Pigeons in the Trenches: animals, communications technologies and the British Expeditionary Force, 1914-1918

GERVASE PHILLIPS
Manchester Metropolitan University
Email: G.Phillips@mmu.ac.uk

ABSTRACT
Having rejected their use before the war, the British Expeditionary Force established a Carrier Pigeon Service as a pragmatic response to the difficulties of maintaining frontline communications on the fire-swept battlefields of France and Flanders. The success of the service is a powerful illustration of the significant, if largely unheralded, role played by animals in modern warfare. It serves too, to warn against a tendency to over-emphasise the impact of the technologically-innovative in the writing of military history. Carrier pigeons may have been an 'old' technology, but, during the positional warfare of 1915-17, they were acknowledged to be of more practical utility for units in combat than wireless sets.[1]

Introduction: Animals, Modern Warfare and 'the Shock of the Old'

On 23 May 1888, *The Evening Telegraph* reported the outcome of a cross-country race conducted between Tours and Montbazon in France. The competitors were a pigeon, two hussars, two dragoons, two dogs, a dog cart, a bicyclist and two tricyclists. The pigeon was victorious by some margin, covering the route in just five minutes 35 seconds. The hussars, quintessential light cavalry men, seized second and third place, finishing in just less than eight minutes. The heavies of the dragoons were seconds behind them. The dogs completed their runs in eight minutes 8 seconds and eight minutes 38 seconds; the cyclist in nine minutes and 15 seconds and the tricyclists in ten minutes 30 seconds and ten minutes 40 seconds. The poor dog labouring to draw a cart finishing last, in twelve minutes 5 seconds.[2]

Odd as this race seemed, it had a serious purpose. It was an experiment conducted by

[1] I am grateful for the suggestions made by the anonymous reviewers for BJMH on the first draft of this article.
[2] 'Pigeons, Hussars, Dragoons, and Cyclists Race', *The Evening Telegraph*, 23 May 1888, p. 2.

the French Army in order to ascertain the fastest means of communication between commanders and formations in combat, under the rapidly changing conditions of warfare in the late nineteenth century. The battlefields of this era were characterised by their geographical expansion, partially a consequence of the sheer size of armies that industrial states could now mobilise, and partially of the tactical dispersion of troops, as they sought to avoid the range and firepower of modern weaponry. In 1888, that threat came from the breech-loading rifle. In the decade after the Tours-Montbazon race, the danger became yet more pronounced as the magazine-fed, bolt-action rifle, the automatic machine-gun and quick-firing artillery further extended battlefield ranges and compelled combatants to scatter, or entrench, to gain cover.

On this empty battlefield, without reliable and swift means of communication, senior officers could no longer exercise effective command and control over their troops. Hence the search for some means by which information and orders might freely flow across the battlefield was a pressing concern in the decades before the First World War. The use of animals in this role, and the clear advantages they offered over mechanical contrivances (and not just, as we shall see, bicycles and tricycles) is of particular note: modern industrial warfare did not actually lessen the age-old reliance of armies on animals. Indeed, technological innovation created a significantly greater demand for animals by the military in a wider variety of roles. The first half of the twentieth century would see the largest mobilisation of animals for military purposes in history. The scale of modern war's appetite for animal bodies was prodigious. In November 1918, the British Empire counted 791,696 draught and riding animals with its armies in all theatres: 510,000 horses; 225,311 mules; 36,834 camels; 8,425 bullocks; 11,028 donkeys. In addition, it was served by 100,000 carrier pigeons.[3] Their use was not an anachronism; it was, in fact, a necessary and defining characteristic of modern warfare.

Yet military historians have, by and large, not recognised the centrality of animals to the conduct of modern war. They have generally written 'innovation-centric' history which privileges the latest technology, usually narrowly defined as concerning 'metallurgy, chemistry, ballistics and electronics ... mechanics and engineering.'[4] Openness to the new in these fields has been viewed as key to military effectiveness while persistence in the use of existing technologies is usually dismissed as evidence of

[3] *Statistics of the Military Effort of the British Empire during the Great War, 1914-1920* (London: HMSO, 1922), p. 878. A. H. Osman, 'Pigeons in the Great War', in Colin Osman (ed.), *Pigeons in Two World Wars* (London: Racing Pigeon Publishing, 1976), p. 8.

[4] Trevor N. Dupuy, *The Evolution of Weapons and Warfare* (New York: De Capo, 1984), p. 169.

military conservatism.[5] Even when the widespread continued utility of animals is acknowledged, there remains a tendency to assume that this is the consequence of a lack of access to recently-developed technological alternatives rather than as evidence for the efficacy of older technologies. Robert DiNardo, for example, in his seminal study of the horse-dependent German Army of the Second World War has suggested that the *Heer* was a 'military anachronism'.[6] Yet even the American and British armies of that conflict, when campaigning in theatres with poorly-developed transport infrastructures or terrain that was simply impassable to mechanised forces, employed animals. The United States Army did not demobilise its last draught mules until 1956. The British were still employing camels in desert warfare in Aden in the 1960s.[7]

Historians need thus to rethink their attitude towards the use of animals in modern warfare. They might draw productively on recent developments in allied sub-disciplines, particularly economic and technological history. Eschewing conventional 'innovation-centric' historiography, David Edgerton has argued instead for 'the shock of the old': the sustained importance of the established technologies actually used on a day-to-day basis within a given society.[8] This reframing of the history of technology (a word most usefully defined broadly as the application of scientific knowledge for practical purposes, which would clearly include such subjects as animal breeding, management and care) ought to be noted well by military historians.[9] The British use of carrier pigeons in World War I offers a particularly interesting case study. Having chosen innovative solutions to the problems posed by battlefield communications pre-war, the British Army on the Western Front was subsequently compelled by circumstances to turn to the pigeon, with largely successful results. In a perceptive essay, Charles Messenger effectively captured the key to maintaining 'trench communications' as a 'belt and braces technique of having several alternative means [available].'[10] No one means of

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[5] See, for example, Tim Travers, *The Killing Ground: The British Army, the Western Front & the Emergence of Modern Warfare* (London: Routledge, 1993), p. 91.

[6] R. L. DiNardo, *Mechanized Juggernaut or Military Anachronism: Horses and the German Army of WWII* (Mechanicsberg, PA.: Stackpole, 2008), pp. 127-133.

[7] Emmett M. Essin, *Shave Tails and Bell Sharps: The History of the US Army Mule*, (Lincoln: University of Nebraska Press, 1997), pp. 189-202. Alan Harfield, *Pigeon to Packhorse: The Illustrated Story of Animals in Army Communication*, (Chippenham: Picton, 1989), pp. 63-64.

[8] David Edgerton, *The Shock of the Old: Technology and Global History since 1900* (London: Profile, 2006), pp. xi-xviii.

[9] *English Oxford Living Dictionaries* on-line (Oxford University Press: 2016), https://en.oxforddictionaries.com/definition/technology [accessed 29/10/2016].

[10] Charles Messenger, 'Trench Communications,' in Basil Liddle Hart (ed), *Purnell's History of the First World War*, Vol. 5 (London: BPC Publishing, 1968-1970), p. 2048.

communication proved robust enough to meet the needs of frontline troops. The new technologies of telegraph, telephone and wireless, were fragile, insecure and cumbersome. Runners and dispatch riders where physically vulnerable. Opportunities for visual signalling were inevitably limited in a war largely conducted in trenches and shell holes. The pigeon was not suitable to mobile operations and struggled in extreme meteorological conditions. Yet all these 'means' had their place. When available in sufficient numbers, pigeons particularly proved their worth during offensive operations, as advancing troops advanced beyond their cable networks. In such circumstances, they were not a mere supplementary method of communications; they were the principle means by which the firing line communicated rearward.

The Military Use of Pigeons: Continental Europe's Openness to the 'Old' and Britain's Preference for the 'New'

Pigeons have a long history of military use; they had relayed the news of Julius Caesar's conquest of Gaul to Rome in 52 BCE; in 1574, the Dutch city of Leiden, besieged by Spanish forces for six months, were dissuaded from capitulation by pigeon-borne news that a relief force was close at hand; it was pigeons that carried the news of victory over Napoleon across Europe in 1815. Yet it was the Franco-Prussian War of 1870-71 that secured for the pigeon a place in modern warfare. In an interesting example of how innovation in one technology can promote resurgence in the use of an older technology, the development of micro-photography dramatically enhanced the utility of the carrier pigeon. Photographic images, including images of text, were copied, at greatly reduced size, onto thin films of collodion, which could then be projected onto a screen to be read. One film could contain, on average, 2500 communications. A single pigeon could carry up to eighteen such films. Besides, modern communications technologies were simply very vulnerable in wartime. As the invading German forces severed telegraph links between French border fortresses and their capital, the garrisons turned to the *pigeon voyageur*. Later, during the four-month siege of Paris itself, an extemporised pigeon service carried 150,000 official and 1,000,000 private communications into the beleaguered city.[11] The military implications were not lost on continental soldiers. Military lofts were established across the continent, with Germany and France at the forefront of development. By 1914, the major combatants were all committed to the use of carrier pigeons and it has been estimated that at least 500,000 birds were mobilised by the rival armies over the course of the conflict and were consumed by it on a dreadful scale; the French monument to carrier pigeons, dedicated in Lille after the war, estimated that some 20,000 had died in their service.

[11] 'The Use of Carrier Pigeons in War', *Freeman's Journal and Daily Commercial Advertiser* (Dublin), 21 September 1870, p. 4. Robert E. Lubow, *The War Animals: The Training and Use of Animals as Weapons of War* (New York: Doubleday, 1977), pp. 27-29.

In Belgium, about a million pigeons were seized or destroyed by the occupying forces.[12]

Interestingly, the pre-war British Army stood outside this continental development, evincing a marked preference for mechanical or electrical solutions to the technological challenge of maintaining battlefield communications. The military utility of pigeons had been noted and much commented upon in Britain during the years following the Franco-Prussian War and they had their staunch advocates, notably Captain H. T. W. Allatt, who lectured widely on the subject.[13] For a number of years, the War Office seemed amenable to the idea of using pigeons to carry orders and despatches. In 1887, they were used experimentally during the army's Easter manoeuvres. In 1898 further tests had been conducted, with 153 birds 'tossed' from a tug 30 miles off Southampton at 9.30 am; the fastest had reached its loft, 85 miles distant, by seventeen minutes past one, that afternoon. Allatt was eventually asked to establish an official 'carrier pigeon section' to further these trials but it saw limited operational service. During the Second South African War (1899-1902), the garrison of Ladysmith had maintained contact with officers in Durban via carrier pigeon but this system had been extemporised locally, dependent upon the Durban Homing Society who had 'patriotically offered the loan of their birds to the military authorities' when war broke out. The Royal Navy does appear to have made some use of homing pigeons when gathering intelligence on Russian ship movements in the Baltic, during the Russo-Japanese War and in its immediate aftermath.[14] Yet there remained serious doubts about the viability of a homing pigeon service in modern warfare. In 1899, one British commentator noted 'their postal service will obviously only work one way [and] as a means of sending messages to a moving force they are utterly unavailable.' Nor would it be practical to supply every likely location for a military headquarters with a loft in advance of hostilities. There, too, was the question of their reliability; it was feared that they could not be temperamentally depended upon in wartime, being apt to 'get discouraged or lost.' The War Office thus abolished the pigeon section in 1907.[15]

That decision was not uncontested, with critics pointing to the economic efficiency of

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[12]'Pigeons on the War Path', *The Leeds Mercury*, 7 September 1889, p. 1; 'Pigeons from the Fatherland', *The Daily Telegraph*, 24 December 1898, p.7. 'Memorial to War Pigeons', *The Times*, 9 March 1931, p.12.

[13] H. T. W Allatt, 'Pigeons as Messengers in War', *The Pall Mall Gazette*, 30 January 1886, p. 6.

[14] 'The War Authorities and Carrier Pigeons', *Citizen*, 18 March 1887, p. 3; 'Racing Pigeons for Use in War', *Nottinghamshire Guardian,* 24 December 1898, p. 6; 'Pigeons as Carriers of War Messages', *The Huddersfield Daily Chronicle*, 29 November 1900, p. 4. 'Pigeons in Naval War', *The Evening Telegraph and Post* (Dundee), 6 July 1906, p. 2.

[15] 'Pigeons as Messengers in War', *The Yorkshire Herald*, 25 November 1899, p. 14.

pigeons, 'the costs of keeping [them] was infinitesimal', and also noting that alternative technologies had their own limitations: 'it cannot be that the wireless telegraph has made the pigeon post obsolete, for it will be years before small scattered sections of the army can carry their own Marconi apparatus.'[16] In point of fact the army (unlike the Royal Navy) was hesitant to embrace wireless communications wholeheartedly, not simply because the equipment was so bulky and unreliable but also because signals could be easily intercepted or jammed by the enemy. Nevertheless, the army did persist in its use of wireless and, more generally, clearly favoured novel technological solutions to the problems posed by battlefield communications: the telegraph, the telephone (eventually) and, at a more tactical level, visual devices such as the heliograph and signalling lamps. As a corollary, the army rejected the 'old', in the form of the carrier pigeon. In short, the British army's attitude can be characterised as 'innovation-centric', with a marked preference for new electronic and mechanical technologies. This preference was evident by the turn of the century; a complete 'Telegraph Division' had landed in South Africa at the outbreak of hostilities in 1899.[17]

This evidence that the British army was innovation-centric in its attitude towards communication technology is, from a historiographical perspective, rather striking. A recurrent theme in the literature concerning the early twentieth-century British officer corps has been its alleged aversion to modern technology. It is a tradition rooted in the tendentious analysis of the army's putative resistance to mechanised warfare originally offered by Basil Liddle Hart and sustained by more recent historians, such as Williamson Murray.[18] And it has recently manifested itself very strongly in one of the few academic works to tackle the question of the British army's use of communications technologies on the battlefield, 1914-18, that by Mike Bullock and Laurence Lyons. Their focus is relentlessly innovation-centric, their central thesis being that the army's alleged institutional bias against wireless prevented the earlier deployment of the continuous wave (CW) sets that belatedly proved themselves the 'most effective and flexible means of communication' in the summer of 1918. The Royal Flying Corps had developed such a set by February 1916 but, un-championed by any senior officer, its adoption was needlessly delayed. 'What was missing', Bulloch and Lyons maintain, 'was both the vision to see that CW wireless would revolutionize command and control and the will to concentrate the engineering talent necessary to design and manufacture

[16] 'War Pigeons Abolished', *The Nottingham Evening Post*, 12 August 1907, p. 7.
[17] R. E. Priestley, *The Work of the R.E. in the European War, 1914-19: The Signal Service* (Uckfield: Naval & Military Press Reprint, 2006), pp. 3-4.
[18] Basil Liddell Hart, *The Tanks* (London: Cassell, 1959) *passim* & *Memoirs,* 2 vols, (London: Cassell, 1965), Vol. 1, p. 77. Williamson Murray, 'Armored Warfare', in Williamson Murray and Allan R. Millett (eds), *Military Innovation in the Interwar Period* (Cambridge: CUP, 1996), pp. 21-22.

reliable, durable CW sets to realize that vision.'[19]

The hypothesis that CW sets might have had a positive impact on the battlefield as early as summer 1916 is unconvincing. It rests upon a counter-factual chapter in which Bullock and Lyons envisage that copies of the prototype set produced by the RFC in February had been issued to British infantry units on 1st July, the disastrous opening day of the Somme offensive. The presence of such sets, they argue, would 'have made a huge difference', with infantry, instead of losing touch with the artillery barrage, able to use wireless to direct artillery fire onto points of enemy resistance and thus reach their objectives at a relatively low cost in casualties.[20] However, the prototype CW sets would simply not have proved robust or portable enough for front line service. R. E. Priestley, who worked with the early CW sets, described them as 'extremely delicate' and recalled that 'there were literally dozens of ways in which they could go wrong'. [21] The best scholarly studies on the development of British military communications during the First World War are by Brian Hall. Yet Hall's approach, too, tends towards the innovation-centric. He focuses primarily on the adoption and deployment of new telecommunications technologies, principally the telegraph, the telephone and the wireless. The same tendency is evident in Elizabeth Bruton's essay on communications during the latter stages of the Flanders offensive of 1917. She offers an insightful analysis of the problems facing British signallers at Passchendaele. Commenting that the battle offered no particular innovation in telecommunications, she highlights the difficulties experienced in attempting to lay and maintain cable systems for field telephones while noting the effective liaison between artillery batteries and the aircraft spotting and correcting their fire by means of radio telephony (voice over wireless) and wireless telegraphy (Morse code over wireless). Both Hall and Bruton are, of course, fully aware of the extent of the use of pigeons, but only consider their service briefly, dismissing their presence as an essentially retrograde step: 'the British Army was forced to adapt, using older forms of communication such as carrier pigeons.'[22] Similarly, in the history of the signal service in France written by

[19] Mike Bulloch & Laurence Lyons, *Missed Signals on the Western Front* (Jefferson, NC.: McFarland, 2010), pp. 193-194.
[20] Bulloch & Lyons, *Missed Signals,* pp. 76-83.
[21] Priestley, *The Signal Service*, p. 226.
[22] Brian Hall, 'The British Army and Wireless Communication, 1896-1918', *War in History*, Vol. 19 No. 3 (2012), pp. 290-321, and 'Technological Adaption in a Global Conflict: The British Army and Communications beyond the Western Front, 1914-1918', *Journal of Military History*, Vol. 78 No. 1 (2014), pp. 37-72. Elizabeth Bruton, 'Signalling at the Battle of Passchendaele, July to November, 1917', in Graeme Gooday and Stephen Johnston, *Innovating in Combat: Telecommunications and intellectual property in the First World War* (University of Leeds and the Museum of Science and Industry,

the veteran R. E. Priestley, pigeons, like runners and mounted dispatch riders, were of interest only as 'supplementary' means of communication and they received far less attention from him than the various telecommunications technologies adopted by the BEF before and during the conflict. This, perhaps, should be no surprise; Priestley was a scientist, closely associated with the development of wireless during the war and subsequently enjoying a distinguished university career. His focus on the technologically innovative was natural and, as has been seen, not out of place in an army with a preference for the 'new'.

The Development of the BEF's Pigeon Service, 1914 - 1915

On the outbreak of war, the possibility of using pigeons as a means of communication was immediately recognised. Unfortunately, this recognition took the form of intense suspicion that they would be employed by enemy agents. Transportation of pigeons by rail was banned and fanciers across the country suddenly found their lofts the subject of police scrutiny. Before regulation became too heavy handed, the War Office had consulted with leading fanciers themselves. A. H. Osman and other leading figures from the National Homing Union (NHU) formed the Voluntary Pigeon War Committee and worked with the authorities to write the relevant regulations for keeping and transporting pigeons under the Defence of the Realm Act. Thousands of fanciers also made their lofts and their birds available for military service. 'This was', reported *The Times*, 'one of the channels through which the British workman has exerted his patriotism. In 1916, some 20,000 pigeons worth £20,000 to £30,000, were acquired – all bred and supplied, free of cost, by fanciers who owned the best pedigree stock.' Many of those fanciers would themselves go into uniform to serve military lofts (including Osman, who rose to the rank of colonel, and who secured 100,000 birds for active service for all branches of the military during the conflict). Yet the essentially civilian foundations of the British military pigeon services, including the free provision of birds and lofts, is a powerful reminder of the national volunteerism that underpinned Britain's war effort. Unlike Germany and France, Britain did not go to war with an effective military pigeon service, but thanks to Britain's loyal fanciers, the potential to create one were there.[23]

It was the war at sea that first called British pigeons to active service. In this instance, the recourse to pigeons did reflect the lack of availability of a technologically-innovative alternative. German mine-laying in the North Sea had commenced in the opening hours of the war and soon became a hazard to belligerent and neutral merchant fleets.

Oxford, 2016) http://blogs.mhs.ox.ac.uk/innovatingincombat/signalling-at-passchendaele-western-front-world-war-one-1917/, [accessed 28/06/2017].

[23] 'Carrier Pigeons in War', *The Times*, 20 November 1918, p. 3. Osman, 'Pigeons in the Great War', pp. 9-12.

To meet this threat, a mine-sweeping service composed of trawlers from the fishing fleet was organised. There were not enough wireless sets for these vessels but pigeon fanciers supplied birds to their crews. This was an undoubted success and, in late 1914, Osman was tasked with organising a home defence pigeon service, which he referred to as 'the first carrier pigeon service in the British army.' Yet he noted too the demand from France for an initial sixty men, experienced with pigeons, for active service with the British Expeditionary Force (BEF).[24]

While Osman would work closely with the BEF's pigeon service, he was not the driving force behind its development. That was the responsibility of a recently-commissioned second-lieutenant: Alec Waley. In August 1914, Waley was a civilian, determined to serve in the field but with 'no military experience whatsoever' and, at 39, over-age for most branches of service. Discovering that he could enlist as a dispatch rider, he had his chauffeur teach him to ride a motorcycle in a morning and, somewhat bruised, presented himself at a recruitment office that afternoon. Duly commissioned, he accompanied the BEF to France as part of the newly-established Intelligence Corps. In this role, he was placed in charge of a small number of pigeons which had been secured from the French for intelligence work. He, however, would soon find wider employment for them: 'under his enthusiastic impulse [the pigeon service] proved its value, for when ... the Germans were closing in on Ypres [in late 1914], and the roads through the town became shell traps, Alec Waley was a well-known figure taking to the front line the pigeons that saved the life of many a dispatch rider.'[25]

For some time, he continued to serve with Intelligence as the Carrier Pigeon Service (CPS) was enlarged. However, on 28 July 1915 the CPS was taken over by the Director of Army Signals, with Waley as 'officer commanding'. By the end of the war, Waley, and his 380 'pigeoneers', would be responsible for lofts operating 20,000 birds and for having trained some 90,000 soldiers to care for and fly pigeons.[26] The first priority, though, was simply establishing lofts. With pigeon fancying such a popular activity in pre-war France, this could be done by requisitioning suitably located civilian lofts (usually housing around 50 to 100 birds), for which the owners were paid a monthly rent. This would be operated by a sergeant or corporal of the CPS, who commanded a small squad of a pioneer or two (soldiers trained for specialist labour and basic engineering duties), an orderly, and dispatch riders who carried the birds forward for units entering the front-line. Much of Waley's day-to-day duties throughout the war consisted of inspecting such lofts, and his diaries regularly record both instances of

[24] Osman, p. 22-23.
[25] 'Major Alec Waley', *The Times*, October 2, 1934, p. 19.
[26] The National Archives WO/95/123/4, War Diary of the Officer Commanding, Carrier Pigeon Service, Royal Engineers, 28 July 1915. Priestley, *Signal Service*, p. 53.

satisfaction with what he found, 'November 8th [1915] ... inspected BETHUNE lofts. All in excellent condition, birds doing good time', and sometimes the contrary: 'May 26th [1917] ... Reprimanded the corporal i/c [No. 4 Motor Loft] owing to the extremely slovenly manner in which I found everything.'[27]

Yet Waley was not simply supervising lofts, he was organising personnel and the training of infantrymen to handle pigeons in the trenches, securing specialist equipment and devising the procedures by which the CPS would operate. There is a growing recognition among historians of the contribution of civilian expertise to the successful military prosecution of the war. This, as the work of Christopher Phillips has demonstrated, is evident in the careers of such individuals as the experienced railway manager Sir Eric Geddes, commissioned as a major-general and appointed Director-General of Transport in the autumn of 1916, and acknowledged as 'having provided the logistical platform from which to build the war-winning machine of 1918.'[28] Waley brought both managerial and administrative talents honed in a successful career in business and a long-standing connection to France into the army with him. He had lived and worked in Paris for many years, where he was Treasurer to the British Chamber of Commerce, and served, from 1904 until 1912, as British Pro-Consul at Chantilly.[29] Yet, in the case of the CPS, it was not just the professional skills of a middle-class businessman that were crucial to success. The expertise of the working-class pigeon fanciers in khaki, recruited directly by Osman and the National Homing Union, was the *sine qua non* of Waley's command. The carrier pigeon may have been an old technology but caring for, training and handling the birds was a highly technical subject. Furthermore, these fanciers did not merely operate the lofts and train the birds, they disseminated their knowledge directly to the soldiers who would handle the pigeons in the line. Waley pressed corps commanders to establish "schools" in their areas, and lofts were attached directly to divisions for the training of drafts from the infantry, so that instruction and deployment for active service could effectively occur simultaneously.[30]

Inevitably, the marshalling of the necessary resources, both human and avian, the establishment of lofts and procuring the correct equipment (from pigeon baskets to suitably-small message pads) took time. Demand for pigeons was high and, for some units progress was too slow. In late 1915, the impatient signallers of 12th Division

[27] WO/95/123/4, 8 November 1915; WO/95/123/6, 26 May 1917.
[28] Christopher Phillips, 'Early Experiments in Civil-Military Cooperation: The South-Eastern and Chatham Railway and the Port of Boulogne, 1914-15', *War & Society*, Vol. 34, No. 2 (2015), p. 90.
[29] 'Major Alec Waley, K.C.S.G.', *The Tablet*, 29 September 1934, p. 409.
[30] WO/95/123/5, 20 October 1916.

established their own unauthorised lofts, using untrained pigeons. While clear this could not be permitted, Waley appears to have handled the situation diplomatically, visiting 12th Division within days and working with them to establish, officially, 'a small temporary loft' with suitable birds.[31]

Yet even if the resources were not always available, this demand for lofts was indicative of the extent to which the army, once on active service, had pragmatically modified its pre-war preference for the technologically innovative and had overcome its suspicions of the viability of a carrier pigeon service. Although compared to the French or Germans, the BEF's use of pigeons in 1915 remained small scale, wherever available they had swiftly demonstrated their worth. A French officer summarized the overall situation for communications in positional warfare: the telephone was 'the most practical and swiftest means of liaison', but lines were frequently broken by shellfire and advancing troops left their cable network behind. Wireless and ground telegraphy then 'serve to double the telephone lines and to replace them when they have been cut.' Yet contemporary sets and their associated paraphernalia (such as spare accumulators) were unwieldy, unreliable and their prominent aerials drew fire. In use 'their currents interfere with each other'. Signallers relying on visual communications had to choose a position from they could be seen by their own side without being exposed to the enemy but 'such conditions are frequently impossible to realise.' Runners had to be dispatched 'two, or even three or four at a time' such was the risk from enemy fire.[32] In these circumstances, the utility of pigeons was manifest. During the offensive at Loos in September, they provided an effective means of communication between advancing infantry and their supporting gunners. Written messages were relayed back by bird long before cables could be laid to new positions and contained a level of detail that other alternatives, such as signal flares and rockets, could not (messages of 150-200 words were recorded): 'September 27: At 2nd Division two good messages had come in both marked, "Very Urgent". Their times were: - 77th Brigade sent up at 10.35 received Divisional Headquarters at 11.20. The second came up from Hohenzollern Fort at 12.10 received at loft 12.35. Both of these messages were giving indications for the direction of Artillery fire."[33]

The time from 'tossing' the bird to receiving the message at the loft was, of course, crucial; the proper training and handling of the birds and refining of the operation and locating of lofts all allowed for significant improvement by the end of the year, even in

[31] WO/95/123/4, 10 October 1915.
[32] Paul Azan, *The War of Positions* (Cambridge, Mass.: Harvard University Press, 1917), pp. 57-61.
[33] WO/95/123/4, 27 September 1915. WO/95/123/7, October 14, 1918.

poor weather conditions. Few birds went missing:[34]

39% 15 minutes.	30% 20 minutes.	12% 25 minutes.
7% 30 minutes.	2% 40 minutes.	1% 50 minutes.
1% 60 minutes.	6% over 1 hour.	2% missing.

Table 1: December 6th ... Times made by the birds during the month of November at Poperinghe, are, considering the time of year, exceptionally good.

That pigeons were faster and less vulnerable than runners was quickly established. That they could, in some circumstances, even out-pace wire was more remarkable. In May 1916, Waley recorded: 'officer i/c Divisional Signals ... mentioned that when messages were over 30 words the pigeon nearly always beat the wire, as a certain amount of time was always lost in re-transmitting the wire from Brigade to Divisional Headquarters.'[35]

Winged Messengers over the Wired Battlefield: The Challenges of Front-line Service

The principle task of the CPS at this point was to integrate pigeons into a multifaceted system of communications at a point in time when no single technology could provide the flexibility, reliability and portability demanded on the modern battlefield. As the CPS took its place within the BEF's communication system, a variety of problems, both small and large, were encountered, addressed and, by and large, overcome. Some of these were relatively minor. For example, the pigeon baskets used by dispatch riders to transport the birds to the frontline proved suitable for use by motor cycle dispatch riders, but, strapped to the back of a horseman, less so: the pigeons arrived 'badly knocked about.' The French had purpose-designed cavalry pigeon baskets, examples of which were being supplied to the British by February 1916. Indeed, this was just one instance in which the British benefitted from the French pigeon service's expertise. Throughout the war, Waley liaised with French officers and NCOs and they too thus shaped the BEF's CPS (which would eventually establish breeding lofts on the French model and, later in the conflict, British signallers followed their lead in experiments with training pigeons to fly by night).[36]

A more challenging issue concerned the location of lofts. Requisitioned civilian lofts had provided a ready basis for the service but they were not always well sited. One of the

[34] WO/95/123/4, 6, 8 December 1915.
[35] WO/95/123/5, 29 May 1916.
[36] WO/95/123/4, 8 September 1915; WO/95/123/5, 25 January 1916; WO/95/123/5, 28 February 1916; Priestly, *Signal Service*, p. 138.

drawbacks of using pigeons was that the birds over-flew intermediate levels of command; an advancing infantry company might toss a bird with a message for its brigade HQ. That message would be delivered to a loft serving its division and would, thus, have then to be fed forward to the brigade. This could be a time-consuming process. And the pigeon offered only one-way communication; as they awaited a response, the infantry had no way of knowing if their communication had been received. Establishing new lofts in the right locations alleviated these problems but there was a dilemma: placing lofts well forward reduced flight times and facilitated liaison but exposed them to enemy shells. On one occasion, when the British took over a sector from the French, Waley wrote of the fine loft the CPS inherited but, as it was 14,000 yards behind the line, he thought it 'inadvisable to re-stock it.' Instead a new loft was established some 6,000 yards behind the frontline.[37] Greater flexibility in this regard was achieved by the provision of mobile lofts, the first of which were in service by February1916. It generally took the birds from a week to a fortnight to settle to a new location, but in the conditions of static warfare, that was not a problem. The army initially displayed its characteristic preference for the technologically 'new' and the earliest mobile lofts were motorised: converted omnibuses. Yet these were road-bound. Horse-drawn lofts proved more mobile and almost 200 were eventually deployed, often very boldly: 'Dec.14th [1917]. HEUDICOURT. Nos. 54 and 47 horse drawn lofts appear to be placed too far forward as they are actually within 2000 yards of the present German front line.'[38]

Perhaps the greatest operational challenge facing the CPS, though, was the human one. While the recruitment of experienced fanciers gave the service a core of expertise, the overwhelming majority of the soldiers who would be required to work with the birds had no prior knowledge of their care. Training was thus a crucial function for Waley and his staff and through their efforts about 90,000 men would ultimately become proficient in the technical subject of handling pigeons. In most cases, problems arose from simple ignorance or carelessness, such as confining pigeons in their trench baskets for four or five days (24 to 48 hours should have been the maximum). In other instances, the issue was more serious: birds were occasionally deliberately maltreated. In May 1917, Waley recorded that 'a certain number of birds in 15th and 29th Division would appear never to have been tossed. There is a possibility that these birds were done away with whilst in the trenches. The birds accounted for in casualties by shell-fire was about 40% of the birds actually missing.'[39] Yet, strikingly, kindness was more frequently the problem. It was often difficult to prevent soldiers from making pets of

[37] WO/95/123/6, 20 February 1917; WO/95/123/6, 26, 29 July 1917.
[38] WO/95/123/5, 26 February 1916; WO/95/123/5, 23 August 1916; WO/95/123/6, 14 December 1917; WO/95/123/7, 11 September 1918.
[39] WO/95/123/5, 30 October 1916 and WO/95/123/6, 2 May 1917.

the birds and offering them treats to eat which made them fly sluggishly.[40]

The regard which soldiers developed for the birds was significant. The pre-war justifications for rejecting pigeons for military use had rested upon assumptions that they would prove emotionally unequal to the stresses of war; they would become 'discouraged' and, disorientated, they would get lost. In combat, however, they were not found wanting. Indeed, the French began to decorate individual pigeons for bravery (a practice subsequently emulated by both the British and the Americans), awarding the 'war ring' to birds such as '787-15', for his service at Verdun: 'In spite of enormous difficulties, resulting from the intense smoke and abundant discharges of gas he accomplished the mission with which Commandant Raynal [O.C. Fort Vaux] charged him...Stupefied by gas, the gallant bird arrived dying at the dovecote.'[41] In part, these awards (and subsequent memorialisation) reflected the growing influence of theriophilic sentimentality in western culture but they were also recognition that the practical success of the carrier pigeon services under the conditions of modern war was, in large measure, owed to the physical and emotional resilience displayed by the birds. Waley noted how quickly, in fact, they became use to shell fire; even when a loft suffered a direct hit, the survivors 'although frightened will be fit for work in a few days.' On another occasion, he remarked that 'The mobile lofts at OOST DUNKERQUE and COXYDE are under continual shell-fire but the birds and personnel appear to have become thoroughly climatised.' Poison gas could harm pigeons, depending on the chemical used and the dose received, but its use does not appear to have hampered the operations of the CPS to any serious degree: 'May 29th [1917] lofts [at Poperinghe and Kruisstraat] had been heavily shelled with gas shells ... With the exception of two birds, none of the birds showed any affect.' [42]

The Carrier Pigeon Service in Offensive Operations, 1916-1917

It was during the offensive battles of 1916 and 1917 that pigeons proved of greatest value for they became the *primary* means of maintaining contact with advancing, or isolated, units on the battlefield. When Waley visited II Corps on 31st July 1917, the opening day of 3rd Ypres, he was informed that '75% of the news which had come in from the firing line had been received by pigeon.'[43] These battles also illustrated the complex relationship between established and nascent technologies in terms of their actual use, confounding any deterministic notion of the innovative simply supplanting the obsolescent. In January 1916, for example, cavalry signallers, then serving in the

[40] WO/95/123/5, 11 August 1916; WO/95/123/6, 22 February 1917; Priestly *Signal Service*, p. 221.
[41] 'Feathered War Heroes', *The Times* 4 February 1920, p. 13.
[42] WO/95/123/4, 21 December 1915; WO/95/123/6 19, 29 September 1917.
[43] WO/95/123/6, 31 July 1917.

frontline, sought to maximise the potential of their wireless sets by using them *in conjunction* with their pigeons. Deploying their bulky, wagon-carried equipment, they established a wireless station behind the trenches, alongside their loft. From this they could contact a receiving-only set in the trenches and thus respond to the messages carried back by pigeon: 'by this means, two-way working was established in a novel fashion.'[44]

By the opening of the Somme offensive in July 1916, the pigeon service could play an enhanced role because it was larger than it had been during operations at Loos and more efficient. Yet there were still not enough trained birds or lofts wholly to supplant visual signalling and the use of runners by advancing units during this battle. Waley was highly satisfied with what was achieved: 'Birds in 4th Army area being made use of and numerous operation messages coming in, in excellent time' (on the Somme, messages were delivered, on average, within twenty minutes of the birds being tossed, even during the later stages of the battle, when they were 'caked with clay').[45] The real difficulty that the CPS was encountering was matching supply to demand; on 23rd October, Waley noted 'there is a shortage of birds ... owing to the exceptional number of Divisions in the line and also owing to the Tanks ... requiring birds.' On 13th September 1916, Waley had 'spent the morning at "Tanks" arranging for birds and giving Officers details re use and handling of carrier pigeons.' Two days later the tanks would be committed to battle for the first time, complete with their complement of pigeons. Again, they swiftly proved their worth, the crews tossing their pigeons to report the capture of enemy positions, send 'SOS' messages and request artillery barrages when no other means of communication was available to them.[46] Yet the on-going expansion of the BEF (six divisions had landed in France in August 1914; 21 had served with Fourth Army alone on 1 July 1916) meant that there were simply not enough pigeons available for all the formations that wanted them. Nor were always enough qualified personnel: 'Second ANZAC have not yet fully trained enough men and only 1 division in this corps is now being supplied with pigeons.'[47]

The peculiarly severe winter of 1916-17 took a heavy toll of all the BEF's suffering animals (an ill-fated decision to clip-out horses and mules just before the freezing weather set in, in an effort to control 'Sarcoptic mange', had had disastrous consequences).[48] Similar poor judgements exacerbated the shortage of pigeons: 'a

[44] Priestly, *Signal Service*, p. 142.
[45] WO/95/123/5, 17, 20, 28 August; 21 September.
[46] WO/95/123/5, 12, 13,15, 17 September; 23 October; 14 November 1916.
[47] WO/95/123/5, 6 December 1916.
[48] A. G. Arbuthnot, 'Horsemastership during the War', *Journal of the Royal Artillery* Vol. 46 (1919), p. 339.

large number of birds [have] been lost at WATOU through Pigeon men in the trenches tossing these birds in a heavy snowstorm'.[49] Tough as pigeons had proved to be, that winter was a killer and the losses hampered preparation for the spring offensives. In February 1917, Waley noted, 'owing to a large number of birds being lost during the last 2 months' snow from Mobile Lofts, there is a shortage of birds in 3rd Army area.'[50] Strenuous efforts were made the following month to make good the deficit, including restocking mobile lofts with a draft of 1000 young birds from Britain. Yet demand for birds and personnel continued to grow too and not just from the British; Waley and his men were responsible for training and equipping both the Portuguese and, later, the American carrier pigeon services.[51] Consequently, the service struggled during the Arras offensive. On 9th April the battle opened; 'in all about 40 messages were received in 3 Army area. This is much below the number received during the first day of the "SOMME" offensive. Weather conditions most unfavourable. Strong N.E. Gale; also sleet and rain during the whole of the day.' On 11th April, only a few messages came in, 'mostly from TANKS ... but the strong N.E. gale and snow were all against pigeons.'[52] Yet as the storms began to abate the situation began to improve. On 7th June, the British exploded nineteen mines and seized the Messines-Wytschaete ridge. Waley spent the morning with the signal office of the Heavy Machine Gun Corps; '26 messages had come in from Tanks in good times the first one arriving at 5-20 [am].' The next day he reported II ANZAC Corps had received 200 messages and a further 72 had come in from the tanks: 'all messages were of extreme military importance.'[53] These successes would set the pattern for the remainder of the summer. For the BEF's signallers, 1917 would be the Year of the Pigeon.

By 31st July, the day on which Waley learned that 75% of all communications being received from the frontline were being delivered by pigeon, the Carrier Pigeon Service had reached the peak of its efficiency, with some 12000 trained birds now available. As Priestley confirmed, it 'had far outstripped the forward wireless service in its practical utility' and was now not simply connecting advancing units rearwards to their own headquarters but was serving lateral communications as well. In July and August, the British XIV Corps liaised with its neighbours, the French I Corps, by pigeon. Pigeons were also ensuring that the fire of even the heaviest guns, although placed well back, was now being brought to bear very rapidly in support of the infantry: 'From the forward lofts birds are being sent to Heavy Artillery Groups and messages are coming

[49] WO/95/123/6, 22 January 1917.
[50] WO/95/123/6, 22 February 1917.
[51] WO/95/123/6, 24, 25 August; 14 September; 25 October 1917. WO/95/123/7, 28 February; 23, 25 May; 7 July 1918; Osman, 'Pigeons in the Great War', pp. 46-48.
[52] WO/95/123/6, 9, 11 April 1917.
[53] WO/95/123/6, 7, 8 June 1917.

in excellent times averaging 6 minutes.' [54] In 1929, a former infantry company commander, A. L. Binfield, would pay tribute to 'the wonderful service rendered by pigeons' during Third Ypres. He recalled how, after his men had taken the village of St Julian,

> It was observed that the enemy were assembling for a counter-attack, and, as a last resource [sic] our last pigeon was sent up asking for artillery barrage to be put down ... To our dismay the pigeon disappeared over the German lines, but, in spite of this the barrage came down in 14 minutes after the release of the pigeon as a direct result of the message we sent. The German counter-attack was launched but failed to reach the shell-holes we were holding – a very fortunate matter for us, as S.A.A. and Lewis-gun ammunition was practically exhausted.[55]

Although Third Ypres was notorious for the appalling weather in which the operations were conducted, tales of pigeon endurance became the stuff of legend. Colonel A. F. Thompson would recall:

> In October [1917] the forward area was a sea of liquid mud, and pigeons in their journey up to Company Headquarters were apt to get so plastered with mud that they were unable to fly when released. One day a pigeon that had been dispatched from the front line of shell holes with a test message failed to put in an appearance at the corps loft, and all units in the area were asked to report whether the pigeon in question had been found. A succession of 'nil returns' was at last broken by definite news from a battalion headquarters, which reported as follows 'Pigeon No.X101 passed here travelling due west ... walking and going strong.'[56]

As late as November 21st, Waley would proudly record that 'Birds are still doing very useful work from PASSCHANDALE.' Yet by then the service was struggling again. Storms and 'very heavy fogs' added to flying times and contributed to mounting losses. It was not simply the weather that was the problem. There were still not enough birds to meet increasing demand and, consequently, many young, untrained birds had been dispatched to the trenches and ill-advisedly tossed in dangerous conditions. In other instances, demands were being made on birds that pushed them to the point of exhaustion. The corporal in charge of the loft at Bapaume 'complained of the manner

[54] WO/95/123/6, 13, 23 August. Priestley, *Signal Service*, p. 222.
[55] 'War Pigeons', *The Times*, 12 July 1929, p.10.
[56] 'War Pigeons', *The Times*, 10 July 1929, p. 17.

in which birds had been used from Tanks. In one case 24 birds were sent up again to Tanks after having only been back in their loft some 2 hours. 40 birds from this loft were lost during the attack on 20th November [at Cambrai].'[57] Conditions for the Carrier Pigeon Service were, thus, deteriorating by the end of 1917. They would get worse next year.

The Challenges of Mobile Warfare, 1918

The practical limitations on the use of pigeons in severe wintry conditions clearly posed the CPS particular problems. By late 1917 a decision had been made that offered a potential solution. The BEF would formally establish a messenger dog service. Some units had been making *ad hoc* use of dogs since winter 1916-17. The results had been very positive; like pigeons, dogs could carry communications when no other means were available, they proved faster and less vulnerable than runners, coped admirably with the appalling environmental conditions and were remarkably adept at locating their handlers, even at distances upwards of 4000 yards, over unfamiliar ground, and at night. Waley, who was familiar with the French army's use of 1500 dispatch dogs, played a key role in creating the BEF's 'messenger dog groups', and the central kennel at Etaples was under his command. By April, the first groups were proving themselves in action.[58] While British dog use never matched that of the French (or Germans) this innovation once again points to the complexity of the technological history of the Western Front and the continued efficacy of the 'old' alongside the 'new'. And yet, by then, the very nature of warfare in France and Belgium had changed dramatically with profound implications for signals. In the more mobile battles being fought in the aftermath of the German spring offensives and the Allied counter-offensive of summer and autumn, the effectiveness of the communication technologies that had dominated up until that point were much reduced, including that of the pigeon service. Priestley, having noted that pigeons were more useful than forward wireless stations in 1917, commented on the 'reversal in the importance of these two methods of signalling which took place the following year.'[59]

Yet it would still be a mistake to assume that the carrier pigeon service did not continue to make a valuable contribution up to the end of the war. For Waley, his men and his birds, the impact of the German spring offensives, opening on 21 March, was, it is true, little short of catastrophic. Lofts were overrun or destroyed by shell fire and many birds were lost (often being killed to prevent their capture). As the Germans

[57] WO/95/123/6, 21 November; 13, 14 December 1917.
[58] WO /95/123/6, 1-11 December 1917; WO/95/123/7, 5 January, 4 May 15 April 1918. The fullest account is E. H. Richardson, *British War Dogs* (London: Skeffington, 1920), although it understates Waley's contribution.
[59] Priestley, *Signal Service*, p. 222.

advanced, birds carrying 'SOS' messages had frequently arrived at lofts in good time but communications between the lofts and headquarters were often severed by that point, so the messages served no purpose. Waley, characteristically, continued to record many instances of useful messages being brought in by pigeon but even he was forced to concede that 'during [a] rapid retreat in a few hours pigeons were useless.' Yet even as the Germans pushed forward, Waley was busy reorganising his command, 'salvaging' pigeons and equipment wherever possible, training new birds and establishing new lofts, including one in Paris, as a contingency should the Germans drive a wedge between the BEF and the French, to ensure a continued means of liaison through (or rather over) enemy occupied territory. [60] When, from July onwards, retreat turned to advance, the Carrier Pigeon Service was thus immediately in a position to contribute once more to the work of the signal service.

During the preparation and early hours of set-piece attacks with limited objectives, the offensives of 1918 still bore much in common with the battles of 1917 and thus pigeons continued to be useful. For example, after the successful operation at Hamel on 4 July, Waley reported 'Signals Australian Corps was enthusiastic about the work done by Pigeons...'[61] However, once the set-piece attack had progressed into a rapid advance, the problems of using pigeons in mobile warfare reasserted themselves. In early September, Waley visited the Canadian Corps 'an average of about 150 birds are being sent up daily to Brigades ... and about 50 operations messages are coming in by pigeon ... but owing to the rapid advance the distance for birds to fly back and the distance for the transmission of messages forward makes it extremely difficult for Divisions to receive messages early enough to be of any real use.' The CPS strove to adapt to these circumstances; pigeons were dropped to advancing units from airplanes, mobile lofts pushed well forward, civilian lofts in recently-liberated towns were requisitioned. A German mobile loft, complete with pigeons, was captured and 'within four days ... the birds were being used by our artillery.' Thus, while far greater use was indeed now being of wireless, there were still many instances where British soldiers had cause to be grateful to the Carrier Pigeon Service: '4-9-18: [visited] lofts at WATTEAU ... An SOS message was received a few minutes before our arrival brought in in 15 minutes from a platoon which was cut off and surrounded.'[62]

In 1899, in a newspaper article dismissive of the military value of pigeons, an experienced fancier was quoted as remarking, 'Heaven help old England if she ever has to depend upon the pigeon as a messenger of war.'[63] The soldiers of that lost platoon,

[60] WO/95/123/7, 11 April, 1 June 1918. Priestley, *Signal Service*, pp. 264-265; 277; 329.
[61] WO/95/123/7, 9 July 1918.
[62] WO/95/123/7, 31 August; 4, 9 September; 2,17 October 1918.
[63] 'Pigeons as Messengers in War', *The Yorkshire Herald*, 25 November 1899, p. 14.

as they watched the protective barrage fall around them, would surely have disagreed with that sentiment in the strongest possible terms. The experience of warfare from 1914-1918 had demonstrated the necessity of including the carrier pigeon among the communications technologies made available to front-line troops. Such provision was a rational and effective response to the conditions of modern warfare: the geographical extent of the battlefield; the tactics of dispersal and entrenchment; the centrality of rapid communications to effective combined arms tactics; firepower that inhibited the movement of runners and dispatch riders; the fragility and insecurity of both wire-based and wireless telecommunications. In particular during offensive operations, as troops advanced beyond their wire networks, pigeons proved their worth. Pre-war fears that birds could not cope with the stresses of modern war proved unfounded. While extreme meteorological conditions (as evident during the peculiarly cold winter of 1916-17 and the storms of late 1917) undoubtedly impaired the performance of the CPS, the birds generally coped well with gas and shell fire, and, even when caked with mud and soaked through with rain, demonstrated a remarkable determination to return, bearing their dispatches, to their lofts. Alongside the ever-dependable mule, they surely ranked among the most stoic of Tommy's animal comrades.

The British experience with carrier pigeons is particularly telling for, having exhibited a marked preference for innovative telecommunication systems before the conflict, they were rushing to establish carrier pigeon services, for both home and active service, within weeks of the opening of hostilities. This was made possible by the volunteerism, characteristic of Edwardian society, that provided both the necessary birds and personnel. There is now an increasing awareness among historians of how mobilising civilian expertise played a key role in the British Army's ability to adapt and innovate when faced with the myriad challenges of the Western Front. In the case of the pigeon service, that expertise was demonstrated not only by the managerial and organisational talents of Alec Waley but by the technical skills of his gallant band of pigeon-fanciers in uniform, the men who operated the lofts and trained tens of thousands of British and allied soldiers how to handle the birds.

We should not be too quick to accuse the War Office of short-sightedness in abolishing Allatt's carrier pigeon section in 1907. For those anticipating a war of movement, the limitations of the carrier pigeon as a military messenger were manifest. Those limitations were indeed made evident during the campaigns of 1918. Yet nor should we simply regard the Carrier Pigeon Service as an aberration born of the trenches, for the story of the pigeon in modern warfare did not end in that year. Although the British Army maintained its regular pigeon service for only a few months after the end of the First World War (providing lofts to occupation forces in Cologne and isolated garrisons in Ireland), the birds were called back into service during the Second World War. The changing characteristics of warfare had created new and

expanded roles for carrier pigeons. Nearly 200,000 birds were donated to the armed services by British breeders, 1939-45. They saved the lives of downed aircrew; they allowed European resistance fighters a secure means of communication with London; they landed behind enemy lines with intelligence operatives and airborne forces; they served troops in jungles and mountains where environmental conditions defeated other forms of communication; they were used by combat units when radio silence was essential, such as by motor torpedo boats off the coast of enemy-occupied France.[64] That the British mobilised twice as many pigeons in the Second World War as during the First should come as no surprise, for the second global conflict saw an historically unprecedented mass mobilisation of animals of all kinds for military service, some in conventional roles, such as horses and mules as draught animals and mounts, especially on the Eastern Front, and some as a response to new technological developments, such as the use of dogs for mine detection.[65] This phenomenon we should note well. The presence of animals on the battlefields of the twentieth century was neither an oddity nor an anachronism. Unless we fully acknowledge and account for that presence, our understanding of modern warfare is incomplete.

[64] W.H. Osman, 'Pigeons in World War II', in Colin Osman (ed.), *Pigeons in Two World Wars*, pp. 55-193.
[65] H. S. Lloyd, 'The Dog in War', in Brian Vesey-Fitzgerald (ed.), *The Book of the Dog* (London: Nicholson and Watson, 1948), pp. 188-191.