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SOME ORIGINS OF MILITARY AERONAUTICS

Flying has opened new avenues for travel in times of both peace and war. The spherical balloon, the dirigible airship, and the airplane are vehicles which contribute to the general role of transportation, useful in peacetime as commercial carriers, and in warfare as carriers of destruction. The application of these carriers in peace or war depends upon the ideas associated with them. A study of the development of military aeronautical policy, then, is a study of man's efforts to integrate aerial carriers into the military organization.

The idea that an aerial vehicle might be used in warfare is not new. Even before man had mastered the use of the air for travel he had suggested that aerial vehicles, like the ships of the sea, might be used for warfare. Dreamers and inventors frequently included suggestions for use in the sketch or prospectus of their aerial machines. One such example which survives is the work of the Jesuit, Francesco Lana Terzi (1631-1687), who in 1670 published a description of a ship based upon a scientific principle.¹ Lana proposed that lightweight spheres be built and the air pumped out to create a vacuum, the whole sphere to weigh lighter than the air displaced by it. Four of these vacuum spheres were to be attached to a basket and a sail mounted for steering. Having suggested such a machine, Lana went on to speculate that:

God would not suffer such an invention to take effect, by reason of the disturbance it would cause to the civil government of men. For who sees not that no City can be secure against attack, since our Ship

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¹Prodromo; ouero Saggio di Alcune inuentioni nuoue promesso all' Arte maestra (Brescia, 1670); published in English as The Aerial Ship (London, 1907).

may at any time be placed directly over it, and descending down may discharge souldiers; that the same it would happen to private Houses, and Ships on the Sea: for our Ship descending out of the air to the Sails of Sea-Ships. . . . it may over-set them, kill their men, burn their Ships by artificial Fire-works and Fire-balls. And this they may do not only to ships but to great Buildings, Castles, Cities, with such security that they which cast these things down from a height out of Gun-shot, cannot on the other side be offended by those from below.²

Lana's work received serious consideration in England when on two occasions in May and June, 1679, Richard Hooke (1635-1703), a member of the Royal Society of London, read a translation of a portion of Lana's Prodromo and discussed the scientific merits of the aerial ship.³

Another example of early thought is preserved in the work of the Dominican, Joseph Galien (1699-1762), professor of Philosophical Theology at the University of Avignon. In 1755, he published "L'Art de Naviger dans les Airs," in which he proposed "a vessel to navigate the air and transport, if we so wish a large body of men with implements of war and food supplies, to as great a distance as Africa, or another country, equally little known."⁴ Galien anticipated rapid troop transport by air while Lana had suggested bombing. It has been suggested that between these two priests, "most of the fundamental concepts of military air power were conceived. . . nearly two centuries before military air power was to emerge as the dominant and decisive element in war."⁵ While the ideas of military air power had been suggested, without the physical machine they soon became meaningless and were forgotten. The only lasting significance of either man, it might be suggested, was his contribution to the scientific study of the earth's atmosphere, air, gases and vacuums, for each machine was based upon these factors and as the inventions were criticized by contemporaries, the errors may have led to new speculation.

The discovery of the balloon in 1783 at last vaulted man into the air. During the first century and a quarter of flight, aeronautics became a science, though one which only meagerly foreshadowed the aerial age which was yet to begin. The balloon did not completely solve the problem of free flight. With it man could raise himself into the air to great heights and drift with the wind, but he could travel only where the wind would blow. For a century before the ad-

²F. Alexander Magoun and Eric Hodgins, A History of Aircraft (New York, 1931), p. 15; citing the translation by Richard Hooke, Philosophical Collections (London, 1679), No. 1, p. 18.

³R. T. Gunther, The Life and Work of Robert Hook (2 pts; Vol. VI and VII of Early Science at Oxford; Oxford, 1930), pp. 518, 523.

⁴Magoun and Hodgins, p. 20.

⁵James T. Lowe, "Classical Origins of Military Aviation," Air Affairs, II (Autumn, 1947), pp. 113-14.

vent of powered, heavier-than-air flight, man strove to master the balloon, to move it against the forces of the wind, and thus to harness it to his will. Yet the lightweight, gasoline engine which could change the balloon into a practical mode of transportation when used as the motive force for a dirigible airship also provided the motive force for the airplane and sounded the death knell of the balloon. Students of military aeronautics, however, cannot wholly ignore the century of the balloon, for it is the source of the preconceptions and attitudes upon which many later experiments and events were based.

Almost as soon as the balloon had been invented there was renewed speculation about its usefulness in war. Benjamin Franklin, after observing the first ascensions in Paris in the fall of 1783, suggested that the threat of aerial attack would be sufficient to convince "sovereigns of the folly of wars... since it will be impossible for the most potent of them to guard her dominions."⁶

As early as 1803, Major General John Money published in London, A Short Treatise on the Use of Balloons and Field Observations in Military Operations, but in the meantime the French had organized two companies of aeronauts and balloons for reconnaissance during the Revolutionary Wars. The balloon continued to be used for reconnaissance and signalling throughout the nineteenth century, and in 1849 an Austrian, Artellerie-Oberleutenant (later Feldmarschalleutenant Freiherr) Franz von Uchatius, devised a small, unmanned balloon made of writing paper and capable of carrying thirty pounds of explosives. When used against the besieged city of Venice, the balloons drifted beyond the city before the bomb-release-timers worked and the explosives fell into Austrian positions on the other side. This is the only attempt at bombing from balloons during the nineteenth century, and it received such scant notice at the time that it is impossible to fix with certainty the day of the month on which it occurred.⁷

In the United States the Secretary of War received suggestions for the employment of reconnaissance balloons during the Seminole War, through letters which he referred to generals in the field; and during the Mexican War, John Wise, the leading American aeronaut of the day, published a newspaper article describing a plan for the aerial bombardment of Vera Cruz.⁸ During the American Civil War at least eleven aeronauts performed war service for the Union Army using some twelve balloons, seven of which were constructed especially for the "Aeronautical Corps," under the direction of Thaddeus S. C.

⁶Franklin to John Ingenhouze, January 16, 1784, in The Complete Works of Benjamin Franklin, John Bigelow, ed. (10 vols; New York, 1888), VIII, pp. 432-434.

⁷Leslie Reade, "Bombs over Venice," History Today, VIII (1958), pp. 421-25.

⁸F. Stansbury Haydon, "First Attempts at Military Aeronautics in the United States," Military Affairs, II (Fall, 1938), pp. 131-138.

Lowe. While these balloons performed valuable services of reconnaissance and artillery fire-control, the usefulness of the balloons depended entirely upon the attitudes and interest of the generals in command.⁹

The limited size of the post-Civil War American Army and the tactics used in the Indian Campaigns did not call for a weapon of such special and problematical utility. The elaborate and expensive mid-nineteenth century balloon train was difficult to handle in mobile situations; by the time ballooning was simplified the Indian Wars were over. The psychological effect that a monstrous bag floating in the air might have had on the Indians, or the advantage of an observation post a thousand feet above the plains, was not considered. Ballooning activity in the United States thus went back to the carnivals in Central Park, New York (where one could draw upon the municipal gas supply), or country fairs. The Army's interest was not effectively revived for twenty years. As the invention known as the balloon and ideas for its use spread, individuals and opportunists had added to already existing knowledge. But what the United States Army might have gained from its experiences of 1861-1863 was not carried forward. Instead, through foreign observers, the broad experiences of military ballooning and Lowe's particular contribution of the portable gas generator became a part of the main stream of both aerial ideology and reality in Europe.

The serious consideration of military ballooning in England, for example, was due in part to previous interest and in part to reports made by European military observers during the American Civil War. Prior to the Civil War, a leading nineteenth century English aeronaut, Henry Coxwell, had been attempting to interest his government in military balloons. In July 1862, an Ordnance Select Committee carried out an experiment with one of Coxwell's balloons.¹⁰ Captain Frederick Beaumont, Royal Engineers, returned from the Virginia Peninsula in time to participate in this test, an event which itself reflected a growing interest in military ballooning. This experiment showed what Beaumont had just observed--that the balloon could be used to observe troops at great distance. Beaumont had spent several months with the Army of the Potomac as McClellan inched toward Richmond and was one of the several reporters and observers who traveled in Lowe's balloon camp. Of his reports on the American War, two were particularly concerned with balloons. The first, "On Balloon Reconnaissance as Practiced in the American Army," was read at Chatham on November 14, 1862, and later printed in the Papers of the Royal Engineer Corps.¹¹ At the same meeting a paper, "On Reconnoitering Balloons,"

⁹F. Stansbury Haydon, Aeronautics in the Union and Confederate Armies, Volume One (Baltimore, 1941), p. 397.

¹⁰B. F. S. Baden-Powell, "Military Ballooning," Royal United Service Institution Journal, XXVII (1883), p. 740.

¹¹N. S., XII (1863), pp. 94-103.

was read by Lieutenant G. E. Grover, Royal Engineers.¹² Grover had been interested in the possible uses of balloons since 1861; and in the same issue of the Papers he also published a history of ballooning based in part on American news dispatches, which appeared in the London Times.¹³ Beaumont later read a paper, similar to his first, at a meeting of the Royal United Services Institution, and his first hand observations of military aeronautics were quoted in several important books and articles during the next few years.¹⁴ Coxwell conducted additional experiments for the Ordnance Select Committee in 1863, concluded by freeing the balloons which carried him, with Beaumont and Grover, to Finckliy, a short distance from the place of ascension at the Royal Arsenal, Woolwich.¹⁵

British interest in military ballooning may also have been encouraged by an article written by the famous American war correspondent, George Alfred Townsend, better known as RATH of the New York Herald. In 1863, he had left the scene of the war to go to England to earn his living writing articles and lecturing. One of the few articles which were accepted was

Three Months with the Balloons in America," published anonymously by the St. James Magazine.¹⁶ Townsend described the ascensions during the Peninsula Campaign, but with a greater air of adventure and suspense and with less technical accuracy than Beaumont.

The impetus to military aeronautics during the nineteenth century was generally French. Observation balloons had been used for military purposes during the French Revolution and a Montgolfier balloon may have affected the troop dispositions before the Battle of Solferino in 1859. A successful ascension the day before the battle allegedly disclosed the Austrian troop disposition, and during the night the French troops were shifted to take advantage of the knowledge thus gained.¹⁷

¹²Ibid., pp. 87-93.

¹³"On the Uses of Balloons in Military Operations," Ibid., pp. 71-86.

¹⁴Frederick Beaumont, "Balloon Reconnaissance," Royal United Service Institution Journal, London, VIII (1864), pp. 52-56. The earlier Beaumont article is quoted verbatim in C.H. Turner, Astra Castra, Experiments and Adventures in the Atmosphere, London, 1865. Also see J. Templer, "Military Ballooning," Royal United Service Institution Journal, XXIII (1879), pp. 173-184.

¹⁵Henry Coxwell, My Life and Balloon Experiences (2 vols., i.e., 2 series, London, 1887-1889) II, pp. 203-204.

¹⁶St. James Magazine, VII (1863), pp. 96-106; George Alfred Townsend, Campaigns of a Non-Combatant (New York, 1866), pp. 112-122; republished as Rustics in Rebellion, edit. by Lida Mayo (Chapel Hill, 1950).

¹⁷Times (London), July 4, 1859; also Coxwell, My Life, I, pp. 64-66.

During the Franco-Prussian War, balloonists performed valuable service for the city of Paris when the Germans severed the French postal and telegraph service between Paris and the provinces. French ballooning activities were centered in Paris, enabling several aeronauts to use their already made balloons, and later those constructed in special factories set up in the idle railway stations, to establish an effective aerial service. Over sixty balloons carried passengers and carrier pigeons out of Paris, although there was no way for the balloons to return to the city. Fifty-four of the flights were successfully completed, but the return pigeon mail service using a form of microfilm was not as successful. Only about one-eight of the birds returned to their Paris dovecotes, a fact attributed to the German appetite for squab.¹⁸

Captured balloons carrying civilian aeronauts and passengers raised questions for which there was then no answer. Were these prisoners to be treated as spies or as prisoners of war? If the siege was to be effective, the threat of instant death might be necessary to discourage flights, but the previous use and gradual acceptance of balloons for reconnaissance softened the issues. The matter went unsettled until the 1874 Declaration of Brussels, concerning the laws and customs of war. While the Germans favored holding persons on balloons to be spies who should be treated as such when captured,¹⁹ the Declaration of Brussels declared that "persons sent in balloons for the purpose of carrying dispatches and generally, of maintaining communications between the different parts of an army or a territory" were to be treated as prisoners of war but not as spies. This position was reaffirmed in 1899 when the delegates to the Hague Conference revised the Brussels Declaration.²⁰

Following the Franco-Prussian War the major powers of Europe each carried on limited experiments in ballooning, and during the colonial wars of 1884 England sent a balloon to South Africa while France included one with the expeditionary force to Tonkin.²¹ The Italians obtained a balloon from French

¹⁸Charles Howard Gidds-Smith, A History of Flying (London, 1953), pp. 180-182; James Glaisher, "Preface to the Second Edition," Travels in the Air (2nd ed.; London, 1871), pp. v-xx.

¹⁹Enrico Catellani, Le Droit Aerien, traduit de L'Italien par Maurice Bouteloup (Paris, 1912), p. 172.

²⁰James Brown Scott, ed., The Proceedings of the Hague International Peace Conferences; Translation of the Official Text; The Conference of 1899 (New York, 1920), pp. 258, 569; A. Pearce Higgins, The Hague Peace Conferences and Other International Conferences Concerning the Laws and Usages of War (Cambridge, 1909), p. 276.

²¹Walter Raleigh and H. A. Jones, The War In the Air (6 vols.; London, 1922-1937), I, p. 149; James Gordon Scott, France and Tongking; A Narrative of the Campaign of 1884 and the Occupation of further India (London, 1885), pp. 278-279; Eric H. Stuart Bruce, "The Use of Balloons in War," Journal of the

sources and sent it with an expedition to Massawah and Saati in Ethiopia in 1887.²² France was the scientific center for aeronautics and the demand for balloons for sport, for meteorological purposes, and for military uses supported several manufacturers. Dollfus and Bouche, in Histoire de l'Aéronautique, claim that the French manufacturers Yon and L. Godard, and Lachambre provided the first materials for the military balloons corps of most of the major powers of the world during the 1880's and 1890's. The dates by themselves are indicative of the growing interest: Russia, 1884; Spain, 1884; China, 1886; The Netherlands, 1886; Belgium, 1886; Denmark, 1889; Austria, 1890; Japan, 1890; Bulgaria, 1893; United States, 1893; Sweden, 1897; Switzerland, 1897.²³

Increased knowledge about military balloons raised the broader question of the effect which aeronautics might have on warfare. In 1893, the delegates to the Conference on Aerial Navigation at the World's Columbian Exposition in Chicago heard J. D. Fullerton of the Royal Engineers of England sum up "Some Remarks on Aerial Warfare." Fullerton thought that aerial warfare might be possible in the near future, that this would revolutionize the art of war and require constant readiness because of the speed airships would attain. Warfare by land and sea would be possible only when a nation was also prepared in the air.²⁴ In 1897, Major B. F. S. Baden-Powell²⁵ published similar views in an article on the "Conquest of the Air" in the United Service Magazine. Pointing out the importance to a country should an efficient machine be invented, he explained that in peace an aerial machine would be a means of obtaining information; in times of "strained relations with another power" three or four machines of one nation hovering over the capital of another would serve as a deterrent to war; and thirdly, during a war, "that nation which had organized an aerial Navy would possess such an incalculable advantage, that, without the slightest doubt the poor 'land lubbers' would receive the most crushing defeat before they had time to think of defense or counter-attacks."²⁶

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²¹Society of Arts (London) (February 21, 1902), p. 227; Johannes Gerandus Wybo Fijnje van Salverda, Aerial Navigation, trans. from the Dutch by George E. Waring, Jr., (New York 1894), p. 11.

²²Charles Dollfus and Henri Bouche, Histoire de l'aéronautique (Paris, 1932), p. 127. For description of the Italian Campaign without reference to balloons see David Mathew, Ethiopia; The Study of a Polity, 1540-1935 (London, 1947), pp. 218-23.

²³Dollfus and Bouche, Histoire de l'aéronautique, p. 127; also H. Lachambre, Grands ateliers Aerostatiques de Vaugifard (Paris, 1900), p. 1.

²⁴U. S. 53rd Congress, 2nd Session, "Operations of the Division of Military Engineering of the International Congress of Engineers," Senate Exec. Dec. 119, p. 574.

²⁵Brother of the founder of the Boy Scouts.

²⁶B. F. S. Baden-Powell, "Conquest of the Air," United Service Magazine, LXVIII (April, 1897), pp. 46-59.