nicholls, Mellanby noted he had mentioned the subject of drug research to Graff during an FPRC meeting.[34] The evidence indicates that Nicholls liaised with Mellanby regarding research

[32] TNA, ADM 1/11912 – Minute, unknown to VCNS, 10 January 1941.
[33] TNA, ADM 1/11912 – Air Ministry to Scientific Advisory Committee, 'Survey of Scientific Activities in the Air Ministry', 24 October 1940, Annex III, 27, Letter, First Lord of the Admiralty to Secretary of State for Air, 28 February 1941 and Letter, Secretary of State for Air to First Lord of the Admiralty, 6 March 1941.
[34] TNA, FD 1/6377 – Letter, Mellanby to MDG, 5 November 1940. TNA, AIR 57/40 – FPRC Minutes, 4 October 1939. Graff was formally welcomed to Committee during this meeting, but the minutes would not record his involvement in Benzedrine related discussions until August 1941.

into Benzedrine and in January 1941, Mellanby was able to notify the former that the MRC would be able to provide the Navy with a researcher to investigate the specific problems of Benzedrine use in the RN.[35] During March 1941, the researcher, Dr Norman Mackworth, undertook 'field investigations at Aberdeen and Scapa Flow into the possible uses of this substance in the Royal Navy', submitting a report, 'The Use of Benzedrine in the Royal Navy', in April / May 1941.[36] Unfortunately, a copy of Mackworth's report, which included details of operational research with minesweepers, is not found in the archives, and the absence of the document from MRC, Air Ministry, War Office or Admiralty files is indicative of the convoluted and somewhat confused administrative nature of medical research in the Navy during this period.[37] Rather than submitting his research to the MRC, it appears Mackworth went directly to the Admiralty, even though the MRC provided the oversight and funding for his research. In turn, the Admiralty seized upon the research as a product of 'their own initiative', much to the annoyance of Mellanby and Professor F. C. Bartlett, a psychologist and

[35] TNA, FD 1/6377 – Letter, Mellanby to MDG, 31 January 1941.
[36] TNA, FD 1/4148 – Staffing, MRC Unit at Cambridge. Letter, Mackworth to MRC, 28 August 1941, p.2; N. H. Mackworth, *MRC Special Report No.268: Researches on the Measurement of Human Performance* (London: HMSO, 1950), p.155.
[37] A search for the report in the private papers of both Professor Sir F. C. Bartlett (Cambridge University Library Manuscript Collection) and Sir Edward Mellanby (Wellcome Library, London) has also proved fruitless.

expert in fatigue working at Cambridge University, who came to supervise the work of Mackworth.[38]

Fortunately, Mackworth provided a synopsis of his report to the FPRC's Sub-Committee on Airsickness in April 1941, which noted two distinct strands to his experiments: first, testing on ratings undertaking physically demanding work; and second, testing on officers. Mackworth was able to conclude that Benzedrine made no 'objective' difference in terms of actual physical output or endurance, but the majority of the ratings tested 'felt better' when conducting physical work under the effects of the drug. In turn, officers felt that Benzedrine helped them with fatigue, especially during a lengthy spell on duty. The nature of such testing was fairly rudimentary, and a single-blind methodology, criticised by Rasmussen as being open to observer bias, was utilised.[39] Nonetheless, such research was significant because it provided data from the operational naval context that formed part of the evidential basis upon which Bartlett developed more specific recommendations for the use of Benzedrine.

Produced in May 1941, Bartlett's paper, which reached Nicholls at the end of May 1941, noted that Benzedrine produced feelings of wellbeing and

[38] TNA, FD 1/5354 – Letter, F. C. Bartlett to Mellanby, 14 May 1941; TNA, FD 1/6377 – Letter, MDG to Mellanby, 30 May 1941; TNA, ADM 1/11912 – Minute, MDG 28 November 1940.
[39] TNA, AIR 57/4 – Minutes of FPRC Sub-Committee on Airsickness, 16 April 1941, pp.1–2; Rasmussen, *On Speed*, p.61.

increased confidence, that it did not impair judgment or skill, but that it did not enhance performance. The drug could help with skill loss due to lack of sleep, although it was not a substitute for sleep. Importantly, the 'majority' of individuals taking the substance would be 'disposed to try harder to do their best'. Bartlett also concluded that the drug was not addictive, but that individuals could come to rely on the drug 'more and more'. Other challenges highlighted included the subjective qualities of the substance and difficulties sleeping after use.[40]

In creating recommendations for the use of the drug, Bartlett stated that Benzedrine was only to be used in closely prescribed circumstances, in 'abnormally strenuous' situations of no more than 8 to 12 hours in duration, or at the end of a period of prolonged strain lasting 48 hours. Such a situation, in which no more than 10 milligrams (mg) of Benzedrine should be used over 12 hours, needed to be followed by an opportunity for rest and recovery. The drug could be utilised once a week at most and was not 'like a rum-ration'. Bartlett's decision to mention the rum-ration, a hugely significant cultural touchstone for the Navy, was clearly designed to emphasis to the naval mind that Benzedrine was not for use in anything but exceptional circumstances. In contrast to rum, access to the drug was not an 'inalienable right' for naval personnel and its

[40] TNA, AIR 57/5 – FPRC Report 308, 'Benzedrine', 20 May 1941, pp.1–3; TNA, FD 1/6377 – Letter, Mellanby to MDG, 29 May 1941 and Letter, MDG to Mellanby, 30 May 1941.

issue would be dictated purely by operational conditions; unlike alcohol with its historic connections to morale and discipline.[41] In this context, Benzedrine use was centred on helping personnel at risk of falling asleep due to the sheer physical and mental strain of operations rather than as a palliative psychological tool.

In turn, and echoing pre-war concerns that Benzedrine was 'a drug that did many different things to many different people, apparently also in different doses', the substance was never to be used without first providing the individual with a pre-operational test dose so as to gauge their reactions to the drug.[42] Mirroring wider societal trends in which access to drugs was placed in the hands of medical and pharmacological professionals, control of Benzedrine was to be given to MOs or commanding officers who were to be 'as fully acquainted as possible with the properties of the substance'. This helped with issues related to harm reduction while serving to shape and control the experience of those taking the substance. For Bartlett, the experience of Benzedrine use could be shaped by stressing the 'maximal suggestion effect', 'linking its use

[41] J. Pack, *Nelson's Blood: The Story of Naval Rum* (Annapolis, M.D.: Naval Institute Press, Third Edition, 1996), p.55; N. A. M. Rodger, *The Wooden World: An Anatomy of the Georgian Navy* (London: Collins, 1986), pp.72–74; N. A. M. Rodger, *The Command of the Ocean: A Naval History of Britain, 1649 – 1815* (London: 2006 [2004]), pp.495 – 496; Admiralty, *The King's Regulations and Admiralty Instructions, Vol.I: Articles* (London 1943), pp.834–836; McKee, *Sober Men and True*, pp.148–160; E. Jones & N. Fear, 'Alcohol Misuse and Abuse with the Military: A Review', *International Review of Psychiatry*, 23 (April 2011), p.168.
[42] 'Benzedrine Uses and Abuses', *The Lancet*, 232, 6010 (5 November 1938), 1062.

with the efficient performance of the job at hand'.[43] By helping to influence the psychological outlook of those utilising the drug coupled with the creation of a positive and controlled environment in which the substance was to be employed, Bartlett's advice demonstrated that purely pharmacological considerations formed only one aspect of the effects of Benzedrine.[44]

Bartlett noted that Benzedrine was for use in a situation, 'calling for maintained mental and co-ordinated alertness. It is far more valuable for officers, individuals, or small groups of highly skilled personnel.'[45] This decision, to encourage officers and highly skilled personnel to utilise the drug, developed from Mackworth's conclusions and enshrined in Admiralty policy in C.B.3062, was in advance of the conclusions of the other services, and later in the war both the British Army and RAF would prohibit the operational use of Benzedrine for those 'required to make important decisions'.[46] Bartlett's position, while supported by Mackworth's experimental data, also reflected operational and cultural factors within the RN. For example, officers, especially ship's captains,

[43] TNA, AIR 57/5 – FPRC Report 308, pp.3–4.
[44] German scholars of the era referred to this as the *Toxische Gleichung*, the 'toxic equation' of individual biology, psychology and other environmental factors. Modern scholars would refer to these factors as relating to 'set' and 'setting'. For example, see S. Snelders & S. Pieters, 'Speed in the Third Reich', Metamphetamine (Pervitin) Use and a Drug History From Below', *Social History of Medicine*, 24, 3 (December 2011), pp.688 – 689; N. Zinberg, *Drug, Set, and Setting* (London: Yale University Press, 1984), p.5. Also, see 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).
[45] TNA, AIR 57/5 – FPRC Report 308, p.3.
[46] TNA, AIR 2/4172 – Minute, DGMS to Air Member for Personnel, 29 September 1942.

played a crucial role in the efficiency and decision making process of a ship; a factor clearly stated in *King's Regulations*, embedded in naval culture and further reflected in the operational experience of naval captains during the conflict.[47] While Michael Palmer demonstrated the evolution of command and control in the naval context, including the influence of rapid technological development, the human has remained very much at the centre of this increasingly complex command process. As Reeve recorded, '[f]atigue and stress have always taken their toll on naval commanders, whether as a result of the intensity of fleet chases and engagements, the protracted strain of convoy duties and blockades…'.[48] Thus, should these individuals struggle with wakefulness then the safety of ships and their crews were at risk. Moreover, given the importance of the 'interface between people and material', the safety of ships depended on the increasingly sophisticated technological systems around which they were built, systems that put significant strain on operators.[49]

Thus, in the first recorded example of the operational use of Benzedrine in the RN, at least the first example currently in the public domain, these two factors clearly affected the decision to employ Benzedrine, with the substance

[47] *King's Regulations*, p.478; 'HMS *Duncan* – Captain's Standing Orders', 6 July 1943 in B. Lavery, ed., *The Royal Navy Officer's Pocket Book, 1944* (London: Conway, 2006), p.77; M. Whitby, ed., *Commanding Canadians: The Second World War Diary of A. F. C. Layard* (Vancover: UBC Press, 2005), p.10.
[48] M. Palmer, *Naval Command and Control since the Sixteenth Century* (Boston, M.A.: HUP, 2005), pp.262–263; Reeve, 'Anatomy', p.27;
[49] Reeve, 'Anatomy', pp.4–5.

utilised in keeping with Bartlett's subsequent suggestions. In May 1941, during the pursuit of the *Bismarck*, the MO on the cruiser H.M.S. *Norfolk*

> had a private stock of benzedrine, held for just such an occasion, and it certainly came in very useful. During five days and nights there was only a single period of some thirty minutes for sleep. I administered benzedrine to the Admiral [F. Wake-Walker], the captain [A. J. L. Phillips], the flag lieutenant, the gunnery officers and the warrant telegraphist all of whom found it most valuable in helping them stay awake.[50]

The use of Benzedrine in this context seemed to support the conclusions put forward in Bartlett's report, including the use of the drug by officers and skilled individuals. The example also indicates the relationship between senior officers and their MOs, with the latter providing medical support and guidance to the former, but with enough latitude to take the initiative with medical practice where deemed prudent.[51]

Operationally, the example demonstrates the timescales sometimes involved in naval engagements, and as Reeve recorded, '[w]orking a ship at sea is a continuous task whether in action or not … Boredom and fatigue are

[50] Coulter, *RNMS, Vol.II*, p.361. The relevant MO journal is probably found in ADM 101/597. However, this file is closed until 1 January 2026.
[51] *King's Regulations*, pp.596–623; Admiralty, BR 767, 'Notes for Medical Officers on Entry into the Royal Navy', 1943 in B. Lavery, ed., *The Royal Navy Officer's Pocket Book, 1944* (London: Conway, 2006), p.48.

perennial pitfalls of life at sea'.[52] Rear-Admiral Sir Frederic Wake-Walker's 1st Cruiser Squadron (1CS) tracked the *Bismarck* for many days without respite, which included prompts from the Admiralty to pursue the *Bismarck* more aggressively, further reflecting that modern communications technology can place even greater strain on commanders who can be disturbed at all hours with tactical, operational and strategic intelligence and orders.[53] In turn, as James Levy observed, an additional pressure was applied to personnel utilising new technologies such as radar, which placed significant mental and visual strain on operators; technology utilised by ships within Wake-Walker's 1CS during the engagement. Tellingly, in 1944, Mackworth would undertake research, which measured visual vigilance among radar operators, including the positive effect of Benzedrine on this process.[54]

With reference to the RAF, Rasmussen suggested that the unsanctioned use of Benzedrine within the organisation placed pressure on the Air Ministry to 'take an official position' on the substance.[55] Thus, while the use of the drug was not prohibited in the Navy at this point (as it was in the RAF), it may well be that 'bottom-up' pressure helped focus the Admiralty on the need to issue a definitive policy statement on the use of the drug. As Graff noted at an FPRC

[52] Reeve, 'Anatomy', p.19.
[53] Reeve, 'Anatomy', p.36; J. Levy, *The Royal Navy's Home Fleet in World War II* (Basingstoke: Palgrave, 2003), pp.97–98.
[54] Levy, *Home Fleet*, pp.97–98; Mackworth, *Measurement of Human Performance*, pp.30–36.
[55] Rasmussen, *On Speed*, p.61.

meeting in August 1941, Bartlett's paper had been submitted to the Board of the Admiralty and to 'various C-in-C's and Commanding Officers for opinion and decision whether the use of benzedrine was justified'. In late May 1941, Nicholls also noted that both Bartlett and Mackworth's reports would be forwarded to the 'right quarter', likely a reference to the Fourth Sea Lord, responsible for naval supply matters and Medical Services at the Admiralty.[56] Demonstrating both the practical and independent streak in the Admiralty, Graff also commented that the former, 'had told the Medical Department unofficially to buy a stock of the drug'.[57]

Whether this indicated the Admiralty's intention to approve operational use is unclear, but it seems probable as such approval was given with the publication of C.B.3062 in September 1941. Moreover, as ships were instructed to carry significant quantities of the drug, sometimes into the tens of thousands of tablets per vessel, the Admiralty needed the time to procure adequate supplies.[58] This also provides evidence of the value the Admiralty placed on Benzedrine, and later in the war a Confidential Fleet Order stated that, the

> Admiralty have no intention of supplying … medical preparations for purposes for which they have no value … Where scientific research

[56] TNA, 57/42 – FPRC Minutes, 20 August 1941, p.10; TNA, FD 1/6377 – Letter, MDG to Mellanby, 30 May 1941.
[57] TNA, 57/42 – FPRC Minutes, 20 August 1941, p.10.
[58] C.B.3062, p.4.

> shows that real benefit does follow from the use of certain preparations every effort will be made to see that those in need of them receive them.[59]

By taking the initiative on the purchase of Benzedrine, the Admiralty was sending a clear message as to its feelings about the potential of the substance.

On publication, C.B.3062 contained not only the Admiralty's recommendations, but a verbatim copy of Bartlett's May 1941 report. The document was widely 'issued for the instruction and guidance of Commanding Officers and Medical Officers', serving to equip these individuals with the knowledge to shape the mind set of service personnel while creating a supportive and efficient environmental setting.[60] That such guidance was issued in a Confidential Booklet offers some indication as to the sensitivity of the subject and wider issues relating to harm reduction and a desire to restrict Benzedrine use to 'exceptional circumstances'. In turn, the Admiralty's only nuance to Bartlett's initial feedback, although a major addition, was that Benzedrine use was only to be approved in ships that carried an MO. This was presumably to ensure that real-time medical supervision was available, including for the conduct of the initial pre-operational testing; the latter a

[59] TNA, ADM 182/132 – Confidential Admiralty Fleet Order (CAFO) 1416/43, 'Medical Preparations. Popular Fallacies as regards their Value', 8 July 1943.
[60] ADM 182/108 – AFO 5240/41, 'C.B.3062 – Issue', 11 December 1941.

prerequisite for the use of the drug on operations.[61] The wider legal context was also relevant and the Admiralty and its ships were not exempt from the implications of civilian law when it came to the storage, distribution and use of dangerous drugs. While Benzedrine was not controlled under the Dangerous Drugs Act and its various amendments, Benzedrine tablets were subject to a level of control via an Amendment (1938) to the Poisons List, and they were only to be distributed via medical or pharmacological professionals. Although the drug was not mentioned specifically in *King's Regulations*, the latter made clear MO obligations relating to the control and dispensing of poisons in the Service.[62]

While the development of Benzedrine policy to this point did involve specific naval research and administrative effort, the RN was fortunate to be able to draw on the work of, and be supported by, the MRC, the FPRC and researchers in the British Army. However, in the context of survival at sea, where Benzedrine was deemed to have some potential, the Navy was compelled to take a more central role in research. This process crystallised opinion in the Navy about the need for a personnel research committee, and the creation of

[61] C.B.3062, p.3; *King's Regulations*, pp.492–493.
[62] TNA, ADM 182/64 – AFO 448/31, 'Dangerous Drugs Act and Dangerous Drugs (Consolidation) Regulation, 1928; *King's Regulations*, p.633.

the MRC's Committee on the Care of Shipwrecked Personnel was an important step on this journey. The latter, created in September 1941 by the MRC at the request of the Admiralty, was, as Coulter acknowledged, given impetus by operational developments; in this instance increased losses at sea due to U-Boat operations.[63] The Committee, which examined 'physiological problems affecting survival on rafts or in open boats', established a dedicated sub-committee to consider the use of Benzedrine 'energy tablets'.[64]

The conclusions of this sub-committee were seemingly unique in the wider Benzedrine policy of Britain's armed forces, as they were the first to openly recommend the use of the substance based largely on its wellbeing related effects. As Dudley minuted, the use of Benzedrine 'would lead to the mitigation of suffering and sometimes to the prolongation of survival'. The latter was a reference to the wakefulness / endurance related effects of the drug, but the former was based on Benzedrine's euphoric effects.[65] As Reeve observed, '[d]eath when it came in boats or rafts, came slowly and could involve mental as well as physical disintegration and collapse'.[66] Thus, as Dudley continued, in such 'desperate … circumstances', the potential for abuse, already small, balanced any issues relating to potential harm, and it could be argued that

[63] J. Coulter, *RNMS, Vol.I*, p.21.
[64] TNA, FD 13/28 – Minutes, MRC 26 September 1941, p.2; TNA, ADM 116/5509 – Minute, MDG, 27 February 1942.
[65] TNA, ADM 116/5509 – Minute, MDG, 27 February 1942.
[66] Reeve, 'Anatomy', p.27.

Benzedrine use in this context was to help shipwrecked survivors transition from one world to the next, making their last hours and days a more pleasant / manageable experience. Careful not to overstate, Dudley and the Sub-Committee noted that their conclusions were based in the realms of the theoretical as 'direct experiment could not be undertaken'. Dudley concluded by noting that while valuable, the importance of Benzedrine in this context was 'slight in compared with other measures such as adequate water and protection from cold, heat and immersion'.[67]

While the use of Benzedrine in this context was supported in principle, practical and logistical issues prevented the widespread issue and use of the drug until at least mid-1944.[68] Such difficulties centred on the supply of a suitable container for the substance, which needed to balance a robust, waterproof and easy to open design while taking up minimal space in the already replete survival rafts and floats found on ships.[69] Lengthy and detailed correspondence exists on the subject with exchanges between the Admiralty and E. Griffiths Hughes Limited, the supplier selected to provide the drug and its

[67] TNA, ADM 116/5509 – Minute, MDG, 27 February 1942.
[68] TNA, ADM 182/118 – AFO 3111/44 – 'Life Saving in H.M. Naval Service', 15 June 1944.
[69] TNA, ADM 116/5509 – Minute, MDG, 27 February 1942, Minute, Director of Victualling (DV), 9 July 1942, Minute, Director of Naval Construction (DNC), 22 July 1942 and Minute, DNC, 23 February 1943.

container.[70] Of this correspondence, two issues stand out as particularly relevant: first, the Admiralty decided to purchase a generic version of amphetamine sulphate as opposed to Benzedrine, the proprietary article version supplied in the UK by Menley and James. As Bennett and Bennett observed, ship owners were usually responsible for supplying medical or safety equipment for merchant vessels, but in the case of Benzedrine, the Ministry for War Transport felt it the duty of the state to provide such drugs; hence a desire to reduce costs. This decision reflected not only the importance placed on the drug, but also the value of providing the substance in secure and adequately labelled containers so it could be used safely on operations.[71] The latter was to be achieved by retaining centralised control over the ordering and distribution of the drug, and the RN supplied amphetamine sulphate to combat and merchant shipping during 1944 and into 1945. This demonstrated the significance attached to the substance, and the wider global reach, scale and impact of Britain's maritime activities.[72]

[70] For example, see TNA, ADM 116/5509 – Letter, E. Griffiths Hughes to Medical Department, Royal Navy, 14 April 1944, Letter, Technical Assistant, MDG to MDG, 19 May 1944, Letter, MDG to E. Griffiths Hughes, 23 May 1944 and Letter, Technical Assistant, MDG to MDG, 9 November 1944.

[71] TNA, ADM 116/5509 – Letter, MoWT to MDG 21 August 1942, Letter, MoWT to MDG, 31 August 1942 and Letter, MDG to MoWT, 2 September 1942, Letter, MDG to E. Griffiths Hughes, 20 May 1943 and Letter, MDG to Medical Transport Officer, Glasgow, 25 August 1943; Bennett & Bennett, *Survivors*, pp.24–26.

[72] See TNA, ADM 116/5509 for extensive correspondence on the establishment of a logistical and administrative system to control the supply of the drug and the high demand for the substance from mid-1944 and into 1945.

Second, a legal issue was raised in the production of the packaging for the amphetamine sulphate, and Griffiths Hughes noted that in abiding by the Poisons and Pharmacy Act (1933) the word 'poison' should be included on the container of the drug. The Admiralty was aware of its responsibilities in this regard, highlighted in *King's Regulations*, but in responding to Griffiths Hughes it noted that it would take responsibility for omitting the 'usual markings'.[73] While not providing reasoning for such logic, it could be that the decision to omit the word 'poison' was driven by a desire to maximise the 'suggestive' effect of the drug. In a time of crisis, the word 'poison' may have affected the mind set of an individual by creating an ambiguous or negative feeling toward a substance that when used under clearly defined conditions was supposed to be beneficial. More generally, the Director of Naval Personnel (DNP) noted that the reading of printed instructions was not ideal in what would be an adverse survival situation. As such, he instructed that MOs were to brief ship's companies on the use of the drug in case of emergency.[74] Agreeing with the DNP, Dudley noted that printed instructions remained a useful 'adjunct' to instruction by MOs,

[73] TNA, ADM 116/5509 – Letter, E. Griffiths Hughes to Medical Department, Royal Navy, 23 June 1943 and Letter, MDG to E. Griffiths Hughes, 30 June 1943. On the implications of the Pharmacy and Poisons Act (1933) and the Dangerous Drugs Acts (1920–32), see H. N. Linstead, *Poisons Law* (London 1936).
[74] TNA, ADM 116/5509 – Minute, Director of Naval Personnel, 24 July 1942. Such instructions were confirmed in AFO 3111/44.

particularly as the drug could be supplied to ships, including those of the Merchant Navy, where MOs were not present.[75]

Such instructions, appearing in an MRC publication of January 1943, were to be included in life rafts and floats, and they were also to be studied by officers and MOs within both the RN and merchant fleet; a point re-emphasised in Fleet Orders of June 1944. While criticising the late-arrival of this document, coming as it did after peak merchant losses were experienced, Bennett and Bennett praised the 'comprehensive and authoritative' nature of the pamphlet.[76] In terms of amphetamine use, the instructions emphasised that the drug should be controlled by the officer or rating in command of the lifeboat / raft, and that the former should be aware of the proprieties of the drug and the situations in which its use may prove beneficial. As with the conclusions of the Benzedrine Sub-Committee, the value of the drug in terms of both wakefulness and wellbeing was emphasised alongside its potentially subjective and negative effects. This included the drug's ability to 'raise the spirits, and prolong the will to "hang on" and live'. However, in contrast to C.B.3062, the MRC's instructions emphasised the risks of the drug in a less worrisome tone: '[a] few people feel worse or become excitable after the tablets. This is not a serious matter, but

[75] TNA, ADM 116/5509 – Minute, MDG, 15 September 1942.
[76] MRC, *Guide to Preservation of Life*, pp.11–12; TNA, ADM 182/118 – AFO 3111/44; Bennett & Bennett, *Survivors*, pp.185–187.

such people should be given no more. The majority feel better for them.' Again, the goal appeared to be to offer clear instruction, reduce the potential for harm and create a positive mind set if the drug needed to be utilised; gaining maximum suggestive effect from the substance. As with the wider operational sphere, amphetamines were only to be used in 'severe' situations or situations where a 'special effort was necessary'.[77]

The work of the Shipwreck Committee was praised for its careful review of the available evidence, its rediscovery of a large amount of prior research, its coordinating role and its ability to utilise experts to overturn 'many false and harmful superstitions'. This set the tone for cooperative medical research inside the Navy, and in parallel to the work on survival at sea, key figures in the MRC and RN continued to discuss the importance of developing the latter's ability to coordinate and direct research relating to naval personnel. As Coulter recorded, a feeling existed that, 'there were appearing naval requirements which could not be solved adequately and expeditiously by the existing organisation'. Coupled with the pressures placed on the MDG and the Medical Department, support for the creation of a RNPRC gathered pace during this period.[78]

[77] MRC, *Guide to Preservation of Life*, pp.11–12.
[78] Coulter *RNMS, Vol.I*, pp.178–179.

In writing to the Scientific Department at the Admiralty in December 1941, Mellanby noted that in spite of some useful cooperation between the Navy and the existing personnel research committees, a failure to develop a specific naval committee, supported by the MRC, was a 'great pity' given the expertise possessed by the latter in terms of personnel research. Mellanby stressed a similar point to Dudley before the end of the year and again suggested the creation of a RNPRC. In responding, Dudley, who had taken over the post of MDG from Nicholls, hinted the latter was a factor in the failure to create a naval specific committee, while Dudley also noted the poor cooperation that existed between the post of MDG and that of Director of Scientific Research (DSR). Commenting upon the important work conducted by scientific and medical researchers in the RN, Dudley, supported by Mellanby, felt that a 'greater degree of contact' was required. This exchange demonstrated the far from harmonious relations that existed between scientific and medical researchers in the RN, and in a letter of February 1942, Dudley noted that great tact was required in developing policy as 'these semi-independent bodies and individuals all tend to be rather jealous of their positions and have established certain vested interests'.[79]

[79] TNA, ADM 1/12150 – Letter, Mellanby to Scientific Department, Admiralty, 22 December 1941; TNA, FD 1/6057 – Letter, Mellanby to MDG, 31 December 1941, Letter, MDG to Mellanby, 28 January 1942, Letter, Mellanby to MDG, 30 January 1942 and Letter, MDG to Mellanby, 12 February 1942.

In various minutes between MDG, DSR and the Director of Training and Staff Duties (DTSD), a certain tension was in evidence, but Dudley's support for the RNPRC, driven by his concerns over a lack of coordination and the role of 'well-meaning "amateurs"', provided decisive impetus.[80] Taking practical steps, Mellanby approached Dr E. A. Carmichael, an individual who had undertaken important Benzedrine related work for the FPRC, to propose an outline for the scope and focus of the RNPRC; a proposal that included an examination of 'analeptic substances' such as Benzedrine.[81] Viewing Mellanby as the natural chair of the RNPRC, Dudley made an informal approach in June 1942, which was confirmed in October 1942.[82] With a proposed chair in place and an outline scheme provided by Carmichael, Dudley drew up more concrete plans, which were forwarded to the Second Sea Lord in July 1942. The less tactful references to amateurism had been removed, but in recommending the creation of the RNPRC, Dudley emphasised the increasingly complex problems faced by naval medical researchers, the lack of research training and expertise possessed by RN MOs and the desire to coordinate these efforts while drawing on the support – both administrative and technical – of the MRC.[83] With

[80] TNA, ADM 1/12150 – Minute, MDG, 12 February 1942, Minute, Director of Training and Staff Duties, 3 March 1942 and Minute, DSR, 6 March 1942.
[81] TNA, ADM 1/12150 – Letter, Carmichael to Mellanby, 28 February 1942, p.4.
[82] TNA, ADM 1/11912 – Letter, Mellanby to MDG, 30 June 1942, Letter Admiralty to Mellanby, 15 October 1942 and Letter, Mellanby to Admiralty, 23 October 1942.
[83] TNA, ADM 1/12173 – Letter, MDG to Second Sea Lord, 13 July 1942.

Admiralty approval for Dudley's plan, the newly created RNPRC met for the first time in November 1942.[84]

Given that the remit of the Committee included a focus on the 'fighting efficiency' of naval personnel, it was unsurprising that the use of amphetamines was discussed by the RNPRC during 1943. However, it was wider MRC discussions about Benzedrine during August 1942 that saw the Navy reflect upon the implications of C.B.3062. In an undated paper submitted to Winston Churchill as Minister of Defence, the Admiralty noted that C.B.3062 offered only general recommendations for the use of the drug. No reports had reached the Admiralty of use in operational conditions, except in some limited instances of sea-sickness, and while it was noted that due to indiscriminate use German forces were restricting their use of amphetamines on operations, the Admiralty still felt 'properly handled, benzedrine would prove of service. The publication issued to the Fleet [C.B.3062] probably errs on the side of caution.'[85] This was an important distinction, and while Rasmussen cited the German decision to scale back on amphetamine use as evidence of problems with the substance, Stephen Snelders and Toine Peters have challenged this argument suggesting

[84] TNA, ADM 1/11912 – Letters, First Lord to Secretary of State for Air and Hankey, 2 November 1942; TNA, FD 1/7018 – Minutes, RNPRC, 17 November 1942.
[85] TNA, Cabinet Files (CAB) 120/784 – Note, Admiralty to Office of Minister of Defence, undated, but c.July / August 1942.

that the control of the drug was driven by social and legal pressures; contexts very different in the case of Britain and the RN.[86]

The implications of the Admiralty's paper indicated that even though C.B.3062 had provided approval for the use of Benzedrine, the practical constraints of policy had limited the opportunities to use the drug on operations. Approval of the drug in survival at sea situations was also recorded, but the policy statement indicated the Admiralty felt further reflection on Benzedrine was required. Additional evidence relating to Benzedrine reached the Admiralty via Dudley in August 1942, who had been appointed as a member of the Military Personnel Research Committee's (MPRC) Sub-Committee on Analeptic Substances. The Sub-Committee's report restated and generally amplified existing research on Benzedrine: that it was useful in terms of wakefulness and tiredness, but it was not a substitute for sleep, that it was not to be used regularly and that control of administration should be retained by MOs. Importantly, the report appeared to challenge a key recommendation of C.B.3062, and in contrast with the *Norfolk* example, it was noted that, 'a dose of 10mgm. should not be taken by a man in a position of authority or a position where decisions of importance must be made'. A lesser dose of 5mg could be

[86] Rasmussen, *On Speed*, p.55; Snelders & Pieters, 'Speed in the Third Reich', pp.686–699, especially pp.693–694. Also, see Steinkamp, 'Pervitin (Metamphetamine) tests', pp.68–71; G. C. Cocks, *The State of Health: Illness in Nazi Germany* (Oxford: OUP, 2011), chapters seven and eight.

taken, with a further dose after an interval of four to six hours, but only if the individual had 'previous experience of the drug and suffered no ill-effects therefrom'.[87] This advice, serving to confirm the RAF's policy of total prohibition, was interpreted strictly in the British Army with restrictions on the use of Benzedrine for those in positions of authority. However, by the end of November 1942, the RAF finally decided to approve the use of Benzedrine by aircrews on operations, including those in decision making positions – pilots and navigators.[88]

The restrictive application of amphetamine policy in the RN may have been shaped by the knowledge that ship's captains were responsible for the safety of an entire ship's company. If an adverse reaction to the drug was experienced, and C.B.3062 did not discount the possibility, hundreds of lives and an extremely valuable naval asset may have been jeopardised. In contrast, RAF policy, while the product of a more extensive period of testing and development, reflected more favourable operational circumstances for use of the drug. For example, bomber crews could generally use Benzedrine on operations safe in the knowledge that they would enjoy a period of rest on return from a sortie. Moreover, an adverse reaction in the skies, while

[87] TNA, FD 1/6380 – Military Personnel Research Committee(MPRC) to MDG, 25 August 1942; TNA, AIR 2/4172 – MRPC Report, 'Memorandum on the Use of Benzedrine and Methedrine in War'; TNA, FD 1/6387 – Composition of Sub-Committee on Analeptic Substances.
[88] TNA, AIR 57/42 – FPRC Minutes, 26 November 1942, pp.6–7.

potentially life-threatening, was, on balance, perhaps a more acceptable risk given that the loss of an aircrew represented a much smaller net casualty than a ship's company. Stressing the limitations of the drug and educating aircrews about safe and efficient use, the RAF considered that such risks were outweighed by the benefits of providing amphetamine to aircrew to promote wakefulness on the hazardous return leg of an operation. In the context of the British Army, while testing and policy development was also more thorough than in the RN, operational factors in the land environment were not without problems. In similar fashion to the maritime setting, it was difficult to predict the end of an operation, making it challenging to select the optimal moment to deploy the drug in battle and almost impossible to guarantee soldiers adequate periods of rest after amphetamine use. Nonetheless, the high attrition rates experienced by infantry units in North Africa, Italy and Normandy – all theatres in which the British Army utilised amphetamines – may have served to mitigate the War Office's concerns about the drug.[89]

The RAF's decision to utilise the drug on operations, discussed at the FPRC, prompted Graff to reveal that certain reports had been received about Benzedrine use in the naval context, including the use of the drug during a

[89] On British Army policy in the Middle East, for example, see TNA, War Office Files (WO) 222/97 – Report, 'Notes on Benzedrine Use in War Operations', 23 December 1942. On RAF policy, see J. Pugh, 'The Royal Air Force, Bomber Command and the use of Benzedrine Sulphate: An Examination of Policy and Practice during the Second World War' (Unpublished paper).

Russian convoy where Benzedrine was given to 'certain key officers and men … [who] could not have stood up to the strain without it'. Captain Richard Oliver-Bellasis, appointed as a member of the FPRC as part of Admiralty / Air Ministry discussions in mid-1941, felt that it was time to revisit C.B.3062 given its restrictive nature. Oliver-Bellasis felt a relaxation of Benzedrine policy was required, encouraging the experimental use of the drug, as he felt the 'Navy might be missing the use of valuable aid'. At a meeting of the MPRC the following day, Dudley may have 'found it difficult in assessing the value of the drug', but this did not stop strategic and operational pressures making the use of Benzedrine a more pressing matter.[90]

Graff's mention of a Russian convoy was particularly apposite, and as Jones and Greenberg have recorded, naval operations in the Arctic theatre saw a 'significant number of stress-related disorders', reflecting the operational conditions experienced. As Coulter observed, these included the extreme temperature, lengthy periods on watch and repeated air attacks. Operational factors also exposed wider strategic pressures and at the end of 1942, the Board of the Admiralty reflected on the significant difficulties experienced by the RN, including heavy merchant losses and a lack of warships, material and

[90] TNA, AIR 57/42 – FPRC Minutes, 26 November 1942, pp.6–7; TNA, FD 1/5929 – MPRC Minutes, 27 November 1942, p.7.

human resources.[91] These strategic and operational considerations helped shape the activities of the RNPRC, and in January 1943 the Committee reported that Critchley was to be made available to conduct experimental and observational work with Russian convoys.[92] Critchley's report, submitted to the RNPRC in April 1943 and given wide circulation in the RN, was based upon his sailing with HMS *Kent* as part of the outbound convoy, JW 52, and HMS *Matchless* as part of the inbound convoy, RA 52; both operations taking place between mid-January and early February 1943.[93]

In his report, Critchley stated some of the more common factors affecting performance on such convoys, including weather, lack of light, boredom interspersed with intense and sometimes lengthy attacks and further strain on personnel utilising a range of technological equipment. In moving to discuss Benzedrine, Critchley noted that there was 'a fairly widespread mistrust of the use of such a drug even in cases of emergency, mainly on account of its anticipated after-effects'. It is unclear whether this was based on wider prejudices about the use of drugs, via the 'rather strict limitations' contained in

[91] Jones & Greenberg, 'Royal Naval Psychiatry', p.197; Coulter, *RNMS, Vol.II*, pp.424–425, 464–468; Reeve, 'Anatomy', pp.15–18; TNA, ADM 167/114 – Admiralty Board Minutes, 5 October 1942.
[92] TNA, FD 1/7018 – RNPRC Minutes, 19 January 1943, p.1.
[93] TNA, FD 1/7018 – RNPRC Minutes, 4 May 1943, p.2; TNA, ADM 298/291 – Actions Taken or Pending re: RNPRC Minutes, 1 June 1943, p.1. On these convoys, see M. Llewellyn-Jones (ed), *The Royal Navy and the Arctic Convoys: A Naval Staff History* (London: Routledge, 2014 [2007]), pp.104–105.

C.B.3062 or because of the experience of utilising the substance on operations. In suggesting several scenarios for which the drug might prove useful, including use by officers and technical specialists on extended watches or during periods of extended action, Critchley noted that three problems were evident: the uncertain length of operation, the possibility of an adverse reaction and the 'unsafe or unwise' practice to make repeated use of the drug over an extended period.[94]

While disputed by Pugh, both Rasmussen and Francis have suggested that the RAF used Benzedrine as a frontline psychiatric tool, and it is tempting to attribute its use in the RN along similar lines.[95] Reference to the use of the drug to help with 'fatigue' or 'strain' complicates this process as both terms had inherently ambiguous meanings, with the former appropriated by the RN in 1943 as an institutionally acceptable term for those experiencing 'anxiety states'.[96] However, it is telling that, even with comments on both the mental and physical strain of those undertaking convoying work, Critchley's discussion of

[94] TNA, ADM 298/198 – RNPRC Report, Medical Observations During Passage on Northern Convoy; in Russian; and in Iceland', April 1943, pp.1–4, 44–47, 48–50.
[95] Rasmussen, 'Medical Science and the Military', p.212; Rasmussen, *On Speed*, pp.58, 61, 62–64, 63–66, 71, 82; Francis, *The Flyer,* p.121; Pugh, 'Bomber Command and the use of Benzedrine Sulphate'.
[96] Coulter, *RNMS, Vol.I*, p.99. Also, see Admiralty, BR 898 – 'Advice to Medical Officers in Ships on Psychiatric Cases and Casualties', May 1944. Copy held in Admiralty Library, Portsmouth

Benzedrine focused heavily on wakefulness and alertness as opposed to the desire to make use of the drug for its euphoric or wellbeing related effects.[97]

Critchley's report was discussed by the RNPRC in May 1943, commented on by DTSD in the same month, and subsequently forwarded to MDG. In turn, the RNPRC meeting of 1 June 1943 recommended that MDG produce an addendum to C.B.3062 with the aim of relaxing restrictions to provide approval for the use of Benzedrine in Coastal Forces and small ships where MOs were not present. Indeed, in an earlier report about the RN's Coastal Forces – its small craft such as Motor Torpedo Boats – submitted to the RNPRC in January 1943, a call had been made for providing information and guidance about the use of Benzedrine. As Graff noted at an RNPRC meeting on 19 January, medical supervision for Coastal Forces was part of a wider issue highlighted in the report, although as a further RNPRC report indicated, there was little enthusiasm for the use of Benzedrine in Coastal Forces.[98]

Although newly commissioned RN MOs were still actively encouraged to familiarise themselves with the proprieties and potential of Benzedrine, naval policy was not amended again during the conflict. In fact, the content of

[97] TNA, ADM 298/198 – RNPRC Report, Medical Observations During Passage on Northern Convoy; in Russian; and in Iceland', April 1943, pp.1–4, 44–47, 48–50;
[98] FD 1/7018 – Summary of Action Taken or Pending on Critchley's RNPRC Report, 27 May 1943; Minutes, RNPRC 1 June 1943, p.2; TNA, ADM 261/10 – RNPRC, 'Report on Visit to Coastal Forces', 13 January 1943, p.5; TNA, FD 1/7018 – RNPRC Minutes, 19 January 1943, p.2.

C.B.3062 remained unchanged into the post-war period, when in 1946, it was reissued in declassified form as part of the Book of Reference (BR) series.[99] Thus, in spite of Critchley's evidence and the opinions of members of both the FPRC and RNPRC and the Navy's pioneering role in terms of Benzedrine policy, the limitations imposed on the utilisation of amphetamines saw the RN possess perhaps the most restrictive policy of Britain's armed forces during the Second World War.[100]

Given the duration of naval operations and the demands placed on naval personnel, the RN was attracted to Benzedrine by the promise that it would help its personnel sustain wakefulness, information highlighted by Mellanby. The work of Mackworth provided some important naval-specific operational data, although this lacked the breadth and depth of similar efforts in the British Army and RAF. Nonetheless, Bartlett was able to utilise even this limited information, in conjunction with civilian sources and additional evidence from other MRC studies, to establish some cautious and positive guidance for the use of the drug during combat operations. His decision to compare Benzedrine use to the issue of the rum-ration was a clear indication of the very different functions and effects of these drugs. Bartlett's guidance was so influential that it was issued

[99] C.B.3062 became BR 1528 via CAFO 94/46.
[100] Lavery, ed., BR 767, 'Notes for Medical Officers', p.50.

by the Admiralty verbatim as part of C.B.3062, although with the addendum ensuring that the drug should only be issued on ships that possessed an MO; the latter providing real-time support and supervision.

The guidance contained in C.B.3062 was sensible, well-intentioned and ground breaking. A desire to provide clear and positive guidance for MOs and ship's captains was part of what could be seen as a progressive educational agenda aimed at harm reduction and the promotion of the efficient use of the drug on operations. However, the operational circumstances under which Benzedrine use was permitted appeared to be overly cautious. Some of these restrictions, based on length of operations and availability of adequate periods of rest, were prudent and were not unique to the RN. Yet, the rapidity with which C.B.3062 was issued, in comparison to the lengthier process of policy creation in the RAF, for example, suggests the Admiralty should have been more thorough and less hurried during the gestation period. The pace at which such policy was issued and the manner in which the Admiralty actively pursued the acquisition of amphetamines provides an interesting paradox with the restrictive nature of the practical aspects of its policy. Whether this pace was driven by the 'bottom-up' use of the substance is unclear, but the example of H.M.S. *Norfolk* indicates a level of independent awareness about the drug driven by the wider media / medical profile of Benzedrine.

The evolution of the Navy's Benzedrine policy also illustrates wider organisational issues relating to the conduct and coordination of medical research in the service. The creation of the Shipwrecked Personnel Committee demonstrated the virtues of a dedicated committee that could coordinate the efforts of medical and scientific researchers in the RN while drawing on external support from the MRC. Coming into existence when the RN was facing strategic and operational challenges, especially in the context of convoy operations, the RNPRC helped catalyse further discussions on amphetamines. However, in spite of positive recommendations to modify the content of C.B.3062, no amendments were forthcoming. Calls for further research in November 1942 and again in May 1943 demonstrate that the RN needed to have undertaken a systematic process of operational experimentation before issuing C.B.3062. Such data, however rudimentary, would have only served to strengthen the organisation's understanding of the drug and to boost faith in the substance by MOs, ship's captains and personnel using amphetamines in the operational context.

In terms of motivations, amphetamine use in the RN was governed by considerations relating to both wakefulness and wellbeing, and the example of the use of the drug in the survival at sea context provides a positive illustration of an organisation approving the use of the substance based in part on its

euphoric effects. The decision to recommend the provision of amphetamines based purely on its theoretical potential reflected not only the desperate circumstances that could face shipwrecked personnel, but also the genuine promise attached to the drug. An agreement to provide the substance to the merchant fleet, at cost to the British government, offers further evidence in this regard. Wider motivations for use during combat operations are more opaque, especially in comparison to the RAF, and there are genuine complications when the language of strain and fatigue are considered. Nonetheless, the value of amphetamines as an aid to wakefulness appears to be the primary driver in the RN's decision to approve the use of the drug on operations.