

## The Aeronautical Revisions of H.G. Wells's *THE SLEEPER* Narratives

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The year 1899 is notable to flight historians and to the admirers of H.G. Wells; in that year the Wright brothers built their first aircraft, and Wells's *When the Sleeper Wakes* was published. The two events, although unconnected, have a common ground in that the novel contains a detailed description of flight in the twenty-second century. It is possible that Wilbur and Orville Wright, who read all they could find on aviation,<sup>1</sup> may have seen a copy of *When the Sleeper Wakes*. In any case, when the Wrights achieved the world's first powered flight in 1903, it was along somewhat different lines from what Wells had envisaged. His specific aeronautical predictions in the novel were thus made redundant. When Wells revised his book in 1910 (changing the title to *The Sleeper Awakes*), he attempted to make his fictional aviation consistent with contemporary fact. The purpose of this article is to discuss Wells's aeronautical revisions, partly to reveal his knowledge of early aviation, and partly to demonstrate the risks involved in predicting future technology (an occupational hazard in science fiction).

Before considering the aeronautical revisions, it is necessary to consider the textual history of the novel as a whole. H.G. Wells was given to rewriting his works, something attested to by *The Time Machine*, which was published in five different forms.<sup>2</sup> *When the Sleeper Wakes* is bibliographically less complex: there exist four published versions. These are two 1899 serialisations, which differ, the first book edition of the novel, which differs from the serialisations, and *The Sleeper Awakes*. Prior to the book's publication in May 1899,<sup>3</sup> *When the Sleeper Wakes* appeared in two magazines, the American *Harper's Weekly* and the English *Graphic*, from January to May of the same year.<sup>4</sup> According to Wells, the novel was further serialised: he makes reference to "one or two American and colonial periodicals" (italics mine).<sup>5</sup> However, intensive search failed to locate any mention of colonial serialisation for *When the Sleeper Wakes*. It may be that it never occurred, and that Wells confused the novel with another of his many works.<sup>6</sup>

Constructing a genealogy for the 1899 versions, and even dating them accurately, is difficult. *When the Sleeper Wakes*, as Bernard Bergonzi has noted, was first mentioned by Wells in the summer of 1897: "I am also thinking of another scientific romance of *The Time Machine* and *War of the Worlds* type".<sup>7</sup> Documentary evidence suggests that Wells was working on the novel throughout the winter of 1897-8. On New Year's Day he wrote to George Gissing that parts of *When the Sleeper Wakes* had been "rewritten...time after time".<sup>8</sup> In his autobiography, Wells stated that he finished the novel in Spring 1898, before a holiday in Rome.<sup>9</sup> "I wound up the Sleeper sufficiently to make it a marketable work, hoping to be able to revise it before the book printers...got hold of it. But fortune was against me".<sup>10</sup> This account seems at odds with the three 1899 versions of the novel, as it implies that Wells wrote only one version.

Bergonzi and David Lake have demonstrated that Wells's testimony about composition dates on another occasion is suspect.<sup>11</sup> It seems probable that in the spring he completed one draft of the novel. Given that Wells normally wrote several versions, and then made a choice between them for his printed texts,<sup>12</sup> he may have written two of the variants — the serialisations — before his holiday. There is no available information about the American sale, but the *Graphic* had bought *When the Sleeper Wakes* by September 1898,<sup>13</sup> which suggests an early date of composition.

There is no doubt that the magazine versions predate the book form of the novel. The proof is a scene where the hero Graham encounters futuristic books. In the first edition text, one of these works is Joseph Conrad's *Heart of Darkness*, which was not written before December 1898.<sup>14</sup> Conrad and Wells were at this stage mutual literary admirers and neighbours.<sup>15</sup> It seems very likely that Wells saw *Heart of Darkness* before it was published in early 1899.

Even without the Conrad reference, the three 1899 versions can be placed in chronological order on stylistic grounds. The text in *Harper's Weekly* is the least polished of all the Sleeper narratives, the most like a first draft. It is also the most optimistic, romantic, and socialist. The main action of *When the Sleeper Wakes* is a revolt of the oppressed 'People', led by Graham. Yet Bergonzi has noted that the tyrant Ostrog has elitist views that Wells "was to put forward in his own name a couple of years later".<sup>16</sup> It seems that with each draft of the novel, Wells became less in sympathy with his socialist hero. Wells gradually removed the suggestions of love between Graham and the leftist Helen (explicit in *Harper's Weekly*). In the book versions, he made it clear that the revolt was doomed — "I...eliminated certain dishonest and regrettable suggestions that the People beat Ostrog".<sup>17</sup> The line of transmission is therefore: *Harper's Weekly*, the *Graphic*, the first book edition, and *The Sleeper Awakes*.

At this point, the non-aeronautical variants in the Sleeper narratives will be briefly discussed. Wells made numerous minor changes between the serialisations, the most notable being to Graham's dying words. In *Harper's Weekly* he says "Helen...meet...Wake and meet" (p.453), which implies a romantic resurrection, and in the *Graphic* the more cynical "Weak men" (p.563). The first book version shows signs of considerable revision, with the serial chapters 22 and 23 heavily edited and spliced together, and the last chapter (26), omitted altogether. This chapter, "From the Hillside", made it clear that both Graham and Ostrog die. Its exclusion meant that the novel ended as Graham plunged to his death after an air-battle, with his opponent apparently unscathed. The 1910 revisions deleted about six thousand words, mostly a lengthy history of the future, and the last traces of the love affair.

Aeroplanes are first mentioned in chapter 8 of the novel, and from that point references to flight are common. Two chapters in particular are concerned with aviation: chapter 16, and "The Coming of the Aeroplanes" (the final chapter, after the excision of "From the Hillside"). The former describes Graham's first flight, and the latter his fatal air-battle. Most of the aeronautical revisions occur in chapter 16.

Any technological change tends to engender linguistic change, with new words coined for new discoveries. The language of aeronautics altered in the period

1903-10, with a number of words introduced, and one important spelling change made. Wells was obviously aware of these innovations when he prepared the text of *The Sleeper Awakes*. Throughout the nineteenth century there were two forms of the prefix *aero*, with or without a diaeresis (i.e. *aëro*). Wells used *aëro* in "A Story of the Days to Come", the 1899 companion piece to the *Sleeper* narratives, the *Graphic* and the first edition texts (*Harper's Weekly* has *aero* throughout, which is presumably an idiosyncrasy the American editor). *Aëro* gradually disappeared from aviation in the first decade of this century.<sup>18</sup> Wells omitted the diaeresis in *The Sleeper Awakes*.

When writing the novel originally, Wells had a semantic problem: he wanted to distinguish between a large multi-winged aircraft and a smaller machine with "two pairs of lateral air floats in the same place" (chapter 16, serials and first edition). He used the existing word *aeroplane* for the former, but for the latter was obliged to invent a term — *aëroplane*. When, in 1907, the French aviators Blériot and Esnault-Pelterie tested a flying machine similar to the *aëroplane*, a new word became common, *monoplane*.<sup>19</sup> In the 1910 version, Wells deleted *aëroplane*, either replacing it with *monoplane* (22 times), *flying machine/machine* (4 times) or else not providing a synonym at all. One of these omissions was to the story's detriment: Wells removed a mention of *aëroplane*, with the result that in *The Sleeper Awakes* it seems to appear from nowhere (p.286).

The *Sleeper* narratives (and the 1908 novel *The War in the Air*) indicate that Wells was well-read in aviation. There is no available information about his sources, but he must have had access to the various aeronautical journals and the two compendia, James Means's *Aeronautical Annual* (1895-7) and Octave Chanute's *Progress in Flying Machines* (1894). In addition, he was friendly with an inventor and flyer, J.W. Dunne, although it is not clear when the two became acquainted. They met, at the latest, in 1903.<sup>20</sup> Wells does however list the pioneers whose work he drew upon when constructing his fictional aircraft: "Maxim and Pilcher, Langley and Chanute, and, above all...the aerial proto-martyr Lillienthal [sic]" (chapter 16, serials and first edition).

Lilienthal, Pilcher and Chanute were builders of hang-gliders, while Maxim and Langley constructed unflyable aeroplanes. All now have a place in the history of flight, with Lilienthal (who died in 1896) probably the most famous. In the 1910 revisions, Wells could have updated his list, but instead he deleted these pioneers completely. The reason was probably that the Wright brothers had eclipsed their precursors.

An anonymous reviewer in the 1899 *Academy* complained that it was impossible to tell how the *aëroplanes* were navigated.<sup>21</sup> This is untrue: "Steering...was effected by the opening or closing of one or two thin strips of membrane in...the otherwise rigid wings, and by the movement of the whole engine backward or forward along its...rail" (chapter 16, serials and first edition). Shifting the engine presumably steers the plane by altering its centre of gravity, a technique used by flight pioneers. However, the early aviators achieved the shift by moving the pilot. The idea apparently originated with the ornithopterist Smythies in 1860), and was developed in hang-gliders by Lilienthal and Chanute. The latter's assistant, A.M.

Herring, contributed the notion of parallel bars, called rails, by which the pilot could pull his body backwards and forwards.<sup>22</sup> This method of altering the centre of gravity must have influenced Wells.

The "thin strips of membrane" seems to be what aviation historians have termed a "steering air-brake". This device, used by Lilienthal, consisted of a flap "designed...to be raised or lowered...in order to retard the wing it was attached to, and thus steer the aircraft by changing its heading".<sup>23</sup> It was not an aileron, though Wells arguably says the membranes were used for lateral control. "The *aëronaut*...opened the valve of the leeward wing until the stem of the *aëroplane* was horizontal and pointing southward" (chapter 16, serials and first edition). However, "No steering airbrake was ever fitted to a full-size aircraft".<sup>24</sup> Thus, in his 1910 revisions, Wells deleted it and the shifting engine from chapters 16 and 22. Unfortunately, the airbattle in "the Coming of the Aeroplanes" is largely a description of *aëroplane* steering. Wells, perhaps overcome by torpidity, elected to retain the obsolescent steering in this, the last chapter of the book versions.

The setting of the *Sleeper* narratives placed certain restrictions on Wells's aeronautical ideas. The central image of the novel is a megalopolis, a densely concentrated city extending above and below ground rather than out in a sprawl of suburbs. In this city there is no space for a conventional aerodrome. Wells solved the problem of landing areas by positing "flying stages", huge platforms from which aircraft are launched by a mechanism similar to that used on the modern aircraft carrier. The notion came from Langley, who used a catapult and rail device to launch his flying machines.<sup>25</sup> Wells's "launching carrier" seems to be an exact copy. However, by 1901, Wells had decided that the city of the future would extend horizontally after all.<sup>26</sup> Revising *When the Sleeper Wakes* accordingly would have been a formidable piece of work. Wells decided to keep the megalopolis as it was, complete with flying stages.

From Pilcher and Maxim, Wells apparently took the idea of a wheeled undercarriage.<sup>27</sup> He seems, though, not to have understood that one purpose of the wheels is to absorb shocks on landing, because the *aëroplanes* use the undercarriage only when not in the air: "it was possible to attach pneumatic wheels or even the ordinary motors for terrestrial traffic to them, and so carry them to a convenient starting place" (chapter 16, serials and first edition). Reading the first three versions of the novel, it is difficult to see how the *aëroplanes* avoid crash landings on the flying stages. Wells must have realised his error, because the reference to removable wheels, and to all landings not absolutely necessary to the plot, are absent from *The Sleeper Awakes*.

The main problem of early aviation was the lack of an adequate power plant. The internal combustion engine, was used in contemporary cars, was simply too heavy to be airborne.<sup>28</sup> Until, the Wright brothers built a special light-weight engine, the problem seemed insoluble — Wells was reduced to creating a miracle substance called 'fomile' to power his fictitious planes (chapter 16, serials and first edition). By 1910, fomile would have been ridiculous, and Wells removed it from his novel.

On the whole, Wells was surprisingly accurate in his aeronautical predictions. Such were the powers of his imagination, it is difficult to believe that he did not

experience flight until 1912,<sup>29</sup> well after the completion of *The Sleeper Awakes*. His errors in prediction are largely understandable, with one possible exception. In the serial texts, the following occurs: "He then drank two prescriptions, one containing strychnine; the other, ergot — doses...invariably administered to those about to fly, and designed to counteract the possible effect of diminished air-pressure upon the system" (chapter 16).

Strychnine is a highly poisonous vegetable alkaloid, while ergot is a fungal disease of rye, responsible for the medieval mass-poisonings called Saint Anthony's Fire. Today the combination sounds utterly noxious. Yet there was reason for its inclusion in *When the Sleeper Wakes*, albeit as a result of a thorough ignorance of ergot and strychnine, as well as of the upper atmosphere.

Altitude sickness had first been diagnosed in 1596, and had been widely publicised by the nineteenth-century balloonists. However, there was divergence of opinion as to its cause: "diminution of barometric pressure *per se*, or...diminution of oxygen pressure".<sup>30</sup> It was not until 1878 that Frenchman Paul Bert explained the phenomenon. Altitude sickness is "caused solely by the lessening of the oxygen tension in the air...decrease in the quantity of oxygen contained in the blood is the prime factor".<sup>31</sup> Yet, Wells, writing in 1898, talks of "diminished air-pressure" and assumes it can be counteracted by medication.

The reason was that Bert's *La Pression Barométrique* received little publicity. His obituary in the *Lancet*, published in 1886, did not even mention the book.<sup>32</sup> In addition, Wells may have assumed from the famous ascent of the balloon *Zenith* (1875) that Bert's cure for altitude sickness — bottled oxygen — was ineffective. Bert sponsored and acted as medical advisor to the balloonists,<sup>33</sup> but they did not take enough oxygen, and there were two fatalities.

The onset of altitude sickness is marked by "fatigue, short respiration, rapid...palpitations; distaste for food, then, buzzing in the ears, respiratory distress, dizziness, vertigo, weakness...nausea, vomiting, drowsiness; finally, prostration, dimming of the vision, various haemorrhages, diarrhoea, and loss of consciousness".<sup>34</sup> Wells's mistake was in apparently seeking separate cures for the symptoms, without considering that they had one root cause. Ergot and strychnine were both part of the official pharmacopoeia at the turn of the century.

Strychnine is listed in the *Index Medicus* during the 1890s as a respiratory and cardiac stimulant. Taken at high altitudes it would increase the breathing, already heightened by lack of oxygen. However, stimulation occurs only in convulsion-producing, if not lethal doses. In addition, strychnine can be cumulatively poisonous if taken repeatedly. This fact was known when Wells wrote the novel,<sup>35</sup> and he must have been informed of it before the publication of the book, because references to strychnine occur only in the serialisations.

Wells's reliance on ergot is more puzzling, since in the 1890s it was used almost exclusively in obstetrics. Ergot raises the blood pressure and stops haemorrhaging, particularly of the uterus. Presumably Wells thought it would be useful in the last stages of altitude sickness. He was not aware that altitude haemorrhaging is

relatively uncommon.<sup>36</sup> Ergot is mentioned in the first three versions of *When the Sleeper Wakes*, However, by 1910 the work of Paul Bert had been rediscovered,<sup>37</sup> and ergot was accordingly deleted from the novel.

To conclude: the futuristic aircraft in *When the Sleeper Wakes*, fantastic speculation at the time the novel was written, can be shown to have a solid conceptual basis in fact. Wells derived his aéroplanes and aëropiles from the existing aeronautical technology at the turn of the century: the work of Langley, Pilcher et al. As this article has shown, the aëropile in particular was a fictional conglomerate of these experimenters' ideas. Leaving aside fomite and the ergot-strychnine potion, Wells's extrapolation was more or less faithful to what was known of aviation in the 1890s. He obviously went to some pains with his research, and it is not his fault that he was so quickly proved wrong. Science is not static, and lesser writers than Wells have been caught out by progress. Often, like Wells, they have subsequently brought the scientific and technological content of their work up to date; in fact, revision for these non-aesthetic reasons is not uncommon in the field of science fiction.<sup>38</sup>

Concerning Wells's aeronautical revisions as a whole, perhaps the most relevant comment comes from Wells himself, a sentence found in all the Sleeper narratives: "But for the most part to read such a thesis is to realise how full the world is of unanticipated things" (chapter 2).

#### Notes

1. Charles Harvard Gibbs-Smith, *Aviation: an Historical Survey from its Origins to the End of World War 11* (London: Her Majesty's Stationery Office, 1970), p.94.
2. Bernard Bergonzi "The Publication of *The Time Machine*, 1894-5", *Review of English Studies*, n.s. 11 (1960), 42-43.
3. The serialisations both came to a close on 6 May 1899, and the first reviews of *When the Sleeper Wakes* (the book) appeared in early June.
4. On p.34 of J.R. Hammond's *Herbert George Wells: An Annotated Bibliography of His Works* (New York: Garland, 1977), the dates of the *Graphic* serialisation are incorrectly given as 1898-9.
5. H.G. Wells, Preface, *The Sleeper Awakes* (London: Thomas Nelson and Sons, 1910), p.i.
6. Evidence to support this view is provided by Wells's biographers. Norman and Jeanne Mackenzie state on p.150 of *The Time Traveller: the Life of H.G. Wells* (London: Weidenfeld and Nicolson, 1973) that Wells received £700 for the serial rights of *When the Sleeper Wakes*. Of this amount, £350 were paid by the *Graphic* alone. It seems likely that the remaining moneys came from *Harper's Weekly*, and that therefore there were only two serial appearances for the novel. Until proved otherwise, there are only four published variants of the Sleeper narratives.
7. Quoted in Bergonzi, *The Early H.G. Wells: a Study of the Scientific Romances* (Manchester: Manchester Univ. Press, 1961) p.140.
8. Quoted in Mackenzie, p.134.

9. *Experiment in Autobiography* (London: Gollancz, 1934), vol. II, p.582.
10. Wells, Preface, p.i.
11. "Publication", 42; David Lake, "The Drafts of *The Time Machine*, 1894", *The Wellsian*, 3 (Spring 1980), pp.6-7.
12. Lake, p.8.
13. Mackenzie, p.139.
14. Ian Watt, *Conrad in the Nineteenth Century* (London: Chatto and Windus, 1980) p.134.
15. Wells, *Experiment*, pp.617-18.
16. *The Early H.G. Wells*, p.153.
17. Wells, Preface, p.ii.
18. Svante Stubelius, *Airship, Aeroplane, Aircraft: Studies in the History of Terms for Aircraft in English*, Gothenburg Studies in English, 7, ed. Frank Behre (Göteborg: 1958), p.51.
19. Stubelius, p.314.
20. Mackenzie, p.222.
21. "Prophet v. Novelist", *Academy*, 10 June 1899, p.625.
22. Gibbs-Smith, pp.35, 75, 83.
23. Gibbs-Smith, pp.41,78.
24. Gibbs-Smith, p.41.
25. Gibbs-Smith, p.63.
26. *The Early H.G. Wells*, p.144.
27. Although other early aircraft had wheels — Gibbs-Smith, pp.24,62,90.
28. Gibbs-Smith, p.58.
29. Mackenzie, p.287.
30. John F. Fulton, Foreword, *Barometric Pressure: Researches in Experimental Physiology*, by Paul Bert, trans. Mary Alice Hitchcock and Fred A. Hitchcock (Columbus, Ohio: College Book Company, 1943), p.viii.
31. Bert, pp.949,981.
32. Fulton, pp.v-vi.
33. Fulton, p.vii.
34. Bert, p.333.
35. H.M. Field, "Alkaloidal Strychnine in Effective and Continued Use Unsafe", *Index Medicus*, 12 (July 1890, 343.
36. Bert, p.331.
37. James P. Henry, *Biomedical Aspects of Space Flight* (New York: Holt, Rinehart and Winston, 1966), p.39.

38. For example, see Gregory Benford's *Jupiter Project* (1975 and 1980) for pre- and post *Voyager* descriptions of that planet.

## The Wheels of Chance

H.G. Wells. London & Melbourne (Dent) 1984, £2.50.

The Everyman's Library edition of Wells's bicycling romance of the 1890s has been reissued with a delightful introduction by Bernard Bergonzi. Of *The Wheels of Chance*, Bergonzi says that "Wells skilfully encloses one literary genre, the picaresque adventure, in another, the bleakly realistic novel about humble existences". As for its hero, the irrepressible Hoopdriver, "In every sense we stay with him throughout the book, cheerfully moving on, covering the ground, pedalling forward in pursuit of fresh adventures".

P.P.

## A New Volume of Wells's Autobiography

*H.G. Wells in Love*, edited by G.P. Wells, is described as "an autobiographical memoir of astonishing force and candour, which the author knew to be unpublishable in his own lifetime." Together with a new edition of the two volumes of *Experiment in Autobiography*, *H.G. Wells in Love* is to be published by Faber & Faber in September.