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Illustrations from the Wellcome Library

A J E Terzi and L W Sambon: Early Italian Influences on Patrick Manson's "Tropical Medicine", Entomology, and the Art of Entomological Illustration in London

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On the death of Silas M Burroughs in February 1895, and after unpleasant legal arguments with Burroughs' estate, Henry Wellcome at last found himself in sole charge of Burroughs Wellcome & Co.; from then on he could, and did, shape its future to include his own interests not only in scientific research, but also in the history of medicine. In 1896 he engaged C J S Thompson to "research history of medicine and collect objects and books".[1] That marked the beginnings of the priceless collections now housed in the London Wellcome Library. Many of the objects there, books as well as works of art, have been subjected to scrutiny by scholars and younger generations of students over the years; but parts of the iconographic collections are less well known, among them a series of watercolours, drawings, etc. of entomological specimens and diseased patients, as well as caricatures of friends and colleagues, all showing the professional versatility and expertise of the artist, A J E Terzi.

Terzi and other contemporaries might have deserved mention in the discussion which followed C P Snow's (1905–1980) Rede Lecture on 'The Two Cultures' in 1959.[2] Snow's interest in his subject had grown from interdisciplinary discussions and table talk in Cambridge common rooms; stripped to their essentials, the underlying ideas called for closer political and educational understanding of, and co-operation between, "new" scientific knowledge and the humanities. In the original lecture, and in the lengthy and often heated discussions which followed, no attention was paid to visual and graphic arts. Yet, half a century earlier, there had been exemplary, and fruitful, collaboration between illustrative arts and scientific advance,

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[1] John Symons, *Wellcome Institute for the History of Medicine: a short history*, London, The Wellcome Trust, 1993, pp. 3–5; WA/HSW, 'Personal papers of Henry Solomon Wellcome', 1896, [2], p. 3.

[2] C P Snow, *The two cultures: and a second look*, Cambridge University Press, (1959) 1964.

nowhere more so than within the then relatively new academic discipline of tropical medicine in London.

In the eighteenth and nineteenth centuries, surgeons and physicians stationed with British troops overseas had occasionally felt the need to accompany their observations of parasites, etc. with their own largely amateurish illustrations. The introduction of professional artists and illustrators into entomology and related subjects in the late nineteenth century was largely fortuitous and originated in a growing friendship and collaboration between Patrick Manson (1844–1922) and the Italian Dr Louis Westenra Sambon (1865–1931), who carried in his wake the, also Italian, artist and illustrator Amedeo John Engel Terzi (1872–1956).[3]

Louis Sambon counted French and Italian ancestors on his father's side, and English and Danish ones on his mother's—his father had fought with Garibaldi's army in Sicily in the 1860s. Born in Milan and brought up in a family of archaeologists and classical scholars, apart from his father's brief military experience, he never lost a taste for the remains and artefacts of Italy's past history.[4] In the 1890s, Sambon, recently qualified at Naples and working in London, was introduced to Manson whom he had admired from afar. A friendship developed, and when Manson's London School of Tropical Medicine finally opened in October 1899, Sambon soon joined the staff, lecturing on epidemiology and parasitology, with particular emphasis on disease-causing "venomous insects, spiders, scorpions and snakes" and their "geographical distribution".[5]

When, after initial difficulties and delays, Manson had at last opened his School,[6] he could concentrate on a project he had had in mind since attending an informal conference the previous summer in Rome, where Giovanni Battista Grassi (1854–1925), Amico Bignami (1862–1929) and Giuseppe Bastianelli (1862–1959) had described their experiments, proving that the parasites causing human malaria (*Plasmodium vivax, P. malariae*, etc.) evolve through the same stages as does the avian malaria parasite (*P. danilewskí*), and that all are transmitted by species of *Anopheles*, including Ronald Ross's "dapple-winged" mosquitoes.[7] The Italian experiments were near-conclusive for the immediate Roman area, but left questions unanswered for more remote and less densely populated regions. Manson was determined to settle questions of transmission and epidemiology of malaria once and for all. With the full support of the Italian authorities, he now planned the first definitive epidemiological malaria experiment, to be carried out in the Roman Campagna.

As an initial test, mosquitoes reared and infected in Italy were sent under due precautions to London, where it was arranged for them to bite a man who had never had malaria, or ever been exposed to malarial infection—in fact, Manson's

[3] Peter Mattingly, 'Amedeo John Engel Terzi 1872–1956', *Mosquito Systematics*, 1976, **8** (1): 114–21.

[4] J V Morton, 'Solidified wine 2,000 years old', *The Wine Trade Review*, 15 April 1923.

[5] 'VII. Dr. Lewis W. Sambon', in *Syllabus of lectures of ordinary course*, London School of Tropical Medicine 1907, p. 17.

[6] L Wilkinson and A Hardy, *Prevention and cure, a history of the London School of Hygiene and Tropical Medicine*, London, Kegan Paul, 2001, pp. 7–10.

[7] Sir Philip Manson-Bahr, 'The crucial malaria experiment', in *idem*, *History of the School of Tropical Medicine in London (1899–1949)*, LSHTM Memoir No. 11, London, H K Lewis, 1956, pp. 98–103.

Figure 1: Terzi's somewhat unkind cartoon of his friend and mentor, Louis Sambon, *c.* 1919. (Wellcome Library, London.)

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eldest son, Patrick Thurburn Manson (1877–1902), at the time house physician to his father at the Albert Dock Hospital.[8] He duly succumbed to, and survived, a typical case of malaria, only to die less than two years later in a tragic shooting accident, while on an expedition to study beriberi on Christmas Island.[9]

The next step in Manson's plan was the installation of a purpose-built, mosquito-proof hut, its parts shipped to Italy and there assembled and erected on the edge of a swamp in a game preserve belonging to King Umberto I (1844–1900), in the district of Ostia. The experimenters were granted special permission by the king, whose interest was fuelled by the hope that positive results might help to reduce existing severe social consequences of annual outbreaks of malaria in local populations in the Po valley. Unfortunately he did not live to see them brought to their successful conclusion by October 1900—Umberto had been assassinated by anarchists at Monza in July.

With the hut installed, it was time for the experimenters—the "guinea pigs"—to move in. From Manson's School came Sambon and George C Low (1872–1952), the latter a former student, then research assistant to Manson in malaria work, who would eventually end a long working life as Director of the London School's Division of Tropical Medicine. They arrived at Ostia in June 1900, and were soon installed in the hut. Sambon, never one to hide his light under a bushel, regarded himself as "leader of the expedition", adding to its numbers his Italian artist friend, Amedeo Terzi, to record and illustrate their experiences, and an Italian servant. With enough Italian speakers and adequate supplies, they then proceeded to live in their mosquito-proof "Humphrey Hut" for a full three months, moving about freely in the daytime, and ensconced in the hut's mosquito-proof safety every evening and night during the mosquitoes' limited periods of biting. At the end of their three months' stay, they returned to London by October 1900, having at no time suffered from malaria in an area where the population at large suffered repeated attacks during the summer months. Also infected had been sixteen police detectives sent to investigate the murder of the king. Low, Sambon, and Terzi returned home as healthy living proof of Manson's theories concerning transmission and epidemiology of malaria.[10]

The official reports of this definitive experiment were published, by Manson in 1900,[11] and by Sambon and Low in 1901.[12] Terzi's illustrations accompanying the latter detailed article were a great success with Manson, and within his School, where Terzi was offered a position as illustrator. He arrived in London to join Manson's staff in November 1900, but then worked for the School for less than a year before leaving "for unexplained reasons" in October 1901. He did however continue to provide illustrations for Sambon, and also became associated with the Entomology Department of the British Museum of Natural History, having been

[8] P H Manson-Bahr and A Alcock, *The life and work of Sir Patrick Manson*, London, Cassell, [1927], p. 118.

[9] Obituary, Anon., 'Patrick Thurburn Manson, M.B.London', *Br. med. J.* 1902, **ii**: 749.

[10] L W Sambon, 'Tropical and sub-tropical diseases', pp. 170–88 (see pp. 173–6) in 'In commemoration of the life and work of the late Sir Patrick Manson', *J. Trop. Med. Hyg.*, 1922, **25**: 155–208.

[11] P Manson, 'Experimental proof of the mosquito-malaria theory', *Br. med. J.*, 1900, **ii**: 949–51.

[12] L W Sambon and G C Low, 'Report on two experiments on the mosquito-malaria theory', *Med. chir. Trans.*, 1901, **84**: 497–556.

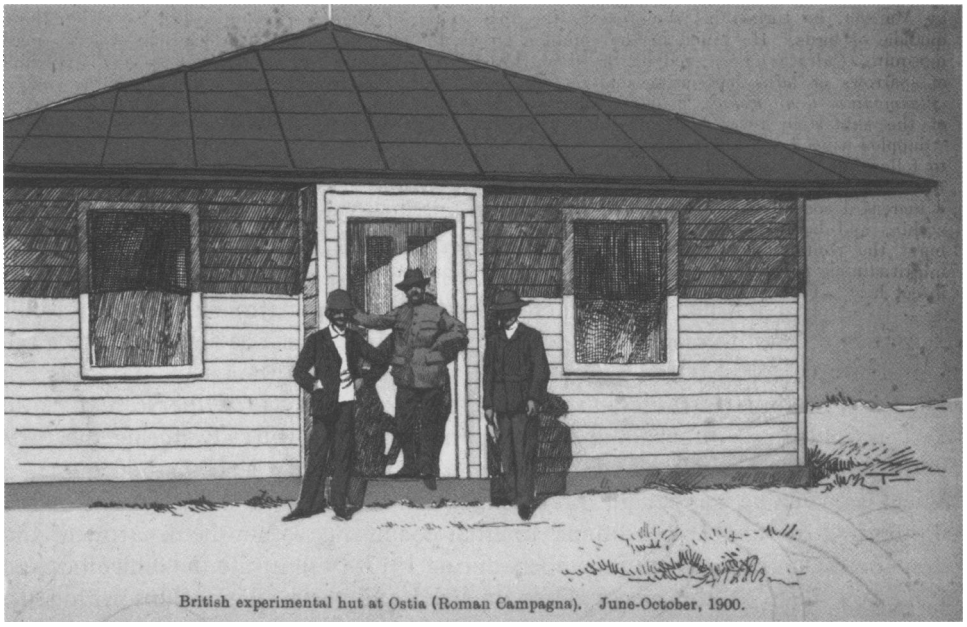

Figure 2: The Humphrey Hut and its occupants from June to October 1900: Sambon in the doorway, Terzi on his right (both Italians sporting moustaches) and George Low on his left. (Wellcome Library, London.)

invited by E E Austen to illustrate his monographs on British blood-sucking flies and tsetse flies.[13] Few details of Terzi's life outside medical illustration are known, and nothing of his family life in either Italy or London; he seems to have been of a reclusive temperament, and even his few friends received little in the way of confidences. When he died in London in 1956, there were no official obituaries, and only two decades later was a one-time friend of his at the Natural History Museum asked to produce biographical details of the artist for the archives. Relying on personal recollections and details provided by Terzi himself in private conversations, Peter Mattingly published in 1976 a biographical essay in *Mosquito Systematics*. According to Mattingly, Terzi claimed to have had no teachers, but "by his own efforts, early in life", to have "trained in painting, modeling, architecture, perspective, lithography and engraving on stone, and afterwards, in England, in anatomy, zoology, entomology and medical science".[14]

His early training in arts subjects was presumably acquired at home. He was born in Palermo in 1872, the younger of two sons of Andrea Terzi, a lithographer and painter of many examples of classical architecture in the region of Palermo. Amedeo's

[13] E E Austen, *A monograph of the tsetse-flies* (Genus *Glossina*,Westwood), London, British Museum (Natural History), 1903; *idem*, *Illustrations of British blood-sucking flies*, London, British Museum (Natural History), 1906; *idem*, *A handbook of the tsetse-flies (*Genus *Glossina)*, London, British Museum (Natural History), 1911; N D Riley, 'Austen, Ernest Edward (1867–1938)', *Entomologist's Monthly Magazine*, 1938, **71**: 72.

[14] Mattingly, op. cit., note 3 above, p. 118.

elder brother Aleardo was a gifted book illustrator and poster artist. A J E Terzi himself provided no information at all about his mother or his wife, nor indeed about his one son and one daughter, apart from their existence. His later training in the sciences was most likely acquired by "osmosis" at Manson's School and at the Natural History Museum.

Terzi's close collaboration with Sambon, whose appreciation of art and artistic talent both in classical perspective and as illustrative accompaniment to bacteriological and entomological research never left him, continued over the years. At the same time, dating from his early work with E E Austen, Terzi became a regular contributor to published and unpublished work in the department, although to his lasting regret—not to mention his resentment and irritation—he never became a full member of its staff. Mattingly wrote: "He greatly resented the fact that he was not given a position on the museum staff though I think at that time [the Second World War] it would have been administratively impossible".[15] Already during the First World War—the Great War—Terzi's employment at the museum had encountered difficulties when he was caught out during a visit to Italy and his return to London complicated by wartime conditions. Internal documents within the department and letters between Terzi and staff members during 1917–19 illustrate the difficulties and also throw light on the personalities involved and their relationships within the department, none of which appear to have been easy.[16]

In his biographical note, Mattingly also wrote of Terzi's "reputation for bloody-mindedness" and "the cantankerousness with which he was generally credited".[17] In turn, M W Service wrote of Mattingly after his death in 1993 that "He could be impatient and curt with both visitors and his colleagues at the Museum. He not only had no time for small talk but apparently saw little merit in wasting time on acknowledging colleagues or exchanging pleasantries with any whom he might encounter"; but he still added in his conclusion that "Mattingly was an original, and it is a duller world now that they don't come like him any more".[18] In fact, comparing such remarks with the surviving staff correspondence within the museum, one is tempted to conclude that similar reflections could have been made concerning a number of that generation of past members of that, and perhaps also of other, science departments at the time.

Terzi's attitude to Sambon on the other hand differed from his usual reclusive tendencies—Sambon was perhaps the only colleague for whom he had genuine admiration and even affection, regarding him as his mentor and the man who had launched him on his career as an artist and illustrator through his involvement in the great malaria experiment in the Roman Campagna. Even after Sambon's relatively early death he kept in touch with the family in Italy and London, where his daughter

[15] Ibid., p. 118.

[16] Letters between Sir Sidney Frederic Harmer, FRS (1862–1950), Emer. Prof. Francis Jeffrey Bell (d. 1924), Charles Edward Fagan (1855–1921), Secretary, British Museum (Natural History) 1919–1921, and A J E Terzi, from 1918 to 1919, in the Natural History Museum Library archives, P. 1636.

[17] Mattingly, op. cit., note 3 above, pp. 118–19.

[18] M W Service, 'Peter Frederick Mattingly (1914–1993)', *Bull. R. Ent. Soc.*, 1994, **18** (1): 54–6.

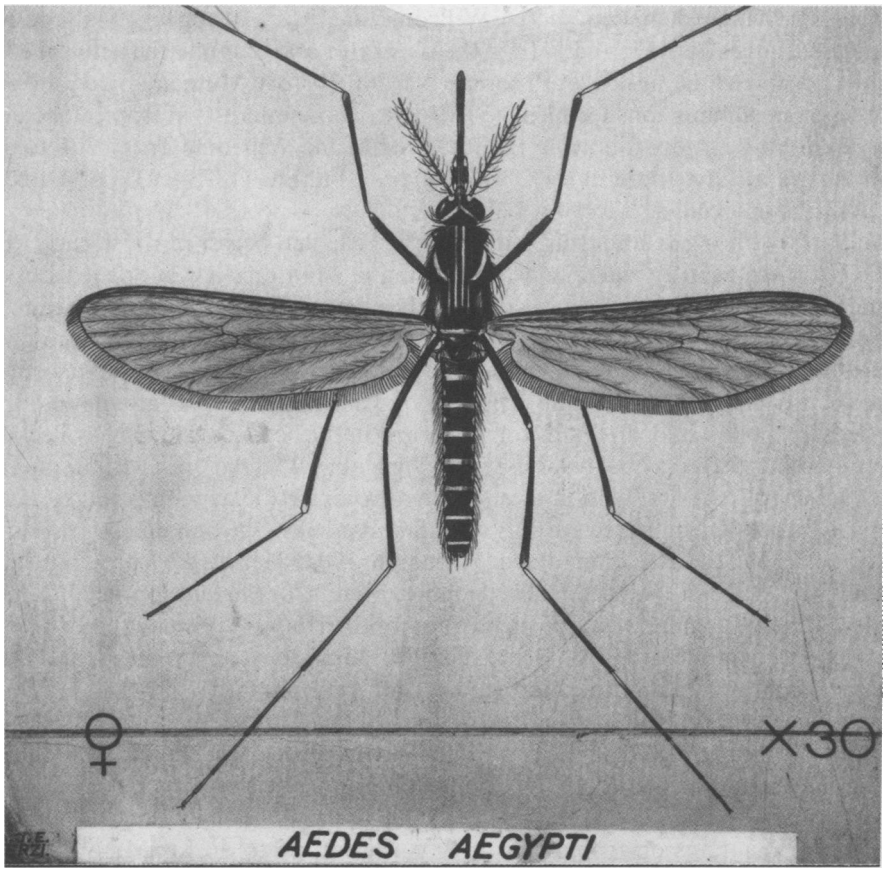

Figure 3: A coloured drawing by Terzi of the mosquito *Aëdes aegypti* which transmits the virus of yellow fever. (Wellcome Library, London.)

Juliet was also involved in research in tropical medicine and entomology.[19] In spite of Terzi's well established eminence as an illustrator—he continued to be held up as an example to younger generations working on similar subjects—he never formally taught. In 1928, Ferris wrote:

> ... certain drawings [are] selected to represent the simpler work of one of the most finished entomological illustrators of the present day. This illustrator is one who combines the qualifications of both the artist and the scientific investigator to such a degree that his illustrations are not only pleasing to the eye, but technically impeccable as well. The writer would recommend that the student who is interested in the subject of entomological illustration should study the work of Mr. A. J. E. Terzi [he] will find no better teacher.[20]

[19] H A Baylis, T C Pan, and Juliet E B Sambon, 'Some observations and experiments on *Gongylonema* in northern Italy. A preliminary note', *J. Trop. Med. Hyg.*, 1925, **28**: 413–19.

[20] G F Ferris, *The principles of systematic entomology*, Stanford University Press, 1928.

From surviving documents in the Wellcome archives[21] it appears that the long lasting association between A J E Terzi the illustrator and Sambon the active medical scientist continued, alongside work for the Natural History Museum, on a joint free-lance basis, in commissions for Henry Wellcome, whose interests in tropical medicine were developing rapidly following the founding of the Wellcome Tropical Research Laboratories at Khartoum in 1902 with Andrew Balfour (1873–1931) as Director, and with the associated "Floating Laboratory".[22]

Sambon's working relationship with Henry Wellcome began in those early years of the twentieth century, when he was lecturing at Manson's newly opened London School of Tropical Medicine.[23] At this early stage Sambon repeatedly requested Wellcome to intercede on his behalf with Manson for him to be relieved from giving lectures in order to be able to devote more time to travels in Italy to pursue studies on subjects of interest, at the time primarily on pellagra, as well as attempts to trace and acquire books and artefacts for inclusion in Wellcome's growing collections. Such requests received a cool response from Wellcome, who did "not wish to interfere with the School".[24] With Terzi in attendance to record patients with pellagra as well as any parasites encountered on the way, Sambon then set out on his travels for Wellcome in 1904. In a letter dated 31 March 1904, Henry Wellcome agreed to engage "Mr. A. Terzi" to accompany Sambon on a "Continental journey" to make "copies, sketches, studies, etc., of pictures and other things you may direct",[25] on a basic appointment fee of £6 per week, plus 10 francs a day for expenses, and travel second class, which in any case was paid for by Sambon.

From then on A J E Terzi worked on and off for Sambon and Wellcome, both on trips abroad and in London. On 4 November 1904, he is mentioned in correspondence addressed to C J S Thompson as an obvious choice for the job of drawing mosquitoes etc.; two days later A J E Terzi himself writes to Thompson concerning "diagrams on tropical diseases you want me to do for Mr. Wellcome", at Sambon's request.[26]

Amedeo Terzi had in fact been preceded in Wellcome's employment by his elder brother Aleardo, mentioned above by Mattingly, who however did not refer to, and probably was never told by Amedeo about, this aspect of his brother's career. It seems Aleardo had, originally, also through Sambon the family friend, been engaged to copy an illustration of *Fabbricazione della Teriaca* for the Wellcome collection.[27] From July to November 1904, there are a number of handwritten letters from Aleardo to Wellcome (with answers typed by a secretary) concerning this work,

[21] Wellcome Archives, Wellcome Historical Medical Museum (hereafter WA/HMM) CO/EAR/839–845; 850.

[22] Balfour obituaries: *Br. med. J.*, 1931, **ii**: 245–6; *Lancet*, 1931, **ii**: 325–7; *Nature*, 1931, **127**: 279–81; P F D'Arcy, 'Andrew Balfour and the Sudan', *Adverse Drug React. Toxicology Review*, 1994, **13** (1): 3–21.

[23] See note 5 above.

[24] WA/HMM/CO/EAR/840: letter from Wellcome to C J S Thompson advising him to "ignore ... entirely ... remarks ... [Wellcome] does not wish to interfere with Sambon's relations with the School [of Trop. Med.]".

[25] WA/HMM/CO/EAR/842.

[26] WA/HMM/CO/EAR/950: 'Brothers Terzi', (Box 65). letter dated 6 Nov. 1904.

[27] WA/HMM/CO/EAR/950. Between 23 July and May 1905 there are more than twenty letters concerning unfinished work on *Fabbricazione della Teriaca*.

long considered "unsatisfactory" and "not doing himself [Aleardo] justice"; the correspondence was prolonged and complicated by Aleardo not meeting deadlines, failing to turn up for appointments, and being generally unpleasant about changes required and amounts of, and dates for, payment. This all continued until May 1905, Aleardo sounding increasingly impatient, until he finally declared himself almost immobile with rheumatism and hence returning to Italy, suggesting his younger brother as his substitute.[28]

From then onwards, correspondence between A J E Terzi, Sambon, and C J S Thompson is calm and professional; by the end of June 1906 Amedeo Terzi appears quite happy to accept a cheque for £45 for sixty large coloured diagrams "illustrating the relation between Disease and Animals".[29] This working relationship continued for some time, Terzi meanwhile also keeping up his illustrative entomological contributions to the Natural History Museum. During this period, occasional examples of his work are found as well in the early reports from the Wellcome Tropical Research Laboratories at Khartoum, then under the directorship of Andrew Balfour from 1902 to 1913, before the latter's later career at the Wellcome Scientific Laboratories in London, and finally as Director of the successor to Manson's School, the London School of Hygiene and Tropical Medicine.[30] In July 1909, Terzi borrowed from the Wellcome Library the third Khartoum report, which he needed for "more diagrams"—although six months earlier there had been difficulties regarding three missing original diagrams for which he had been paid in advance. Terzi at first tried to suggest that Sambon—his mentor, friend and collaborator—must have "lost them"; finally confessing, shamefacedly and privately to Sambon and Mrs Sambon what he had not liked to admit before, that he never in fact completed them. He now promised to mend his ways.[31]

Over the years, the correspondence then gives interesting, sobering, and not altogether encouraging insights into everyday relations between Terzi and Sambon, and at the same time into the impact of such problems with employees and their general behaviour vis-à-vis the existing behind-the-scenes administrative network of the growing Wellcome organization. In fact, certain letters reflecting the attitude of C J S Thompson to the problems, and Henry Wellcome's own responses to those and ultimately to Thompson himself, anticipate future difficulties prior to Thompson's abrupt dismissal in 1925.[32]

Earlier letters between Thompson and Wellcome left an impression of unreserved appreciation of Amedeo Terzi's work. As for Sambon, although he was recognized initially by Manson and others at home and abroad for his scientific output, much of it was later criticized and its conclusions ultimately proved to be inaccurate. His studies of pellagra centred on his claim that it was a protozoal disease and not

[28] Ibid. Final letter from Aleardo.

[29] Ibid. (CO/EAR/950): letter from A J E Terzi dated 30 June 1906.

[30] E M Tansey and R C E Milligan, 'The early history of the Wellcome Research Laboratories, 1894–1914', in J Liebenau, G J Higby, E C Stroud (eds), *Pill peddlers: essays on the history of the pharmaceutical industry*, Madison, WI, American Institute for the History of Pharmacy, 1990, pp. 91–106; 'Sir Andrew Balfour (1873–1931)', in Wilkinson and Hardy, op. cit., note 6 above, p. 329; and as note 22 above.

[31] WA/HMM/CO/EAR/950: letter from A J E Terzi *re* three missing drawings etc., dated Feb. 1909.

[32] Symons, op. cit., note 1 above, p. 18.

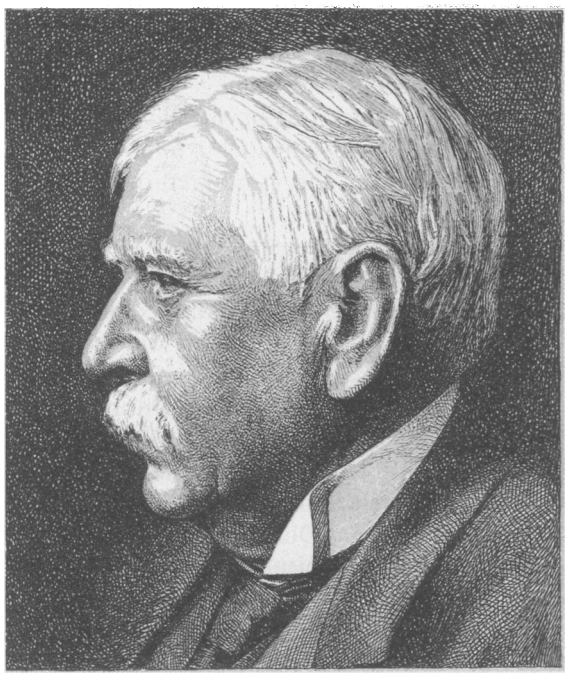

Figure 4: Terzi's drawing of Manson in his later years, used in Sambon's memorial essay in the *Journal of Tropical Medicine and Hygiene*, 1922, **25**: 155–208. (Courtesy Library, London School of Hygiene and Tropical Medicine.)

related to dietary deficiencies.[33] This, and subsequent studies—by then independent of Wellcome association—proved in the end to be highly misguided, although even at the time of his sudden death in Paris in 1931 he was described as "carrying out investigations on cancer, in Westmoreland".[34] Most of his cancer studies were carried out in Italy throughout the 1920s; his correspondence preserved in the Wellcome archives comes to a halt in December 1921. The last letters, dated between February and December 1921, concern urgent requests from the library and administration for immediate return of borrowed books and a camera.[35]

Sambon's work on the epidemiology of cancer was linked to his main consuming interests in parasitology and protozoal diseases; it was also associated with contemporary studies, published by Johannes Fibiger (1867–1928), professor of pathological anatomy in the University of Copenhagen, between 1913 and 1920.[36] Fibiger claimed that a worm, *Spirometry plastica* (*Gongylonema neoplasticum*) caused cancer

[33] Wilkinson and Hardy, op. cit., note 6 above, pp. 239–40.

[34] A J Engel Terzi and S Maulik, 'Dr. L. W. Sambon', *Nature*, 1931, **128**: 486.

[35] WA/HMM/CO/EAR/845: letters 7 Feb., 21 Feb., and June 1921.

[36] Theodore L Sourkes, '1926: Johannes Fibiger (1867–1928)', in *idem*, *Nobel Prize winners in medicine and physiology 1901–1965*, London, Abelard-Schuman, 1967, p. 123.

of the stomach in rats, and that cockroaches might be involved as intermediate hosts, before the worm moved on to man and rats.[37]

Sambon enthusiastically adopted Fibiger's ideas, and in turn based studies of his own on epidemiological observations in the Trentino region of Italy, forming the concept of "cancer houses" (not in itself a new idea), based on an uneven geographical distribution of cases of cancer within certain areas, even among individual houses in the same street. According to Sambon, the "cancer houses" were heavily infested with cockroaches, known vectors of *Gongylonema*; hence his observations supported Fibiger's claims of a causal relationship between presence of the worm and formation of neoplasms in the inhabitants.[38] Sambon's helminthologist colleague R T Leiper (1881–1969) at Manson's School was soon able to show the errors of Sambon's conclusions: *Gongylonema neoplasticum* is not found in Italy, and the related species *G. pulchrum*, which can, but rarely does, infect man, had never been found in Trentino, the region studied by Sambon. An acrimonious correspondence followed between Leiper and his "exuberant Neapolitan colleague"; but Leiper was right, and in the end even Fibiger's rat tumours were shown to be non-malignant.[39] But by then, Fibiger had long since been awarded the Nobel Prize for 1926 for "his discovery of the *Spiroptera* carcinoma". It was to take the Stockholm Nobel Committee ("Physiology or Medicine") a full forty years to recover from their mistake. In the meantime no other prizes for cancer studies were awarded until 1966, when F P Rous (1879–1970), then aged eighty-seven, received his richly deserved, long overdue, prize for his pioneering work, in that century's first decade, on cell-free transmission of spindle-celled sarcoma in Plymouth Rock hens, by what has since become known as Rous's sarcoma virus.[40]

After the death of Sambon in 1931, Terzi continued to work in London for the Department of Entomology at the Natural History Museum for another twenty years, throughout the Second World War and until a few years short of his own death in 1956. He will be remembered for his countless, inspired illustrations of entomological subjects now housed in the Wellcome Library and in the main library of the Natural History Museum and its entomology department; and also for his few portrait drawings, watercolours of diseased patients, and his irresistible caricatures of himself and his colleagues during that pioneering malaria expedition in the Roman Campagna in the first summer of the twentieth century.

[37] Ibid., 'Description of the prize-winning work', pp. 124–7.

[38] L W Sambon, 'Observations and researches on epidemiology of cancer made in Holland and Italy (May–September 1925)', *J. Trop. Med. Hyg.*, 1926, **29**: 233–87.

[39] [R T Leiper], 'Rats, worms and cancer', *Br. med. J.*, 1926, **ii**: 1002–3; R T Leiper (reply to H A Baylis 'Gonglyonema and cancer', *Br. med. J.*, 1926, **ii**: 503–4), *Br. med. J.*, 1926, **ii**: 504; Anon., 'Fibiger's tumour of the rat's stomach', *Lancet*, 1938, **ii**: 735–6, referring to W Cramer, *Am. J. Cancer*, 1937, **31**: 537.

[40] A P Waterson and L Wilkinson, *An introduction to the history of virology*, Cambridge University Press, 1978, pp. 158–60; Wilkinson and Hardy, op. cit., note 6 above, p. 240.