

On Earthworms
A.N. PAGLIATI
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Daniele Rosa: Profile of a researcher

Daniele Rosa was born in Susa (Piemonte) in 1857. His father, Norberto, a close friend of Daniele Manin, and member of the «Parlamento Subalpino» died when Daniele was five years old. His mother, Laura Valletti, herself in poor health, was faced with the burden of raising her still young children. The family moved to Avigliana and then to Turin, where Laura Valletti died two years before Daniele took his degree in 1878.

In Turin Rosa completed his classical studies, and, against the wishes of his family who would have preferred him to enter law, he enrolled in the Faculty of Sciences. He was strongly attracted to the Natural Sciences and spent much of his time in the University's Zoological Museum. The director of the museum was Michele Lessona, a man of wide culture who had gathered together a group of young well trained assistants that included Lorenzo Camerano, Ermanno Giglio-Tos and Alfredo Borelli. The Museum with its stimulating atmosphere and pro-evolutionary doctrines «... was the very environment in which to germinate my future theoretical work...».

In 1880 Rosa graduated with a thesis on the freshwater fishes of Piemonte. After taking his degree he spent six months at the Institute of Zoology in Göttingen, where under the guidance of the director, Ernst Eblers, famous for his work on Polychaetes, he undertook the study of the Oligochaetes, then a little known group.

Upon his return to the Museum in Turin, he resumed his study of Oligochaetes. The years 1884-1899 saw the appearance of his most important works on the Lumbricidae: the monograph, *I lumbricidi del Piemonte* (1) and the *Revisione dei Lumbricidi* (2). Michaelson's famous monograph (3) was in part based on the latter. Rosa then classified the material obtained in foreign expeditions, however he saw systematics not purely as a discipline that served to group together living organisms, but rather as a science that could reveal the relationships between various species. A catalogue of fauna was the occasion for Rosa to set down acute biogeographic observations.

Rosa also investigated morphological and histological problems related to Oligochaete lymphocytes and their supposed relationships with chloragogen. He studied the structure and function of the valves and blood vessels of earthworms. These studies were confirmed by Stephenson (4), and he was soon considered an authority on Oligochaetes, together with



Daniele Rosa (1857 - 1944)

Perrier, Beddard and Michaelsen. However, it cannot be said that Rosa's university career was either brilliant or rapid. During the years at the Zoological Museum in Turin, he substituted Lessona in the zoology teaching from 1892 to 1894 (in 1884 he was appointed Doctor associated to the Faculty of Science). From 1895 to 1898 he held a course on comparative embryology, also at the University of Turin. He applied for Chairs at various Italian Universities, however without success despite his already long list of scientific publications. Colosi (1961) (5) writes «... in actual fact the scientific figure of Rosa caused increasing annoyance in someone who delighted in reigning uncontested in Italian zoology...».

In 1898 he applied for the Chair of Zoology and Comparative Anatomy at Parma, and was found suitable; at the end of the same year he was appointed Professor of Zoology and Comparative Anatomy at Sassari; in 1900 he was Assistant Professor at Modena, where he was appointed Full Professor in 1902.

Daniele Rosa was timid and reserved, and his private life was unremarkable. He was not a «public figure», as were some of his colleagues. His only public appearances were at zoological and scientific congresses. Even in his contacts with colleagues and students he kept to the bare essentials and impartiality. He had health problems, which worsened with age, sight difficulties that kept him from his microscope and from drawing, and family problems (his sister's illness); all of which contributed to increase his isolation. He only felt really well in his study, where he worked assiduously; he translated the works of Haeckel, and elaborated his ideas on the progressive reduction of variation and its relationship with extinction and the origin of the species (1899), a work that he described as «the forerunner of hologenesis».

His interest in the extinction of the species dated back to his childhood. He recalled the vivid impression made by the pictures of pre-historic animals in the *Gazzetta del Popolo*, a newspaper on which his father collaborated. Later, at the University Zoological Museum, Rosa was in contact with Lessona, whose main interest was evolution, and who was a strong supporter of Darwin: «... I cannot forget the question of the disappearance of many higher forms and indeed I had convinced myself that the explanation proposed by Darwin for this extinction was insufficient...».

In 1905 Rosa was called to the «Regio Istituto di Studi Superiori Pratici e di Perfezionamento» in Florence, where he remained for 12 years. During this period he developed the theory of hogenesis (6) in its definite form. This theory did not meet with much success, but it did influence Henning (7), whose work is still well accepted. Rosa continued his work on Oligochaetes and also studied Polychaetes.

Rosa's hogenesis can be placed among the so-called «orthogenetic» theories, which were supported by many European zoologists: Koelliker, Nägeli, Eimer and Emery. According to Rosa, present-day organisms are modified descendants of simpler organisms, which, in turn, descend from even simpler ones, and so on until the primary «stock-species» are reached. The latter would be «much simpler than present-day microbes». The theory of hogenesis also attempts to explain why «speciation» is no longer found: the evolution of the

species was first rapid, then it gradually slowed down because of the progressive decrease of variability, until, sooner in certain groups than in others, a last stage of fixity was reached and we have the «terminal species» that is unable to divide into other species.

In opposition to the indeterminism of Darwin's theory of natural selection, the hologenetic theory, like all orthogenetic theories, foresees an organizing force in evolution, and the mechanism underlying biological change is related to an «internal cause»: «... no one can formally contradict the belief that these were willed by a supreme being, and so the concepts of evolution and creation are harmoniously reconciled...» (8).

In 1917 Rosa returned to Modena, but only for a brief period. He was then called to the Directorship of the Institute of Zoology in Turin. It must have been a source of great satisfaction to return as Director to the place of his early studies. However, two years later he returned to Modena where he stayed until his retirement in 1935. In the same year he moved to Pisa, where he attended the Zoology Institute, but ill-health forced him to move to relatives in Novi Ligure where he died on 26 April 1944 against the background of World War II.

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SANDRA CASELLATO

Dipartimento di Biologia, Università di Padova
Via Loredan 10, I-35131 Padova (Italy)