

Carlo Moreschi (1876-1921): co-founder of the journal “La Medicina del Lavoro” and often forgotten pioneer of modern medicine

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KEY WORDS

Carlo Moreschi; complement fixation; history

SUMMARY

Background: Carlo Moreschi (1876-1921) was founding co-editor of the journal “Il Lavoro” (now known as “La Medicina del Lavoro”), together with Luigi Devoto in 1901. Despite this fact, many of his pioneering contributions to 20th century scientific debate are not well known outside Italy. **Objectives:** The aim of this paper therefore was to recall Moreschi’s achievements and the groundbreaking work of this remarkable Italian physician. **Methods:** A comprehensive analysis was conducted on scientific papers written by Carlo Moreschi between 1901 and 1920, extending the investigation to his original manuscripts and private correspondence with family and colleagues. **Results:** Careful examination of Moreschi’s work reveals several studies in the field of social medicine, epidemiology of infectious diseases, general pathology and oncology. In particular, his main interest in haematology and immunology enabled Moreschi to be one of the first to understand the mechanisms of complement fixation and the formation pathways of antiglobulin sera. In this manner, Moreschi significantly contributed to the work of Wassermann regarding the diagnosis of syphilis, as well as contributing to the discovery of the “antiglobulin test”, first described by Coombs in 1945. Furthermore, Moreschi co-founded “Il Lavoro” and “Haematologica”, the oldest journals in their respective fields. **Conclusions:** According to Devoto, Moreschi can be remembered as the archetype modern researcher and clinician. His role in the 20th century scientific debate and his pioneering work in the field of immunology and haematology, that are often forgotten due to his premature death, deserve to be reconsidered and re-assessed by the Italian and international scientific community.

RIASSUNTO

«Carlo Moreschi (1876-1921): co-fondatore de “La Medicina del Lavoro” e dimenticato pioniere della medicina moderna». **Introduzione:** Carlo Moreschi (1876-1921) fu il primo redattore de “Il Lavoro”, fondato da Luigi Devoto nel 1901 e nucleo originario della rivista “La Medicina del Lavoro”. I contributi offerti da questo illustre scienziato italiano al dibattito medico-scientifico di inizio Novecento sono oggi poco conosciuti. **Obiettivi:** Scopo del presente lavoro è quello di ricordare la vita e l’attività di ricerca scientifica di Carlo Moreschi. **Metodi:** È stata

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condotta un'analisi approfondita degli articoli scritti da Moreschi dal 1901 al 1920, estesa anche ai manoscritti originali e alle lettere scritte a colleghi e familiari. Risultati: Moreschi condusse numerosi studi innovativi nel campo della medicina sociale, dell'infettivologia, dell'oncologia e della patologia generale. In particolare, in campo immunologico fu tra i primi a comprendere i meccanismi alla base della fissazione del complemento, aprendo la strada ai lavori di Wassermann sulla sierodiagnosi della sifilide. Inoltre, per primo, lavorò sui sieri antiglobulina umana, offrendo contributi decisivi alle successive ricerche di Coombs in questo settore. Moreschi co-fondò due giornali "Il Lavoro" e "Haematologica", entrambi tra le riviste scientifiche più antiche nelle rispettive discipline. **Conclusioni:** Nonostante la prematura morte, avvenuta all'età di 45 anni, la figura di questo scienziato italiano, che Devoto stesso definì "studioso geniale e clinico moderno", necessita di una maggiore considerazione e valorizzazione da parte della comunità scientifica nazionale ed internazionale.

In 1901, when Luigi Devoto (1864-1936) founded the journal "La Medicina del Lavoro", whose original title was "Il Lavoro - Rivista di Fisiologia, Clinica ed Igiene del Lavoro", his first assistant on the editorial board was Carlo Moreschi (1876-1921) (33). Although the name of this remarkable Italian scientist is mainly remembered due to a number of studies in the fields of social medicine, general pathology, immunology and haematology; many of his pioneering achievements are not widely known by the national and international medical community due to his sudden and unexpected death at the age of 45. This year (2011) marks the 90th anniversary of Moreschi's death and as such provides us with a timely opportunity to remember the life and the groundbreaking achievements of this remarkable man.

MORESCHI'S LIFE AND WORK

Carlo Moreschi was born in Cermenate, near Como, on 1 March 1876. In 1900 he graduated in Medicine from the University of Pavia, where he had worked with the Nobel Prize winning scholar Camillo Golgi (1843-1926). Following graduation, Moreschi was appointed as an assistant at the "Institute of Medical Pathology" in Pavia which was then directed by Luigi Devoto (12). During this period he was profoundly influenced by Devoto's views in the field of social medicine, and in 1902 also helped Devoto co-found the journal "Il Lavoro", which later became today's "La Medicina del Lavoro" (29, 30, 33). Moreschi was co-editor of

this journal for only a few years, until 1904 when he was replaced by Luigi Carozzi (1875-1963) (33). Nevertheless, perhaps his most significant contribution to "Il Lavoro" was to develop its international and scientific profile, emphasizing the importance of reporting medical and legislative experiences from foreign countries and stimulating the publication of studies on the pathogenetic mechanisms of occupational diseases (12) - an ethos that was far less common then, when compared to today.

Prompted by his early interest in social medicine, in 1901 Moreschi investigated a typhus epidemic in Cislago (near Varese), where he analyzed 42 cases of this disease from an epidemiological standpoint, highlighting the mechanisms of disease transmission, particularly the role of direct infection from person to person. Furthermore, in Cislago he clinically investigated different stages of the disease and described the various types of cutaneous rash (rubella-like, measles-like, petechial and papular) which developed among patients (13). In the same period, Moreschi studied the aetiology and pathogenesis of pellagra, analyzing the role of corn (nutritional theory), as well as hypothesizing other possible causes, such as the effects of infectious agents (infective theory), or the role of other toxins in spoiled corn (toxicological theory) (14, 15).

Despite his initial interest in social medicine, Moreschi's main fields of work centred on general pathology, with a particular interest in immunology. In 1904, with funding provided by the bank "Cassa di Risparmio delle Province Lombarde"

(CARIPLO), Moreschi moved to the “Hygiene Institute” at the University of Koenigsberg (Germany), which was then directed by Richard Pfeiffer (1858-1945) where he mainly focused on the complement system (12). In 1905 Moreschi built on the work of Belgian pathologists Jules Bordet (1870-1961) and Octave Gengou (1875-1957) who had studied complement fixation, providing further contributions to the understanding of the mechanisms of what ultimately became known as the “Moreschi-Bordet-Gengou phenomenon” (1, 12). Moreschi’s studies on the anti-complementary properties of certain sera (16) led to the introduction of a complement fixation test to detect traces of blood in medico-legal practice by Albert Neisser (1855-1916) and Hans Sachs (1877-1945) (10). Furthermore, his experiments on the combination of complements and specific immune sera, together with Bordet and Gengou’s studies, formed a basis for the development of the “complement fixation test” used in the diagnosis of syphilis, first proposed by August von Wassermann (1866-1925), after whom it was named in 1906 (1, 2, 7, 12).

Around this time, Moreschi had conducted several experiments on the agglutination of red blood cells, thereby developing a new method to detect serum antibodies against human globulin (8, 17, 18, 19). These studies comprised a basis for the development of the “antiglobulin test”, first described in 1945 by Robin Coombs (1921-2006), after whom it is named. Indeed, when the British immunologist first published his discovery, he openly acknowledged the earlier pioneering works of Moreschi (6, 12, 27), stating: “Since this paper has been written, a paper by Moreschi has come to the notice of the authors. In 1908 Moreschi recorded some experiments on the agglutination of rabbit red blood cells sensitized with a goat anti-rabbit-cell immune serum (which in itself was too weak to cause agglutination), by exposing these washed cells to the serum of a rabbit immunized against goat serum” (6). Despite the fact that Moreschi had become an internationally renowned figure in the field of immunology, he was unable to find a suitable academic position in Italy. As a result, he continued to work in Germany at the “Institute of Experimental Therapy” (Frankfurt, Main) directed by

Paul Ehrlich (1854-1915) (12), publishing papers on the relationships between nutrition and tumour growth and on the inhibition of cancer progression (20, 21). When examined in detail, both articles provide a testament to the international medical community’s increasing interest in cancer research, as evidenced by the first attempts to establish a National Cancer Institute in Milan – a mission unsuccessfully pursued by Luigi Mangiagalli (1849-1928) (12).

Nonetheless, in 1909 Moreschi returned to Italy where he started work at a then-new institute founded by Devoto, the “Clinica del Lavoro”, producing papers on the pathogenesis of fever in collaboration with Felice Perussia (1885-1959), who was the first radiologist of this Institute and also rector of the University of Milan (12). Moreschi lived in Milan only briefly, but despite his short stay, a plaque on the wall of the “Clinica del Lavoro” recalls his name along with other distinguished colleagues who worked there. Moreschi moved to Pavia as assistant at the “Institute of Medical Pathology” directed by Vittorio Ascoli (1863-1931), continuing his studies on the pathogenesis of fever (12). During World War I, he worked on the front lines, diagnosing an epidemic of severe icteric leptospirosis among Italian combat troops (4). In addition he reported some epidemiological aspects of this infectious disease in the Italian army, assuming a fecal-oral route of transmission (22, 26). It is worth noting that during the same period another assistant at the “Clinica del Lavoro”, Pier Diego Siccaldi (1880-1917), had also studied leptospirosis on the front lines: he unfortunately contracted and later died from this disease following the Battle of Caporetto in November 1917. For this reason, in Italy today icteric leptospirosis is also known as “Siccaldi’s disease”, in honour of the young physician who ultimately gave his life for its study.

In 1916 Moreschi was appointed to the Chair of Internal Medicine at the University of Sassari (in Sardinia) and, four years later, at the University of Messina (in Sicily) (12). Indeed, at that time an appointment as Professor in Southern Italy and/or the islands was seen as an intermediate step towards a later appointment at the more prestigious

universities in Northern Italy. During this period, Moreschi undertook clinical research on the pathogenesis of *diabetes insipidus*, the filterability of influenza virus and haemoglobinuria from quinine (23-25). In 1920 his interest in haematology led Moreschi, along with Adolfo Ferrata (1880-1946), to found the journal "Haematologica - Archivio Italiano di Ematologia e Sierologia", which followed after 5 years the only other haematology journal in existence at the time: "Folia Haematologica", published in German. Since the latter publication ceased, "Haematologica" can be regarded as the oldest haematology journal in existence today (31).

Moreschi's life was tragically cut short at the age of 45 while working in Messina. As part of his duties there, Moreschi was called to examine some passengers from a Russian ship, suffering from a fever of unknown aetiology. Moreschi subsequently contracted smallpox, which led to his death within a few days, on 21 May 1921 (12).

MORESCHI'S LEGACY

Moreschi's unexpected and sudden death was a great loss for Italian academic circles, as demonstrated by several commemorative meetings held by his friends and colleagues in the following years (3, 4, 5, 9, 11). During one of these events, the pathologist Alberto Ascoli (1877-1957) summarized the feelings of the Italian scientific community with a phrase in Latin: "*Et multo maiora fecisset diutius si vixisset*" ("and he would have done much more if he had lived longer") (9). "Il Lavoro", the journal Moreschi helped to found, commemorated its first co-editor with the publication of two papers (9, 11), while Luigi Devoto himself recalled the important contributions made by his young assistant to the scientific and medical world, remembering him as "a meticulous researcher, a brilliant scholar, a modern clinician, but also as a pure and great teacher, in whom a rare moral force equalled the value of a scientist" (Commemoration of Carlo Moreschi; 17 June 1921, Pavia). The words spoken by Devoto poignantly summarize the remarkable life of this exceptional, although often forgotten,

Italian scientist. Indeed, Moreschi may be looked upon as the paradigm of an enlightened European researcher – someone who completed his education in foreign research institutes at a time when nationalist ideologies that had developed in certain European countries were restraining cultural and scientific exchanges between researchers of different nations. The findings of this "meticulous researcher" and "brilliant scholar" were essential for the development of subsequent research in social medicine, epidemiology, forensic medicine, general pathology and oncology. In particular, Moreschi should be remembered for his outstanding contributions to the field of haematology and immunology, through a better understanding of complement fixation (the "Moreschi-Bordet-Gengou phenomenon") and his experiments on the agglutination of human red blood cells, which formed the basis of later famous works by Wassermann and Coombs.

In addition to these undoubted achievements, Carlo Moreschi can also be remembered as a "modern clinician", driven by the desire to establish causes of disease and related pathogenetic mechanisms, and then translating the results of his research "from bench to bedside". On several occasions, his sense of clinical research, combined with a certain degree of medical heroism, led Moreschi to risk his life during outbreaks of infectious diseases (epidemic typhus, leptospirosis) – risks which would ultimately take his life. Although his premature death prevented Moreschi from creating his own school and nurturing a new generation of physicians and scientists, this "pure and great teacher" was no doubt ahead of his time in recognising the importance of the scientific journal as a tool for disseminating knowledge in the medical and scientific world. Indeed, he co-founded two journals "Il Lavoro" (later "La Medicina del Lavoro") at the beginning of his career and "Haematologica", just a few months before his death. Both journals are still active today and are the oldest journals in existence in their respective fields.

Finally, even if Moreschi's contributions to occupational health are confined only to the co-founding of "Il Lavoro", his activities at the "Clinica del Lavoro" in the early 20th century provide us with

precious information on the scientific research conducted in this institute during its early years. Indeed, the focus on occupational medicine was not limited only to the diagnosis of work-related diseases but also to the understanding of their pathogenetic mechanisms. In particular, the investigations by Moreschi and other researchers (e.g. Perussia) on the mechanisms of some pathological conditions (such as fever or tumours) are a testimony to the high level of scientific research developed on these topics in the "Clinica del Lavoro" from its foundation. Furthermore, the works of Moreschi can be seen to have paved the way for many other studies on the immune pathogenesis of some work-related diseases (such as silicosis), and for investigations on the development of occupational tumours – issues successfully explored some decades later by the "Clinica del Lavoro" when it was directed by Enrico C. Vigliani (1907-1992) (28, 32).

As a celebration of his life, all original manuscripts, publications and private correspondence of Carlo Moreschi with his family, colleagues and professors have recently been collected and archived at the University of Pavia, the same institute where Moreschi began his career so many years ago. These files are now being catalogued to preserve Moreschi's memory and to simultaneously to offer precious biographical information on the groundbreaking achievements of this remarkable man. In particular, this private correspondence well highlights the difficulties encountered by a young researcher operating in the Italian academic world at the beginning of the last century and perhaps most poignantly helps demonstrate the generous efforts made by his Professors (particularly Devoto), colleagues and family with their support during his early career, providing not only useful advice but also much-needed funds. For instance, when Moreschi wrote to his family from Koenigsberg, he often asked for direct economic assistance, and on at least one occasion he did not even have the money to buy a new jacket for the cold German winter. Finally, these letters, full of warmth, tenderness and melancholy, reveal a touching, human side of Moreschi the scientist. A man who suffered from homesickness whilst studying and working abroad

and one who fretted about the living conditions of his parents, his wife Lotte, and his beloved daughters. Ninety years after Carlo Moreschi's tragic death, there is still much to be learned about his short life, and even more of which to be proud.

NO POTENTIAL CONFLICT OF INTEREST RELEVANT TO THIS ARTICLE WAS REPORTED

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