Fighting on Flying Machines. Wonders and Horrors of Aerial Warfare in Pilots' Personal Narratives (1915-1918)

By Gianluca Cinelli

Abstract: The advent of aeroplanes during the Great War gave birth to an unprecedented form of interrelation between the human and the machine. Like cavalrymen, who had to be expert riders before becoming soldiers, pilots were supposed to master their machines before they could fly them into battle. Therefore, their military drilling included engineering, mechanics, flying theory, and aerial tactics as well as shooting practice. However, as the pilots began to take part in the battles public interest more and more focused on the romantic aspect of flying and duelling. Unlike infantrymen, who barely managed to see their opponents, the pilots were able to engage their adversaries in close-range duels over the trenches, thanks to the technological means of the airplane. Thus, the new "aerial cavalry" depicted in papers and posters and the heroic figures of aces soon became instruments of propaganda. The crude reality of flying and fighting aboard the fragile and often unreliable planes emerges, instead, from the memoirs of the pilots, who were both fascinated and terrified by that new technological warfare. This paper will compare a number of memoirs of pilots from different countries (e.g. Baracca, Bishop, Collishaw, Fonck, Immelmann, Mannock, McCudden, MacLachanan, Richthofen, Udet, and others) to understand how the new aerial warfare was perceived, elaborated and depicted by those who experienced it directly. It will also analyse the rhetorical strategies that the authors of the selected memoirs used to harmonise the legend of the "air cavalry" with the harsh reality of the new-born warfare, oscillating between wonder and horror. Eventually, the paper will claim that the reference to chivalric honour was only a way to embellish a new brutal form of technological warfare.

Keywords: *World War One*, *Aerial Warfare*, *Personal Narratives*, *Military Technological Innovation*, *Autobiography*

Introduction

As the Great War broke out in 1914, aviation was in its prime and the broader public looked at it in awe (Morrow 1995, 305-308). Only eleven years before, the clumsy leap of the Wright brothers' machine on the windy shores of Kitty Hawk had swept away the eighteen-century mainstream idea that no heavier-than-air machine could fly.[1] In such short a lapse of time, the conquest of the sky became in the Western imagery a new horizon of imperialistic will to power (Kehrt 2010, 50-52), suggesting the equivalence of technical progress with appropriation (58). In the eyes of the majority of people in Europe and America aviation remained, however, little more than children's play (De Syon 2002, 118-

119)[2] or a sport for reckless and brave young men,[3] and the only credible aerial warfare was that of literary fictions (Paris 1993, 129-133, Wohl 1994, 74-94). Although the military considered the theoretical threat of aerial bombing of civilian targets with some concern (Davis Biddle 2008, 263-265; Fiocco 2002, 13-20), they also looked at the new aerial machines with scepticism because their deployment in combat implied the production of reliable aeroplanes, strong enough to carry two members of the crew for a couple of hours without breaking down (Kehrt 2010, 60). Nonetheless, since the 1910s the military in Europe began to consider the possibility of developing some sort of aerial corps (Morrow 1995, 309-311; Minniti 2018, 8-9),[4] while the Italian Army deployed aeroplanes for the first time during the Libyan war of 1911-1912 for aerial reconnaissance and bombing, which showed the strategic potential of the new machine (Paris 1991).

The industrial competition was triggered and stimulated by the military through calls for production and this competition soon was presented to the public as another contributing factor to national superiority over the neighbouring countries (Minniti 2018, 106-109). Also, flight schools received an increasing number of applications from men eager to join aviation, although such figures remained limited to a few hundred: in 1910 about 100 pilot licences were issued in France, the UK, and Germany (Minniti 2018, 30) and by the outbreak of the war France can count about 450 military pilots and Germany on almost 520 – pilots and observers (Caffarena 2010, 83). Pilots were not the only personnel required, though. Mechanics and specialised staff with a general understanding of motors and carpentry (aeroplanes were made of wood and fabric) were regularly recruited from industries and they largely outnumbered pilots.[5]

Entrusted with duties of reconnaissance and artillery observation (which was at first done through acoustic and visual signals and later via wireless technology installed on board the machines), aviation played a role that was traditionally assigned to cavalry. In 1914, aeroplanes were neither conceived nor equipped to harm each other. When by chance two enemy machines came across each other, their pilots used pistols, rifles, and hand-grenades, in an attempt to hit the opponent, mostly without any effect. Only during the summer of 1915 did things begin to change dramatically owing to the introduction on the German side of the front of a revolutionary technical device called synchroniser, which allowed the machine guns to fire through the propeller without hitting and damaging it (Fritzsche 1992, 67; Liggieri 2015, 81-82). Anthony Fokker's invention would change the aerial war forever, not to mention that it gave birth to air combat as we still know it today, namely as a

single-handed fight in which each pilot attempts to sit on the adversary's tail and shoot point-blank (Schüler-Springurum 2002, 211).

The skyrocketing evolution of aviation between 1914 and 1918 was, in Richard Overy's words, a "test of modernity" (quoted in Kehrt 2010, 21) alongside the development of other unprecedented forms of weapons such as U-boats, tanks, armoured vehicles, flame-throwers, and chemical agents (Hüppauf 2008, 589). British pilot James McCudden wrote that in 1913 "it was apparent to most people who took the trouble to think, that flying was to be the thing of the future, and the very near future, too" (2000, 1). Another British witness, gunner Alan "Contact" Bott, points out the industrial dimension of aerial warfare:

> The organisation of personnel is not a difficult task, for all are highly trained beforehand. The pilots have passed their tests and been decorated with wings, and the mechanics have already learned their separate trades as riggers, fitters, carpenters, sailmakers, and the like. [...] The machines comprise a less straightforward problem. [...]. The engine and its parts, the various sections of the machine itself, the guns, the synchronising gear, all these are made in separate factories, after standardisation, and must then be co-ordinated before the craft is ready for its test. ("Contact" 1917, 5-7)

As Maurice Kirby puts it, "World War One may be viewed as a critical staging post in the application of scientific techniques to problems of warfare insofar as it inaugurated a trend towards official military and government recruitment of scientists" (2004, 5). However, the tradition of World War One aerial warfare has been handed down quite differently for many decades, namely in the form of the myth of aces and "knights of the air" (Wilkin 2014, 43).[6] Since the introduction of fighter scouts equipped with machine guns to attack enemy aeroplanes in 1915, the press and the military began to build the superman-like image of the fighting pilot as a chivalric warrior that challenged his enemies in spectacular hand-to-hand duels (47). This largely propagandistic myth (Paris 1993, 136; Bernig 2003, 104-106; Szczepaniak 2009, 242), was fuelled since 1916 through the publication of the first pilots' accounts: Max Immelmann's (killed on 20th June 1916 and decorated with the highest German medal, the "Pour le mérite" – also known as "Blue Max" – for his 17 victories), Oswald Boelcke's (killed in a flight accident on 28th October 1916 with 40 victories), and Manfred von Richthofen's (better known as the "Red Baron", shot down on 21st April 1918 with 80 victories) autobiographical accounts appeared in 1916 and 1917 in Germany and made a sensation. Boelcke's book was translated into English in America in 1917, the very year that the US declared war on Germany, and

Richthofen's *Der rote Kampfflieger* was a bestseller.[7] Such an image of the pilot as an extraordinary individual who rules his destiny by fighting heroic duels aimed to correct the impression – increasingly creeping among the troops and the population – that the technology employed on the battlefields was overwhelmingly crushing the anonymous masses of soldiers fighting in the trenches (Alagi 2015, 140-141; Seidel 2015, 69):

> In the myth of the flying heroes, an image was outlined in which technology and the future seemed to combine. Weapons, instruments, and devices appear in the picture and become indispensable for the demonstration of heroicness under the conditions of the modern battlefield. They are not part of a "storm of steel" that overwhelms the soldiers but are ruled by the hero. (Hüppauf 2008, 589)

This remark is worth note because, as I will claim further on, the technological factor was more ambiguous than it seems: on the one hand, it was functional in creating the image of the pilot as the master of the machinery, but on the other hand, pilots learned to fear technology as a power difficult to wield. As we will see, the "symbiosis" between the pilot and the machine emerges from the personal narratives as an ambiguous and rather romanticised experience that encompasses the opposite feelings of confidence and mistrust, bravery and fearfulness, empathy and detachment. In the distance, such a "symbiosis" seems rather a staged idea. In fact, pilots mostly had to endure bodily and mental straining flight conditions (the cold, the height, the lack of oxygen, the effort of gazing in the distance to spot enemy planes, the exposure to exhaust fumes and sprays of oil from the engine, etc.), which turned out to be one relevant cause of nerve-shattering anxiety.

As Habeck claims, "the ordinary men caught up in the maelstrom of the Great War were obliged, for their physical and psychological survival, to deal with technology on a more direct and intimate level" (2000, 100), which forced them "to decide whether the new weapons were something that they could adapt to or even learn to like, or whether they rejected this 'resituation' of technology. When weapons did their job – that is, helped to defeat the enemy, and saved lives in doing so – soldiers were naturally more willing to accept technology" (116). Thus, "soldiers learned to fear and hate the new matériel of war. One of the worst aspects of the conflict was that men were killed from a distance by an 'infernal' machine, shell, or grenade; they never even saw the enemy that was attacking them" (119). Aerial warfare offered a different perception of the combination of war and technology insofar as the latter was

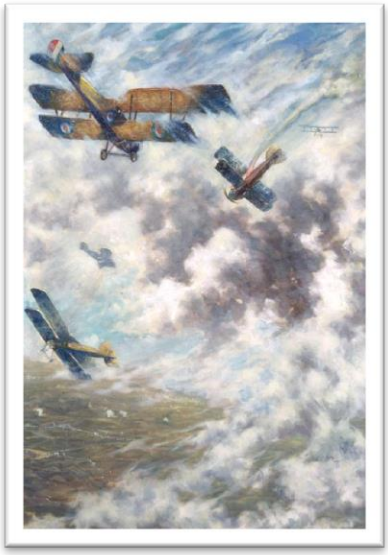

Fig. 1: A dogfight

the necessary precondition rather than an accidental development. While common foot-soldiers in 1914 could march thinking that they would fight traditional battles with cavalry charges, bayonet assaults, trumpets, flags, and colourful uniforms, pilots were already a technological élite. Moreover, since 1915 the new tactics of aerial warfare multiplied the close encounters between enemy aeroplanes in the sky, both in the form of individual duels and dogfights.[8]

Historians have shed a light on the propagandistic nature of the discourse on "air cavalry" and "knights of the air". However, they paid too little attention to the role that technology plays in revealing the truth behind that myth. In my opinion, an invaluable source of this counter-discourse is the corpus of pilots' published memoirs, and in particular, those written by the very same pilots whose deeds contributed to shaping the myths of the "aces" and "knights of the air". One should bear in mind that the myth of "chivalry" is only half of the story, though. Observation and recognition remained the main duties of aviation during the war, followed by bombing and scouting (Alegi 2015, 134), without forgetting the important task of hunting kite-balloons, in which a few pilots developed special expertise.[9] It seems significant that in post-war Germany and France, two countries that heavily used the figures of fighter-scout pilots propagandistically (Bryon-Portet 2007, 149-154; Wilkin 2014, 49), very few memoirs of observers and gunners were published, while in the UK more attention was paid to observers and gunners.[10] Fighter-scout pilots were a minority, albeit "loud", of the airmen and their memoirs do not speak for all. Nonetheless, the most well-known fighter-scout pilots – such as Baracca, Bishop, Boelcke, Buddecke, Collishaw, Fonck, Immelmann, Mannock, McCudden, Richthofen, Scaroni, Udet – provide invaluable insight into the controversial myth of the "knights of the air". The first reason is that in their texts, the relation between the human and the machine stands out as the fundamental feature of their combat experience. Their accounts show how the pilots looked at their aeroplanes in awe, with admiration and suspicion, for they would make the difference between living and dying while fighting in the sky. These pilots were indeed the elite of the flying corps, who tested the new flying weapons to the limit and laid the basis of modern aerial combat. Many also served as training pilots away from the

front and occasionally tested new models of aeroplanes, a dangerous task that often claimed their lives. Their awareness of the genuinely technological nature of their war experience encompasses their mixed feelings of confident superiority, fear, and anxiety. As they build and disprove the myth of "aerial chivalry", their tales sound straightforward and offer a balanced account of the technological novelty, first of all in language: they name the aeroplanes as marvellous things made of mechanical parts, yet almost alive and provided with own character and personality. They find a way to depict the beauty of the flying machines without slipping into the aestheticized descriptions made by poets like D'Annunzio or futurist Marinetti. What emerges from those memoirs, I will argue, is a complex scenario of psychological, ethical, and aesthetic implications, for the technological revolution of aerial combat also represented the exploration of unknown horizons. Of course, many other pilots, who were neither famous nor skilled in combat, published their memoirs. However, these memoirs too often lack precisely unfolding thorough reflection about the close encounter with technology as the core of the experience of fighting on flying machines.[11]

In the following pages, by comparing a corpus of selected memoirs written by aviators who fought on the western and Italian fronts between 1914 and 1918, I aim to explore the close encounter with technology beyond the myth of the aces and "knights of the air". Without pretending to contribute to the historiographical scholarship on the topic, I will focus on highlighting how the technical aspects of the pilots' experiences stand out in their writing and how they affected their opinion about flying, eventually influencing public imagery since 1917. If the psychological toll of fighting on flying machines was mostly understated by the propagandistic narratives, it was not passed over in silence, however, by the "aces" themselves, who accounted for the wonders and horrors of the new aerial technological warfare by creating a novel narrative niche and language for an unprecedented war experience.

1. The wonders of flying

The experience of flight has been called a "vertical revolution" (Minniti 2018) as far as it expanded the perception of space from the horizontal to the vertical axis. The physical experience of leaving the ground and climbing into the air is often described as exhilarating and elating, first of all, because it entails the subverting of usual bodily perceptions: "The organism creates a reference system that, in principle, shows its position at all times. This reference system, which is closely linked to the individual's conception of space, is deeply rooted

in the psychological and tailored to earthly conditions; when flying, it is subject to strong interference" (Asendorf 1997, 162). In flight, the reference system is first of all mediated by the aeroplane moving in space with respect to the height and horizon coordinates, while the body, inside the cockpit, undergoes variations and forces that reverberate on the system, producing unusual perceptions and contractions of the muscles. For example, in the absence of reference points, the speed seems much lower than it is and the distance between objects is difficult to evaluate. On board the open-cockpit early aeroplanes, all the senses were involved in the experience of flight: the skin perceived the violent drought produced by the propeller, which Manfred von Richthofen described as a "beastly nuisance" on his very first flight (1918, 57), and felt the bitter cold at high altitudes, which most pilots describe as excruciating torture.[12] Ears were overwhelmed by the roar of the engine, which forced pilots and observers to speak through a very impractical tube; and finally, the sight was the sense that most engaged with the experience of moving in the air and above the ground. Unlike other senses, vision also encompasses cultural perception of space, and therefore, "it is associated with the physicality of the body and its relationship to the environment, as well as with cultural practices and technologies of specific communities that define sensuous experience in meaning-making" (Lee 2017a, 1132).

In the accounts of pilots, it recurs how wondrous it was to see the land from above, precisely because the human elements of the landscape suddenly appeared small and almost unreal, as Richthofen says about the Dome of Cologne that looked like a "little toy" seen from the sky (1918, 58). Other pilots, at 4500 metres, observed in awe the world that stretched beneath them so vast that they could see the entire landscape of northern France and, over the Channel, the white cliffs of Dover (Lewis 2003, 57):

> From Arras I could see the British Channel, and it resembled more a river of liquid gold than a sea. Across the Channel it was possible to make out England and the Isle of Wight. The chalk cliffs of Dover formed a white frame for one side of the splendid picture. […] The marvellous beauty of it all made the war seem impossible. (Bishop 1918, 130-131)

Such estranging an experience replaces physical distance with an imagined distance: what is far away – home – suddenly draws near, and what is near – the dreary frontline – appears as if an alien and undesirable world (Lewis 1936, 93), as Bishop remembers:

> I could not get the idea out of my head that it was just a game they were playing at; it all seemed so unreal. Nor could I believe that the little brown figures moving about below me were really men – men going to the glory of victory or the glory of death. I could not make myself realise the full truth or meaning of it all. It seemed that I was in an entirely different world, looking down from another sphere on this strange, uncanny puppet-show. (Bishop 1918, 99)

The earth, however, is not the only landscape that pilots admired while flying, because the sky, too, is a landscape mostly consisting of moveable and inconsistent clouds. Seen from the ground, the clouds appear almost as solid objects, but pilots found out that they are no more than mist, through which one can fly without encountering any resistance. The clouds raised great amazement in pilots, sometimes almost casting a spell on them causing reveries and profound detachment from reality. However, flying through the clouds might be a frightening experience, as Cecil Lewis remembered: "In a cloud there is no horizon, nothing above, below, in front, behind, but thick white mist. It's apt to make you panic after a while" (Lewis 2003, 148). Lewis continues to describe the amazement that he felt admiring the towering clouds among which he flew when all of a sudden he was startled by the appearance of a machine out of the blue, which turned out to be the shadow of his own aeroplane cast against a big white cloud (151). Another British pilot describes the cloudscape in a very different way, as an "ice-bound sea, smooth, barren, unpeopled, dead. The lunar landscape could be no more terrible to look upon" (MacMillan 1972, 78). In combat, however, clouds became a relevant tactical factor to exploit because pilots often used to hide beneath and within the clouds to catch their enemies by surprise (Bishop 1918, 65, 68, 132, 155, 173, 258; MacMillan 1972, 78).

The other weather element that pilots had to deal with was the wind. Because many early models, such as the Morane Saulnier "Parasol", immediately turned over if landed or air-borne out of the line of the wind (McCudden 2000, 73), pupils in flight schools were not allowed to take off even with the slightest wind (Hill 1983, 1948). Winds also affected combat tactics: the German crews, for example, preferred to take off with westerly winds, which would permit them to return beyond their lines quickly (Richthofen 1918, 125, 134, 151, 175, 187).[13] Winds were also dangerous when an aeroplane went in a spin, because it could push the machine over the frontline and force the pilot to land in enemy territory.[14] Eventually, rain and frost represented two further dangers for pilots and their land crews. In the first months of the war, when airbases moved with the front and therefore consisted of just tents mounted in a field, ground personnel slept under the wings of the machines, no matter if it

rained. McCudden (2000, 47), who initially joined the war as a mechanic, remembers that he once woke on a chilling October morning covered in frost.[15] Frost could also affect the engine's moving parts, freeze the motor oil, and jam the weapons. Flying, therefore, meant mastering the elements in a space that humans had begun to explore only recently. The pilots' ability to challenge the forces of nature (rain, wind, and mists) strongly contributed to creating the myth of the pilots as "masters" of the air. Weather and atmospheric elements, however, were not the only forces that pilots had to master. In order to fly and receive their licence, they, first of all, had to master the aeroplane, both practically and theoretically, until they "felt" the machine as horsemen learn to "feel" the beast they ride (Bishop 1918, 35; Liggieri 2015, 91).

2. Technical expertise and the human-machine symbiosis

Becoming a pilot required the pupils of flight schools to pass a series of tests, some of which were theoretical. The subjects taught in school included aeronautical service, notions of physics and mechanics, materials, flight equipment, engines, magnetism and electricity, telegraphy and radiotelegraphy, weapons and ammunition, orientation and observation, and cartography (Caffarena 2010, 125). Prospective candidates were supposed to possess basic skills in literacy and math and be psychologically and physically fit.[16] However, during the war, the demand for fresh pilots to replace the casualties was so high that new airmen were quickly licensed after a few weeks of school, with just a handful of hours of flight under their hats (Hill 1983, 1948).[17]

The first flight experience was shocking for many pilots and often ended in disaster, while some of them, instead, compare flying with cycling (Rochford 2015, 15; Bishop 1918, 31). Richthofen admitted his utter ignorance about engines (1918, 66) and was uncomfortable and disoriented as he first took off as an observer in 1915 (57-58). In general, flight accidents were common and killed pilots and observers as much as fighting enemies.[18] "Going up" was both exciting and scary, and if the likely encounter with enemy scouts was a constant cause of concern, the possibility that the engine broke up equally kept pilots on their toes (Baracca 1919, 21). Pilots who were expert mechanics and understood engines properly, like McCudden, Immelmann, Scaroni or Udet, had more chances to increase the reliability of their aeroplanes. The former, who was enlisted as a mechanic and later became a pilot and an officer, remembers in his memoirs that he constantly worked with his ground crew to enhance his S.E.5 scout to increase its speed and ceiling, which would make it superior to any

other German two-seater, which McCudden patiently stalked and hunted for hours almost every day (2000, 228).

Early aeroplanes carried primitive instruments that supported the pilot to steer the machine. One of the most difficult tasks to perform was, as many pilots remember, flying through mist and clouds. It was at that time, that physical perception had to be replaced with mechanical instrumentation to tell the height and position of the machine (Kehrt 2010, 122). The line of the artificial horizon was one of the trickiest technical devices on board:

> The artificial horizon reflects the aircraft's position over the ground in such a way that an artificial horizon line moves relative to a fixed aircraft silhouette. However, this is precisely the difficulty with the reading: the pilot sees the horizon moving, whereas, in reality, the aeroplane is moving. So he has to swap the display in his imagination to get a picture of the position of the machine. This becomes particularly difficult when he is dependent on the artificial horizon, i.e. its image, for example at night, when it cannot be compared with the real horizon line. (Asendorf 1997, 178)

Many pilots, finding the mechanical aspects of flying "compelling", although they "doubted whether audiences, who consisted of people largely ignorant to the technical aspects of flying, would appreciate it" (Isherwood 2014, 4), nonetheless provide detailed descriptions of the machines and their technical and mechanical parts, making comparisons between different aeroplanes and often explaining the meaning of a new technical vocabulary which their readers might not be accustomed to. Aeroplanes were made of a wooden frame covered in fabric and their parts were ailerons on the wings, stabilisers (or elevators), a propeller, the fuselage (or the nacelle in some early models), the rudder, riggings, and wires; the pilot sat in the cockpit and steered the machine through a complicated apparatus consisting of a joystick to move the ailerons and elevators, throttle lever to increase or decrease speed, blip-button (on aeroplanes with a rotary

Fig. 2: Albatros D.III cockpit

engine),[19] pedals to steer the rudder, and the pump to mix air with petrol to fly at different altitudes. Some of these words were already known to the public (e.g. riggings and rudders as parts of sailing ships; wires and pedals in bicycles), but the public was not necessarily informed about how these things were assembled on a flying machine. Therefore, pilots sometimes depicted precisely the apparatus of the aeroplanes and how it was used, and one of the most accurate descriptions was provided by William "Billy" Bishop:

> To those who have never seen a war machine I would explain that to control one, the pilot has to manipulate but a single lever which we call the "joy stick". […] The "joy stick" also controls the banking. By moving it to either side you can tilt up whichever wing is desired. At his feet the pilot has a rudder bar which controls the horizontal direction of the machine. […] The pilot thus has both feet on the rudder bar; holds the "joy stick" with his right hand, and with his left controls the engine of the machine by holding the throttle in his hand. He is always able to do anything he wishes either with the engine or the machine itself. When firing the gun he simply moves his thumb slightly along the "joy stick" and presses the lever which pulls the trigger. To be able to fight well a pilot must be able to have absolute control over his machine. He must know by the "feel" of it exactly how the machine is, what position it is in, and how it is flying, so that he may manoeuvre rapidly, and at the same time watch his opponent or opponents. (Bishop 1918, 210-211)

Bishop's remarks give a precise picture of the symbiosis of man and machine that developed inside the cockpit, the very structure and space arrangement of which was designed accordingly with the human body (Kehrt 2010, 38) so that the pilot could manipulate the whole apparatus by using his four limbs: Bishop, again, writes that the cockpits "generally are finished in hard wood and there are polished nickel instruments all about you. They indicate height, speed, angle, revolutions, and about everything an airman ought to know" (Bishop 1918, 43). British pilot Alan "Contact" Bott wrote that "an airman should regard his body as part of the machine when there is a prospect of a fight, and his brain, which commands the machine, must be instinctive with insight into what the enemy will attempt" (1917, 65). Scout-fighter pilots, thus, made the most complete form of a man-machine compound, as far as they steered the whole plane (in which they seated looking frontally) as a weapon that they could fire (almost) without taking their hands off the controls (McScotch 1936, 34). Cecil Lewis, who flew for many months two-seaters, finally flew his first scout, a Sopwith Triplane, in 1916: "nothing gives such a sense of mastery over mechanism, mastery indeed over space, time, and life itself, as this. [...] It involves mastery, for that alone gives detachment, and only from detachment

comes harmony – a sense of values" (Lewis 2003, 160). Mastery over machines elevates the human to a state of harmonic detachment. In such a state of elation, the pilot could tell the beauty of the aeroplane, especially scouts, whose description is a *topos* of most memoirs. Unlike the early, clumsy two-seaters like the MF.7 "Longhorn", MF.11 "Shorthorn", RE.2 or FE2.b, which were slow, vulnerable, and primitive-looking, the fast single-seater scouts are depicted as fast and powerful as predators, and slender and elegant like birds. The first two were the Fokker E.III on the German side, the French Nieuport 11 and 17, and the British Sopwith Scout. Kehrt defines the revolutionary monoplane Fokker E.III as a ground-breaking "instrument of violence" (*Gewaltdispositiv*) whose strength consisted in the compact unit of man and machine: the former commanded both the steering and the firing through the propeller, so he only had to point the aeroplane itself against the target (Kehrt 2010, 183).

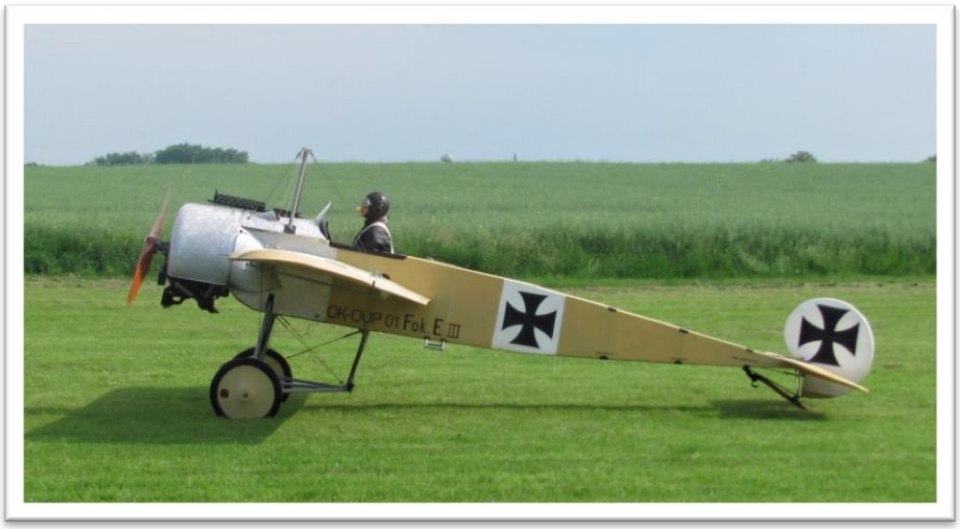

Fig. 3: A modern replica of Fokker E.III

Hans Buddecke saw in this fast scout the "ideal" of aerial warfare (Buddecke 1918, 43) and German ace Oswald Boelcke wrote that the small monoplane that "flies wonderfully and is very easy to handle" was like a "child" to tend and protect (1917, 47); Immelmann's comment sounds soberer and technically detached: "They are pretty machines, light, fast, and agile. The pilot flies alone. He operates the machine gun that shoots through the propeller. The plane is only intended for fighting enemy planes, not for reconnaissance" (Immelmann 1916, 50). To Ernst Udet, the monoplane looked "wonderfully graceful, sleek as a falcon" (Udet 1935). McCudden, on the other side of the front, wrote that "the

Fokker in the air was an extremely unpleasant looking beast" (2000, 85).[20] The technical superiority of Fokker E.III in 1915 and early 1916 made French and British pilots talk of themselves as "Fokker fodder". Cecil Lewis remembers that in 1915 "a sort of mystery surrounded the Fokker. Nobody knew whether it had a rotary or a stationary engine. Few having been attacked by it had come back to tell the tale [...]. All we knew was that it was an evil-looking monoplane scout" (2003, 53).

Fig. 4: Nieuport 17.1c

The counterpart of this German technical wonder was the Nieuport 11 (soon followed by the improved version 17), a fast biplane that many pilots praised as fast, agile, easy to handle, and beautiful. Italian ace Baracca writes enthusiastically about these "new and marvellous machines" (*apparecchi nuovi e meravigliosi*) (1919, 31), while Scottish pilot MacLanachan accurately describes its features such as the reduced wingspan, the surface of the upper and lower planes, the elegant "V" struts and the essential rigging that made the machine look "smart and tidy" ("McScotch" 1936, 7). Obviously, as a French product, the Nieuport was also very popular among French airmen, both famous like Fonck and unknown like "Lieutenant Marc", who makes a comparison between this machine and the equally excellent SPAD VII:

> The Nieuport is lighter and flies on its own, the Spad is heavier and with her you had better not hover near the ground, but what an amazing machine it is! Balance, speed, gentleness... As you fly it, you really have the impression of having wings instead of arms. I'm starting to feel at ease in my machine: a good seat that wraps me, one machine

> gun, almost no instruments but a clock, an altimeter, and a map as big as my hand. To steer her, I just need small moves, almost hints. It seems that the machine obeys the force of my will alone. (Lieutenant Marc 1918, 53)

This French pilot testifies to the enormous leap forward that the fighting scout represented in the creation of the symbiotic unity of man and machine. The simplification of the cockpit, the ergonomic fitness of the seat, and the impression of having wings in place of arms make the pilot look like a thinking machine. As Hüppauf writes, "pilots were literally and metaphorically at the

Fig. 5: Spad VII

helm and seemed to dominate this space of modernization, by taming such a powerful technology" (2008, 589). Once more, Bishop, who scored a relevant amount of his 72 victories flying a Nieuport 17.1c, provides the most elaborated description of this very popular plane:

> Being a French model, the Nieuport Scout is a beautiful creature. The distinctly British machines – and some of our newer ones are indeed marvels of the air – are built strictly for business, with no particular attention paid to the beauty of lines. The French, however, never overlook such things. The modern fighting scout, and to my mind the single-seater is the only real aeroplane for offensive work, may have the power of two-hundred horses throbbing in its wonderful engine. Some of the machines are very slender of waist and almost transparent of wing. Aeroplanes do not thrust their warlike nature upon the casual observer. (Bishop 1918, 42)

The machine is a "beautiful creature" and like a woman looks "slender of waist", which conceals her real power, prowess, and deadly weapons. A hint of dandyism can be caught in Bishop's words and also in other pilots' remarks about the beauty of the machines, even when he spends words of admiration

Fig. 6: Albatros D.III

for enemy aeroplanes: "The German Albatross machines are perfect beauties to look upon. Their swept-back planes give them more of a bird-like appearance than any other machines flying on the western front. Their splendid, graceful lines lend to them an effect of power and flying ability far beyond what they really possess" (52). "McScotch" remembers the first time he saw a Nieuport 28: "She looked like a racehorse among a lot of old cab hacks [...] her whole appearance was so clean and warlike I remarked to the others: 'What a beauty!'" ("McScotch" 1936, 130).

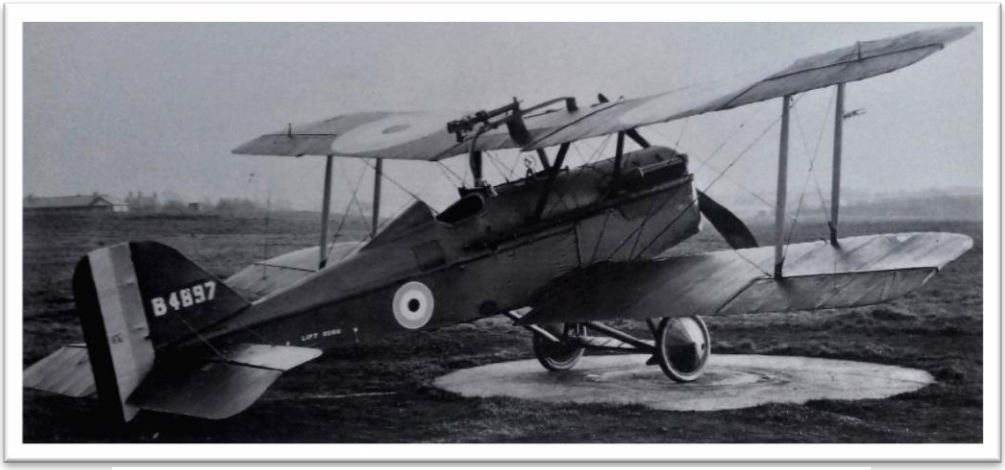

Fig. 7: S.E.5a

Other models such as the S.E.5a were praised for their speed and manoeuvrability (Lewis 1936, 163);[21] McMillan compares the Sopwith Pup, "smooth and stable, mellow like old wine",[22] to her follower, the Camel, which was "a buzzing hornet, a wild thing" (1972, 131), so responsive to the pilot's command that once she was steered too strongly (McMillan being used to flying the slower and less acrobatic two-seater Sopwith 1½ Strutter),[23] "her tail rose

Fig. 8: A Sopwith Pup with pilots wearing flight garments

Fig. 9: Sopwith Camels

like a backing bronco's and threw [him] head first out of the cockpit" (134). In such unfortunate an occasion, the security belt failed and McMillan found himself laying over the machine guns, with his face almost against the revolving propeller. Only struggling and with the help of good luck, McMillan crawled back into the cockpit and resumed the control of his machine.[24] Mastery of the machine was not enough to prevail on the adversary, for, as McCudden wrote, "it is more easy to find a Hun and attack him from a good position than it is to do the actual accurate shooting" (2000, 169). Italian ace Silvio Scaroni writes about that:

> Before I began my service in the fighting squadrons I had never operated a machine gun: I only vaguely knew its mechanisms, but I had never had the opportunity to deepen this expertise. At the first inconveniences that occurred to me at the beginning, I immediately understood the capital importance that the knowledge of one's weapon has for a hunter. (1922, 128)

Although good shooting was a necessary skill for fighting pilots (Bishop 1918, 209-210), this training was largely underestimated by higher commands and flight schools, which outraged Italian pilot Silvio Scaroni (1922, 129). However, the efficiency and efficacy of weapons on board the aeroplanes remained a

major concern for pilots. At first, "all the machines which went up were loaded with hand-grenades, as the intention then was to bring a hostile aeroplane down by dropping bombs on it" (McCudden 2000, 28). Other aeroplanes were fitted with rifles (47),[25] a remarkable advancement if compared with the "fléchettes, or steel darts" (25) that pilots were supposed to fling from above over the heads of the enemy marching troops.[26] Machine guns often jammed to the utter frustration of pilots (Baracca 1919, 40), mostly because of faulty cartridges, but also due to the extreme cold at high altitudes or inaccurate cleaning of the mechanisms. Moreover, Lewis machine guns mounted over-wing on aeroplanes such as the Nieuport 17 and the S.E.5 represented a potential cause of incidents when the pilots had to dislodge them to reload.[27]

Thus, the sort of combat that the myth of the "knights of the air" built and handed down, namely a combat in which two extraordinarily skilled and brave men skirmished to the death with chivalric mutual respect, seems rather belong to the world of tales. Individual ability surely made the difference, as far as being a good shot and skilled in acrobatics would gain superiority over the opponents. From the perspective of propaganda, the mythical image of the knightly pilot was fundamental to convince people that something noble still existed in a highly technological war. In the next paragraph, however, I will show that technology made aerial warfare a brutal slaughter nonetheless. Through the representation of the pilot as a hunter, as pilots' mostly depict themselves, one can see that the encounter with technology and with the enemy in the sky was more similar to an ambush than to a face-to-face challenge. The technical superiority of the machine as to speed, ceiling, manoeuvrability, and firepower permitted pilots to catch the enemy unaware from behind and to murder him by shooting him in the back before he could even try to fight back.

3. The reality of combat: chivalric duels or treacherous murders?

The introduction of a technological device – the synchroniser – that made the aeroplane into a flying weapon also gave birth to a new character, the "ace" (Fritzsche 1992, 67; Wilkin 2014, 47). The use of this word began in France (*as*), after Roland Garros downed three German planes with his Morane Saulnier "Parasol" monoplane, on which he had steel deflectors mounted on the propeller, to operate the machine gun through it without chopping it off (Wohl 1994, 208). As Kehrt highlights, the connection of flying and shooting enhanced the perception of aerial combat as a struggle for superiority that transcended more obscure duties of military aviation like observation, bombing, and artillery direction (2010, 183). The first aces to make the news were German

pilots Oswald Boelcke and Max Immelmann. The German military quickly understood the influence that such "heroes" had on the public and built a propaganda machine around their deeds, not only by divulging the news and detailed accounts of their fights and victories, but also by printing postcards depicting the pilots in dandy-like attitudes, wearing their uniforms and medals, or standing by their machines in virile postures with spread legs and a stern expression on their face. Such images of youth, elegance, determination, and self-confidence were the core of the myth of the "aces" promoted in Germany and France, and more reluctantly and later by the British (Paris 1991, 135; Wohl 1994, 211-221; Alegi 2015, 140-141). The "knight of the air" adapted the reminiscence of medieval romance to the contemporary world of industrial technology (Goebel 2007, 225). He was a new kind of warrior that used the technological machinery – with which also had a symbiotic relationship – in terms of an idealised and romanticised ethos: the encounter with the enemy was close and direct – unlike for ground troops that seldom saw the enemy dug in their trenches beyond the no-man's land –, fair like a sports competition. In short, "the tale of chivalrous air warfare fulfilled a compensatory function. It pictured the kind of battle the war as a whole should have been but was not: a fair and straightforward man-to-man fight" (227).

Pilots' memoirs helped to consolidate such a myth already before 1918. In a letter, Boelcke recalls how, on 8th January 1916, he downed a British observation plane and afterwards landed to meet the wounded pilot and observer: he talked with them and visited the latter in the hospital, bringing to him books and some pictures of his plane (Boelcke 1917, 94-95). Richthofen, too, accounts for a close encounter with his downed adversary:

> I felt some human pity for my opponent and had resolved not to cause him to fall down but merely to compel him to land. I did so particularly because I had the impression that my opponent was wounded for he did not fire a single shot. […] They were the first two Englishmen whom I had brought down alive. Consequently, it gave me particular pleasure to talk to them. (Richthofen 1918, 130)

Ernst Udet (1935) recalls a duel with French ace Georges Guynemer, who gallantly spared his life when he understood that the German pilot could not shoot due to a machine gun failure. This makes the author believe that something of ancient chivalric heroism (*ein Stück vom ritterlichen Heldentum alter Zeiten*) still existed. Udet vividly stuck to the myth of the "chivalry of the air" in the mid-1930s, as he described another duel in terms of a medieval tournament

in which two knights charge each other frontally with their lances (*wir sausen wieder schießend gerade aufeinander zu wie zwei Turnierreiter mit eingelegten Lanzen*).[28] Italian ace Baracca, too, accounts for an episode of "fair play", after he shot down an opponent:

> I talked for a long time with the Austrian pilot, shaking his hand and encouraging him as he was very disheartened; he came from the Russian front where he had earned the Military Cross and the Distinguished Service Medal that he wore on his blue uniform. He had not been able to save himself from my hunt and he expressed his admiration to me with the few words of Italian he knew. (Baracca 1919, 55)

Among British pilots, who tended not to dwell too much in the myth of the aces,[29] the "knights of the air" are often depicted as sportsmen (Goebels 2007, 223), as this remarkable page of British pilot Cecil Lewis demonstrates:

> To be alone, to have your life in your own hands, to use your own skill, single-handed, against the enemy. It was like the lists of the Middle Ages, the only sphere in modern warfare where a man saw his adversary and faced him in mortal combat, the only sphere where there was still chivalry and honour. If you won, it was your own bravery and skill; if you lost, it was because you had met a better man. [...] Sport, after all, is only sublimated fighting, and in such fighting, if you don't "love" your enemy in the conventional sense of the term, you honour and respect him. (Lewis 2003, 45)

McCudden feels respect for his "disciplined, resolute and brave" adversaries (2000, 266) too, and "McScotch" unfolds relevant observations about the ethical aspect of respecting the enemy and fighting without treachery, especially outlining the moral personality of his friend and mentor Edward "Mick" Mannock, the Irish ace with whom he flew in 40th Squadron: to Mannock, killing came as a shock (1936, 74) and he was, therefore, "groping about for some guiding principle in life, in civilisation, and in his eagerness he clutched at anything that resembled an ideal in concrete form" (88).

The myth of "chivalry" combined with that of the "aces" – whose victories were published in charts like the scoring of sport-champions –, therefore, connected with the two fields of experience akin to war, namely sport and hunt (Lee 2017b, 97). As Szczepaniak puts it, fighting was usually narrated as a competition by using hunting metaphors, which also created the opportunity to celebrate individual successes like in sport, and this is why such a narrative implied fair play and mutual respect (2000, 246). Two pilots who strongly

perceived aerial fighting as a sport-like competition and hunt were Manfred von Richthofen and Billy Bishop. To the former, the skies above the river Somme in 1916, while the bloody allied offensive raged, were a "happy hunting ground" (1918, 114). Richthofen built his memoirs around compensatory mythology of hunting as a noble, exciting, and morally acceptable way of killing: "My father discriminates between a sportsman and a butcher. The latter shoots for fun. When I have shot down an Englishman my hunting passion is satisfied for a quarter of an hour. Therefore I do not succeed in shooting two Englishmen in succession. If one of them comes down I have the feeling of satisfaction" (209). Further on in his memoirs, he recounts a period of leave in Germany in the spring of 1917, when he can resume his beloved passion of gaming: "At the moment when the bull came near, I had the same feeling, the same feverishness which seizes me when I am sitting in my aeroplane and notice an Englishman [...]. The only difference is that the Englishman defends himself" (213). About the moral acceptability of this vision one can be doubtful, especially if one considers that the author also received "a good deal of pleasure" from bombing Russian troops (102) and found "particularly amusing" spraying them with bullets because "half savage tribes from Asia are even more startled when fired at from above that are cultured Englishmen" (104). Hunting, in Richthofen's view, seems to turn war into a sport and killing into a detached act of shooting at inferior creatures – be they beasts or "savages". However, one must also take into account that his memoirs were published in 1917 and circulated as an instrument of propaganda, which therefore confirmed the dominant colonial and Eurocentric perspective concerning other people.

Billy Bishop pictures himself as an ambitious person (1918, 106) – not unlike Richthofen – and particularly intense was his competition with Captain Albert Ball, who was at the acme of his "success" when Bishop had just begun to fly on the Western Front: this urged him to fly for many hours over the enemy lines in search of "some easy victims", for he wanted "to shoot a 'rabbit' or two" (134). The sporting competition takes the form of hunting German aeroplanes (126) and the "human rabbits" (153) flying them. In his particular idiom, the machine and the man inside are somehow blurred:

> To bring down a machine did not seem to me to be killing a man; it was more as if I was just destroying a mechanical target, with no human being in it. Once or twice the idea that a live man had been piloting the machine would occur and recur to me, and it would worry me a bit. My sleep would be spoiled perhaps for a night. I did not relish the idea even of killing Germans, yet, when in a combat in the air, it seemed more like any other

> kind of sport, and to shoot down a machine was very much the same as if one were shooting down clay pigeons. (167)

Bishop is brutally honest as he says that the machine is the target to hit, but it is the man inside that must be injured or killed to make sure that the attack is successful (214). This statement undermines the affectation of the knightly duel as a sporting competition, from which the gruesome reality of killing was almost removed. In fact, the numerous propaganda images that accompanied the narration of the aces' deeds often depicted the wrecks of enemy aeroplanes, but not the mangled bodies of their pilots.

The technical nature of the aerial combat made the medieval knightly duel anachronistic (Bernig 2003, 102) because the outcome of any aerial combat depended not entirely on the skill and determination of the pilot, but largely on the technical superiority of his machine and the tactical advantage of the surprise attack or ambush.[30] Among the several tactical rules set by Edward Mannock, his first commandment concerning the attack on an enemy scout was "always above, seldom on the same level; never underneath" (while two-seaters had to be attacked from beneath, to take advantage of the gunner's blind spot) (Bradbeer 2006, 35). Thus, the metaphor of the hunt sheds a light on the true nature of aerial combat more than that of sport: all pilots state in their memoirs that the most effective way of winning a fight was by *not fighting at all*. Rochford writes that the "best way to shoot down an EA was to surprise him and get as close as possible before opening fire" (2015, 58); McMillan writes that "sometimes there was evidence of chivalry, but more often there was just the sheer bloody murder of the head-hunter" (1972, 102), and remembers one episode where his patrol of Camels caught a formation of German Albatrosses unaware: in the utter isolation of his cockpit, overwhelmed by the elating feeling of having a complete advantage, he sat on the leaders' tail and opened fire point-blank on the pilot (171). Similarly, Rochford recounts how a pilot of his Squadron ambushed three Albatrosses: he attacked "at such a close range that the German pilot's head filled the small ring of the Aldis sight on his Pup. He saw the tracers hit the German pilot's head" (Rochford 2015, 56). "McScotch" accounts for the same attack pattern ("taking careful aim and holding my fire until within point-blank range") (1936, 45). Hunting requires, as McCudden puts it, studying the habits, characteristics, and psychology of the prey, stalking and waiting on its feeding grounds (2000, 128-129). Despite his statement that he hated to shoot an enemy without being seen because it was "against what little sporting instinct [he] had left" (236), he talks about "joys only known to the pilot who has done a lot of Hun stalking, though perhaps

that same thrill is not unknown to big-game hunters" (251). This sort of hunt was no duelling, as Boelcke wrote a few weeks before dying, in September 1916: "We cannot call this a fight, because I surprised my opponent" (1917, 195-196). On 23rd November 1916, Manfred von Richthofen shot down British Major Lanoe Hawker after a duel that brought the two pilots into close vicinity, circling each other to have a good shot: "I had time to take a good look at my opponent. I looked down into his carriage and could see every movement of his head. If he had not had his cap on I would have noticed what kind of a face he was making" (Richthofen 1918, 125). Even more astonishing is the impression that the close encounter with the enemy had on McCudden on 10th November 1916: "I got a very close view of the pilot at about 20 yards, and I swear that he was grinning, for that Hun was the nearest I have ever been to one in the air" (2000, 117). Such sudden proximity with another man – and a hostile one – in the emptiness of the vast sky triggers McCudden's amazement on 22nd August 1917, when the eye suddenly perceives the presence of the living human being inside the machine:

> I well remember looking at him too. He seemed only a boy. It seems all very strange to me, but whilst fighting Germans I have always looked upon a German aeroplane as a machine that has got to be destroyed, and at times when I have passed quite close to a Hun machine and have had a good look at the occupant, the thought has often struck me: "By Jove! There is a man in it." This may sound queer, but it is quite true, for at times I have fought a Hun and, on passing at close range, have seen the pilot in it, and I have been quite surprised. (173)

McMillan similarly describes a close encounter with the enemy: "I was close enough to see (and almost to read the expression in) his keen blue-grey eyes behind his goggle glasses and as much of his face as was left uncovered: nose, mouth, chin and shape of cheek" (1972, 162). Ground troops seldom experienced such close encounters during the First World War because hand-to-hand fighting was rare and even during assaults soldiers were hit by bullets, shrapnel, and splinters much before they could reach the enemy positions. In that case, technological weaponry decreased the opportunities for close-range combat, but in the air, the instability of the aeroplane made shooting so imprecise that only by firing at point-blank range did pilots have some chance of downing their opponents. This was a paradoxical condition because in the vast emptiness of the sky it was hard to imagine the possibility of hiding and ambushing enemy planes from behind, and also because flying itself conveyed a feeling of freedom and solitude that hardly harmonised with the reality of

close-range massacres.

As a consequence, the idea that a stalking head-hunter could at any time come out of the blue and open fire from behind was a constant cause of fear and anxiety for pilots. The idea itself of killing in cold blood an unaware pilot by machine-gunning him in the back could be equally shocking, as Italian pilot Silvio Scaroni wrote to his parents on 25th November 1917:

> I confess, my dear, that I still find it hard to get used to this new kind of war. You are so close to your opponent, during an aerial duel, that you can follow every little gesture he makes, in a desperate effort to save himself. In those brief moments, all my faculties are strained, through the aim of the machine gun, to quickly get rid of the enemy. However, as soon as this is hit to death and I see him fall, I no longer think that he was in the same condition as me, against me, and with the same intent: I see only the victim of a moment of ferocity. It will be a strange impression, but one that haunts me like a nightmare. (Scaroni 1922, 55)

Thus, the close encounter with technology that triggered the passion for flight also unleashed its darker side when the reality of close-range aerial combat revealed its horrors and took its psychological toll.

4. The horror: devastating wounds and horrible deaths

The First World War gave birth to the famous definition of "shell-shock" as a condition that affected traumatised soldiers. However, as Cobden explains, this diagnosis never applied to pilots for several reasons (2018, 131). Nonetheless, military pilots suffered from stress, anxiety, nightmares, memory disorders, and even nervous breakdowns that forced them to stay away from the action for weeks and sometimes even months. These conditions were called "flying sickness" and later, especially among pilots themselves, the "nerves" (Cobden 2018). As Collins argues, "while statistics on psychiatric treatment for British war pilots are unavailable, personal accounts and official documents indicate that such difficulties were common in the air corps" (2015, 2). Famous aces like Edward Mick Mannock and Albert Ball suffered from the "nerves" and the former was also forced to take prolonged breaks to recover (Mannock 1966; Smith 2001; Bradbeer 2006, 34; Briscoe & Stannard 2014). Cobden continues stating that the RFC was always on the attack and pilots flew continuous sorties, thus "the pace of air operations was physically and mentally exhausting, which accounted for increased nervous casualties" (134). Even the bold Red Baron was a victim of the "nerves", although this aspect does not

emerge from the first edition of his memoirs in 1917. However, in the third edition of 1933, the chapter "Verwundet" ("Wounded") appeared for the first time (144-149), followed by frequent references to the effects of the serious cranial injury that the pilot suffered from when he was hit on 6th July 1917:[31] physical and mental exhaustion after every flight (149) and above all anxiety, irritability, and a bleaker perception of the war that becomes haunting in the last months of his life:

> I am considering making a sequel to the *Red Battle Flyer* for a very specific reason. […] I now have the dark impression as if the *Red Battle Flyer* should show a completely different Richthofen – than I feel like myself. […] I feel miserable after every fight. That is probably due to the aftermath of being shot in the head. Once I have put my foot back on the ground at the airport, I retire in my four walls and I don't want to see anyone or hear anything. (203-204)

Besides the fatigue resulting from physical and mental exertion, the other major cause of psychological stress derived from living constantly under the shadow of death. Pilots' memoirs depict the horrific wounds that close-range machine gun fire caused in the human body, also because pilots often visited the wrecks of the aeroplanes they shot down to collect evidence of their victories or just trophies to expose in their rooms. Just as ground troops were psychologically affected by the effects of technological warfare (above all the destructive power of high-calibre explosives), so were pilots aware that being shot down meant ending in a "charred mass of wreckage" (McCudden 2000, 230). This pilot wrote that he felt sorry about shooting down enemies on his side of the line, "where you can see the results of your work" (203). Similarly, "McScotch" remembers a conversation with Mannock over the wreckage of an enemy plane: "With great emotion Mick described the mangled condition of the pilot's body – blood and bones. Horrified and disgusted with him I remarked reproachfully: 'I'd never like to see the smashed-up body of a man I'd killed" (1936, 67). Italian ace Scaroni was profoundly affected by the experience of seeing the effects of his shooting:

> I felt, as I went, a strange sense of discomfort at the thought that, in a few moments, I would have the tragic vision of my victims before my eyes: I confess that I would have gladly given up on this trip [...]. The machine was reduced to a shapeless mass, with the canvas and the wooden parts shattered to shreds within a tangle of wires: the engine was almost completely sunk into the soft ground of the field. [...] The body of the enemy aviator was lying in front of the door [...]. He was a blond boy and his bloodless face

> betrayed no expression of pain, it was rather composed and there was a slight smile on it. Of course, he had died without suffering since a tremendous burst had almost truncated him in two, at the height of his chest. I walked away because that sight made me feel bad. (1922, 58)

However, the most terrifying death that all pilots dreaded, which largely depended on technological weaponry, was by fire. If the petrol tank was hit and the machine caught fire, the violent stream of air from the propeller blew the flames against the pilot, who was in the meantime covered in petrol. Without a parachute, the pilot had no choice but to die charred in the fire or jump off the machine. All pilots, even those who found exciting the view of enemy planes going down in flames, were horrified and shocked by what Oswald Boelcke called "a tremendous spectacle" (1917, 117). Mannock was so scared by it, that he carried a gun to shoot himself in case his plane should catch fire ("McScotch" 1936, 86-87). Scaroni describes in horror how he shot down an enemy plane in flames:

> I flew so near that I could already feel the heat of that tragic fire... I saw two hands groping out of the flames that desperately grabbed the edge of the upper wing; I saw the pilot's head come out, covered with a yellow leather helmet... Abandoned the controls, he stood up on the seat, as if trying to escape the flames that now enveloped everything. He turned towards me for a moment, looking at me fixedly, almost begging for help... I felt the desperate gaze of that man on me and I had to witness, without missing one single gesture, that hopeless struggle... he fell into the void. (1922, 108-109)

More than any other experience, spectating death by fire triggers empathy in the pilots. "McScotch" declares himself "horrified and soul-sickened at having sent a human being, even an enemy, to such a miserable death" (1936, 46), for "a flaming machine was a nauseating sight for any pilot" (80). McCudden, too, recalls the state of shock in which sending his first enemy down in flames left him:

> [I] felt quite sick. I don't think I have ever been so conscience-stricken as at the time [...]. That was my first Hun in flames. As soon as I saw it I thought "poor devil", and really felt sick. It was at that time very revolting to see any machine go down in flames, especially when it was done by my own hands. [...] For the reminder of the evening the thought of that Albatros going down in flames, I confess, made me quite miserable. (2000 170-171)

Even Richthofen admits that the sight of flaming aeroplanes impressed him deeply and haunted him in nightmares (1918, 155), and spends compassionate words for those who died so:

> Once I was on the ground next to a benzine tank. It contained one hundred litres of benzine which exploded and burnt. The heat was so great that I could not bear to be within ten yards of it. One can therefore imagine what it means if a tank containing a large quantity of this devilish liquid explodes a few inches in front of one while the blast from the propeller blows the flame into one's face. I believe a man must lose consciousness at the very first moment. (201)

The major cause of such a horrifying death was a simple technological invention, namely the tracer, which Richthofen calls "beastly stuff" (136). This bullet contained a charge of phosphor that left a wake of brilliant light, thus permitting pilots to check where the shooting hit. "McScotch" recalls in his memoirs that once, being frustrated by the apparent inefficacy of his shooting, he decided to fill his drums with three different kinds of ammunition, alternating one armour piercer, one tracer, and one Buckingham, as the British incendiary bullets were called. Edward Mannock, informed about that by a mechanic, stopped him and took the cartridges out of the drum: "Do you mean to say, Mac, that you would coolly fire that muck into a fellow-creature or, worse still, into his petrol tank, knowing what it must mean?" (1936, 87). Many British pilots believed that these tracers were explosive bullets since they continued to burn vividly also after they hit the body (Bishop 1918, 69) and the use of such ammunition raised perplexities in more than one pilot, for example, Francesco Baracca:

> The tracers we use should not set the petrol on fire. Nonetheless, this often happens and it is a very impressive fact to see an aeroplane burn at three thousand metres and the pilots jump into the void as always happens. I am thinking of not using them anymore because I have already caused three machines to meet this end. But those bullets are very useful for correcting the aim because you can see where you hit, and after all they too, the Austrians, use them. (1919, 77)

Nonetheless, all pilots used tracers, some carelessly and even with some satisfaction, like Bishop, who writes that "to see an enemy going down in flames is a source of great satisfaction" (1918, 103) and something that always puts him "in a good humour" (136). The pilots' accounts suggest that the

technical nature of the Great War took the upper hand on any speculation of moral nature: as McCudden stated, thinking about his becoming "too sentimental", "one cannot afford to be so when one has to do one's job of killing and going on killing" (2000, 204). As Habeck states, "machinery did not liberate soldiers from the task to be done; it imprisoned them in that inescapable environment" (2000, 102), which made it impossible to glorify or domesticate industrialized warfare completely (123).

Conclusions

The close encounter with aerial technology in World War One was a two-faceted experience: on the one hand, it triggered enthusiasm and elation, inspiring the idea that humankind was ready to conquer new spaces and subvert the traditional spatial coordinates – through the "vertical revolution" and the myth of the "knights of the air"; on the other hand, it confronted many thousands of young men with unprecedented experiences of physical and mental strain, anxiety, fear, and moral frustration that caused a high number of psychological breakdowns and a diffuse abuse of alcohol among pilots.[32] Richthofen, Bishop, Udet, Mannock, Rochford, Scaroni, and many other pilots confess that they suffered from combat stress. The new weapon manifested over the four years of war a growing potential that included the possibility of bombing military and civilian targets far beyond the front line. Aeroplanes also developed quickly in a frantic race to overcome the enemy by producing faster, more manoeuvrable, and more lethal fighting machines; and aerial fighting tactics also developed fast, often with utter disregard for the effect that prolonged flights at high altitudes had on the pilots. Weapons, too, became more and more deadly, first through the introduction of the synchroniser and later by the possibility of mounting "pom-pom" cannons on scouts.[33] Despite the attempt to domesticate – and romanticise – technology through the myth of the aces and "knights of the air" as supermen able to rule over the machine thanks to their extraordinary willpower and skills, the pilots' testimonies published since 1916 often revealed that aerial warfare had already established the inevitable subjugation of the human to the machine, which permitted some pilots even to foresee the future development of military aviation into a technological super-weapon (McCudden 2000, 267-268; "Contact" 1917, 169).

Reading pilots' first-hand accounts of their close encounters with technology permits us to read through the lines of the myth, a deconstruction which scholars have already undertaken for some years. However, it is undeniable that pilots express through their memoirs a strong feeling of self-reliance and an

enthusiastic conception of mechanised warfare that precisely depends on their mastery of the technological device. Unlike the majority of witnesses from ground troops, who mostly represented the technological apparatus as a monstrosity that overwhelmed the human being, pilots came to grips with the machinery dynamically and romantically. It is not by chance that many pilots refer to their aeroplanes as animals, be they birds (eagles, hawks, sparrows, vultures, crows, and storks) or horses to mount, whose beauty and elegance they also praise – which should not be a surprise considering that some "aces" came from cavalry like Baracca, Nungesser, and Richthofen. As Kehrt points out, the most profound effect of the technological revolution represented by aerial warfare between 1915 and 1918 was the profound interconnection of the human with the machine: unlike other forms of technological weaponry (above all artillery), the aeroplane maintained the human being in the commanding position as far as pilots steered the machine and operated it as a weapon by using the whole of their bodies, i.e. limbs and sensorial apparatus. The aeroplane, above all the fighter scout, empowered the warrior beyond any imagination, transferring the fight from earth into the skies, and yet never turning itself into a soulless, technical monster.[34]

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Fig. 7: McCudden (2000).

Fig. 8: Rochford (2015).

Fig. 9: Rochford (2015).

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1 However, pioneer of aerostatic flight Nadar (pseudonym of Gaspard-Félix Tournachon) stated the opposite in 1864, acknowledging that aerostats would not permit the conquest of the air as far as they just flew in the wind. The zeppelins provided much better and more effective performances insofar as they were equipped with engines and could be steered.

2 Cecil Lewis (2003, 7) remembers that his passion for flight was triggered by his childhood friend Hill, whose attic "was full of models. Models hung on hooks from the ceiling and on the walls; models stood on the tops of chests, on table, on the floor. The bench was a gorgeous muddle of tools and glue, veneer and solder, florists' wire and elastic. He taught me the mysteries of hollow spars, bracing, and rigging."

3 Francesco Baracca (1919, 17), while serving as a cavalry officer, was allowed in January 1912 to join a training course for military pilots abroad, at Reims, whence he wrote to his mother on 5th May that in France pilots were already respected and looked at in awe, while in Italy they were just labelled "foolish or at least reckless" (*dei pazzi o almeno dei temerari*). James McCudden (2000, 2), too, mentions the sceptical comments of his comrades when he left the Royal Engineers to join the Royal Flying Corps: "Some of them said I was a damned young fool, and that if men were meant to fly they would have had wings, and so on." Leonard Rochford (2015, 11) and Silvio Scaroni (1922, 17) remember in their memoirs the glamour that surrounded aerial races in the 1910s when crowds of people gathered around the aerodromes to admire the stunting, looping, diving, and spinning aeroplanes.

4 The British Royal Flying Corps was the first one to be created in 1912 to replace the previously existing Royal Engineers Air Battalion. The RFC was independent of both the Army and the Navy, although the latter soon managed to form its own Royal Naval Aerial Service, whose duty consisted in patrolling and protecting Britain's southern shores and the Channel. However, during the war, the RNAS deployed several squadrons on the Western Front, which were equipped with state-of-the-art machines (mostly Sopwith Pups and Triplanes in 1916 and Sopwith Camels since the summer of 1917). Other countries as France and Germany did not conceive at first of aviation as a third, independent branch of the armed forces.

5 For example, "on 1st October 1918 the Italian flying corps enlisted 55.699 men (1,9% of the 2.940.526 mobilised soldiers), but only 3709 of them were airmen (2433 pilots, 990 observers, and 286 gunners)" (Caffarena 2010, 91). The large mass of the personnel were mechanics, fitters, carpenters, welders, motorists, riggers, blacksmiths, and drivers.

6 I use the word "myth" in the broad sense of a narrative capable of making "the past intelligible and meaningful by selection, by focussing on a few bits of the past which thereby

acquired permanence, relevance, universal significance" (Finley 1965, 283). Therefore, I am not using the word myth as "an interpretation that is blatantly false" (Hees 1994, 2), but rather as a narrative that invents a tradition (3). The myth of the "knights of the sky" remains a fundamental aspect of the historic-cultural heritage of the Great War as the first broadly technological conflict, and the pilots' memoirs are the basic "particles" of that grand narrative.

[7] It is worth noting that Richthofen's book was the first autobiographical narrative conceived as such, while Immelmann's and Boelcke's accounts consisted of the collected letters that the two pilots exchanged with families and friends during the war.

[8] Dogfights "were events of very short duration limited first of all by the supply of ammunition and fuel. They occurred at low altitude above the front line, directly over the heads of the soldiers-spectators, and ended with an immediately observable outcome such as the destruction of an aircraft (perhaps on fire), the hasty retreat behind the lines and safety offered by the anti-aircraft barrage, or consensual interruption (due to lack of ammunition, inability to prevail, or other reasons)" (Alagi 2015, 137-138). Simply enough, Leonard Rochford explained in an oral interview that a dogfight starts when the two parts are "really mixed up and you have to fight" (Miller 1987). Many pilots remember the chaotic entanglement of zooming aeroplanes during a dogfight, which made collisions and accidents very frequent and lethal (McCudden 2000, 154-155; Lewis 2003, 169).

[9] For example, French pilot Maurice Boyau and Belgian pilot Willy Coppens. The latter shot down the outstanding score of 35 observation balloons. See http://aircrewremembered.com/coppens-willy.html.

[10] It is worth remembering, however, that some famous aces began their "careers" either as observers (Richthofen, for example), two-seater pilots (e.g. Baracca, Boelcke, and Lewis) or even as mechanics (McCudden).

[11] To make a few examples, I can mention pilots Marcel Nadaud (1916), Strange (1933), and Mario Ceola (1997); observers Alan Bott (1917) and Auguste Claude Heiligenstein (2009); and gunner Archibald Whitehouse (1938).

[12] Alan "Contact" Bott remembers: "It was cold on the ground. It was bitter as 5000 feet. It is damnable at 10.000 feet. I lean over the side to look at Arras, but draw back quickly as the frozen hand of the atmosphere slaps my face. My gloved hands grow numb, then ache profoundly when the warm blood brings back their power to feel. I test my gun, and the trigger-pressure is painful. Life is worse than rotten, it is beastly" (221). In an oral interview, former pilot Balfour of Inchrye said that frostbite tormented all pilots, who smeared whale oil on their faces to protect themselves from it (Miller 1987).

[13] The American translator of Richthofen's book inserts a long note about the tactical use of wind in aerial fighting on the western front in 1915-1918: "It is well to note how often von Richthofen refers to the wind being in his favor. A west wind means that while the machines are fighting they are driven steadily over the German lines. Then, if the British machine happens to be inferior in speed or manoeuvrability to the German, and is forced down low, the pilot has the choice only of fighting to a finish and being killed, or of landing and being made prisoner. The prevalence of west winds has, for this reason, cost the R.F.C. a very great number of casualties in killed and missing" (Richthofen 1918, 151-152). See McScotch (1936, 35).

[14] For example, see Donald Hardman's interview in the documentary *Cavalry of the Clouds*.

[15] The same experience was recalled by NCO Eric Shrewsbury, a mechanic in RFC, who used to sleep on the ground under the wings during the first months of the war and remembers that one winter morning his blanket was as a "solid board" stiffened with ice (Miller 1987).

[16] The definition of a psycho-physical standard of fitness was controversial, though. In 1914, no study existed that could evaluate the scale of physical and mental strain connected with flight, also because early flight did not reach high altitudes, where oxygen is scarce, and because in flight schools pupils flew their machine at a few hundred metres only. Only as the deployment of air forces grew during the war, the crews of bombers and observation planes, as well as fighter-scout pilots began to fly at high altitudes to keep out of the range of anti-aircraft artillery and exploit the advantage of elevation in combat. However, clinicians began to notice that after flying at high altitude, pilots displayed symptoms like lethargy, loss of appetite, weakness, loss of memory, headache, and breathing difficulties, which eventually gave birth to the clinical diagnosis of "flying sickness" (Cobden 2018, 132-133).

[17] Anyone could become a pilot notwithstanding social origin, nationality, or professional expertise: in Italy between 1917 and 1919, for example, officers were only 1744 out of 5193 pilots (Minniti 2018, 211) and among the non-commissioned officers trained as pilots there were specialised workers, farmers, breeders, shopkeepers, clerks, fishermen, and even peasants (Caffarena 2010, 103). The strictest separation between officers and NCOs concerned the selection of observers, who had to be skilled in many technical duties such as cartography, photography, telecommunication, Morse code, aeronautical tactics, and gunnery. Because of this, observers were almost exclusively officers, while pilots could be NCOs. Therefore, as Caffarena has it, "if on board an aeroplane, like in a social microcosm, observers and machine-gunners re-proposed a rigid class division from a socio-cultural point of view, pilots were an expression of interclass social mobility" (103).

[18] Oswald Boelcke crashed after colliding in mid-air with a member of his flight; Max Immelmann crashed after his synchroniser failed and he damaged the propeller by firing his machine gun; James McCudden crashed after take-off due to engine failure; Albert Ball crashed after he – presumably – lost control of his aeroplane during a dogfight; New Zealander Clive Franklyn Collett crashed while testing a captured Albatros D.Va. The list could extend much further.

[19] Because rotary engines offered limited possibilities of throttling up and down quickly and effectively, the blip button installed on the joystick permitted the pilot to cut off the engine, thus serving as an air brake. Of course, this practice wore off the engine, diminishing its lifespan sensibly.

[20] Aeroplanes were often compared to animals, mostly hawks and eagles, but also horses to ride (and this is the very verb used by former cavalryman Francesco Baracca to mean "flying", *montare*). As Habeck (2000, 115) precisely pointed out, "a German Fokker might 'pounce' on a British plane like 'a hawk on a bird', or an airplane could be 'winged' and brought down to earth. [...] For those without any real defense against the enemy's aircraft, being threatened by a strafing from above made soldiers feel like 'a flock of frightened sparrows beneath the shadow of the hawk'. As with the tank, the airplane was often treated as a living thing, especially by the pilots. They complained of the aircraft's difficult moods (planes were almost always known as 'she') or praised her for her game attempts to hold together in the face of trouble. In contrast to tanks, however, aircraft, even that of the enemy, rarely evoked horror."

[21] Not much did McScotch love the S.E.5, of which he criticised the weakness of the engine and the "sluggishness" of her reaction to controls (1936, 186 and 190). Conversely, McCudden liked the S.E.5 to the point that after flying her for the first time, he dreamt about it the next night (McCudden, 2000, 157).

[22] McCudden was a great fan of this aeroplane that he defined as "remarkably fine", "extremely light", "controllable", and "nice" (2000, 140-141). A "delightful little plane [...] light to handle and quick to manoeuvre" is how Rochford describes the Pup (2015, 39).

[23] McMillan admired the Sopwith 1½ Strutters, "delightful aeroplanes to fly and beautiful to look at. On the ground, when taxiing out to take off, they looked like brown butterflies; in the air they were alive and full of grace, charming companions of the clouds" (1936, 77).

[24] A similar incident occurred in July 1917 to Canadian ace Raymond Collishaw, who performed a violent deflection to avoid a mid-air collision, which made his seatbelt snap and ejected him from his cockpit. The pilot recalls that he had to grasp the wooden structure of the upper wing and wrestle to regain his position inside the cockpit (1973, 118-119).

[25] Other pilots remember the early aerial fights consisting of an exchange of rifle shots. See for example the memoirs of French ace René Fonck (1920) in chapter 3, "En escadrille de Corps d'Armée".

[26] The same experience is accounted for by German ace Ernst Udet (1935), who remembers that in the early days of warfare aeroplanes flew unarmed, exception for darts (*Stahlpfeile*) and grenades to throw at enemy machines.

[27] Cecil Lewis remembers one day when, in the middle of a dogfight, his Lewis machine-gun went down from the over-wing rail and knocked down the windshield, exposing his face to the blowing hurricane of the propeller (1936, 167). McScotch, instead, remembers that once, as he pulled the chain to recharge his machine gun, he pulled the wrong one and dislodged the weapon that rushed down the rail and hit him on the top of his head, almost knocking him out (1936, 36-37).

[28] Billy Bishop mentions this kind of "charge" too, saying that "it is perhaps one of the most thrilling moments of fighting in the air" (1918, 216).

[29] Balfour of Inchrye said in an interview that "aces" is an unfortunate word, for the RFC was made of "individuals and characters" (Miller 1987).

[30] René Schilling notes that 51 out of the 80 aeroplanes shot down by the Red Baron were observing two-seaters, which faster and more manoeuvrable scouts like the Albatros D.V and the Fokker Dr.I triplane could easily overwhelm in a fight (2002, 267).

[31] Richthofen's memoirs were a literary case. Published in 1917, the book was issued again in 1920 and eventually in 1933, with a preface of Richthofen's former fellow pilot Herman Goering. The three books differ profoundly from each other: the first edition offers an image of the author as a bold and heroic young conqueror. The second edition glorifies the individual above the crowd as a great hero, under the fashion of post-war apologetic interpretation of the German soldier who was never vanquished in battle. It is not by chance that the episode of the injury was omitted from this edition, although many unpublished materials written by his brother and letters were introduced. And finally, in the 1933 edition, the figure of the arrogant hero is partially corrected into that of a patriotic soldier who answers the call of duty like the mass of the people, in line with the new Nazi ideology (Schneider 1991, 161-167).

[32] Rochford accounts for episodes of alcohol abuse and violence that left the pilots unable to fly (2015, 51-53), and also former pilot Donald Hardman confirmed that pilots drank a lot to overcome fear and to soothe their anxiety (Miller 1987).

[33] A "pom-pom" cannon was a weapon that fired explosive 37mm calibre bullets. Bishop mentions their use on German aeroplanes in the late stage of the war (1918, 219); Lewis recalls that French pilot Georges Guynemer used to fly a special model of Spad (much probably a XIII model) equipped with a "pom-pom" cannon firing through the hollow propeller boss (2003, 196).

[34] As to such a point, it is interesting to note Richthofen's remarks on huge bombers, which he called "colossi": "In going about in such a colossus one has no longer the sensation that one is flying. One is driving. In going about in a giant plane the direction depends no longer on one's instinct but on the technical instruments which one carries" (1918, 219).