



## Historical biology and evolutionism

150 years after *The Origin of Species*: from Darwin's Darwinism to contemporary evolutionism. Symposium organized by the Chair of Historical Biology and Evolutionism, Prof Armand de Ricqlès, 10-12 June 2009

**Armand de Ricqlès**

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## HISTORICAL BIOLOGY AND EVOLUTIONISM



From left to right: Prof A. de Ricqlès, G. Lecointre (Professor at the Muséum National d'Histoire Naturelle) and G. Boeuf (Director of the Muséum).

### 150 years after *The Origin of Species*: from Darwin's Darwinism to contemporary evolutionism

Symposium organized by the Chair of Historical Biology and Evolutionism, Prof Armand de Ricqlès, 10-12 June 2009.

“Evolution has been and still is the cornerstone of modern science. More generally, evolution is a key concept of biology, based on the study both of organisms in the past, and of the diverse organisms existing today and the relationships between them. The rapid progress currently being made in the life sciences and medicine is based on principles derived from our understanding of evolution. This understanding stems from the study of increasingly abundant data derived from fossils and, equally importantly, from the application of modern molecular and biological techniques, to the study of evolution. Of course, as in all active domains of scientific research, many fascinating questions remain open, and it is important to highlight certain particularly active aspects of research currently under way, concerning evolution...”.

This enthusiastic profession of faith in the evolutionary sciences and their fundamental importance opens a very recent book published by the prestigious Academy of Science and the US Medical Institute, entitled *Science, Evolution and Creationism*. The title of this volume emphasizes certain worrying paradoxes existing presently in our human society which is undergoing rapid globalization. The idea of taking these circumstances into account inspired the organization and content of the present symposium, in the framework of Darwin Year.

We wanted to open the symposium with a brief look at the history of evolutionism,

through the work of historians of science, epistemologists, and biologists. Well before Darwin, some ideas related to what we now call evolution were already in the air and fiercely debated. As Philippe Huneman has shown (Paris I-IHPST), these ideas have taken widely diverse forms within various pre-Darwinian transformism theories. Historiography made Lamarck the real founder of scientific evolutionism, especially in France. St. Tirard (Nantes) showed how interpretations must remain qualified in certain respects. The follow-up of the history of evolutionism, up to the inclusive ‘classical synthesis’, was related according to a generally chronological but also thematic order by J. Gayon (Paris I-IHPST), Th. Hochet (Paris Ouest), L. Loison (Nantes), J. Deutsch (Paris VI) and G. Periquet (Tours).

These talks have strengthened my conviction that, to adequately conceive of (and teach) the present state in which a scientific question is raised, it is extremely useful to take into consideration its historical development, a fundamental source of understanding. The history (and philosophy) of science has another asset: it facilitates the development of a veritable scientific culture, the utility of which, for the citizen, is becoming fundamental as a critical tool, as the applications of scientific knowledge constitute increasingly vital social issues.

The second part of the programme is longer. The idea was to create an ‘inventory’ of some of the main aspects of

A video version of the symposium will be available on the website of the Collège de France as well as on the site CERIMES/ Canal U.

contemporary evolutionism. Here again, the aim was not to produce some kind of exhaustive list, but only to shed light on certain themes that we saw as being of particular interest, either because of their general scope (J. van Helden - ULB, Brussels) or because they concern a particular current issue (M. Morange - ENS). In a way that may be somewhat questionable (S. Samadi - IRD Paris, A. Barberousse, IHPST), a ‘patterns’ approach, pertaining to the reconstruction of the historicity of evolution, was distinguished from a ‘process’ approach focused on the mechanisms underlying this history. This distinction was articulated to reflection on the ‘levels of integration’ of life forms, from a structural and functional point of view. From the DNA molecule (N. Galtier - Montpellier II, R. Debruyne - Mc. Master, V. Barriel - MNHN) to genomes (M. Veuille - EPHE, D. Higuete - Paris VI, O. Jaillon - Evry-Genoscope) to clades (N. Vidal - MNHN, J-Y. Dubuisson - MNHN), ecosystems (Ph. Grandcolas - MNHN) and their spatial contexts (F. Cecca - Paris VI); from the single cell (P. Furla - Nice) to human beings (E. Heyer - MNHN) and their languages (P. Darlu - INSERM); from the fossilized (D. Goujet - MNHN, I. Rouget - ParisVI) to the present (S. Mazan - Orléans), through the species (A. Dubois - MNHN), M. Laurin - CNRS) and speciation (J-N. Wolff - Lyon I, J. Cubo - ParisVI) or symbiotic complexes (M. Poirié - Nice, M-A. Selosse - CEFE Montpellier), valuable and varied contributions illustrated some highly topical themes and research studies.

From all these talks we can conclude that today evolutionism is, more than ever before, a research field which is active,

immense and diversified, as well as profoundly structuring and giving mutual value and meaning to all aspects of biology. From this point of view it is remarkable to observe the constantly renewed heuristic value of the ‘research programme’ offered by evolution. One of the most encouraging current aspects is the remarkable perception, now shared by all the actors, that all the levels of integration (from the molecule to the ecosystem) are simultaneously indispensable for an understanding of the living world, and that research is therefore legitimate at all these levels. Longstanding (and fierce) oppositions between ‘structuralists’ and ‘functionalists’, between ‘naturalists’ and ‘molecularists’, etc. will thus be healed, to the benefit of the advancement of knowledge.

It may seem surprising that the theme of the third and last part, ‘Teaching evolution today’, has its place at this symposium. Only thirty years ago it would have seemed unthinkable, in a country like France, for voices to be raised in protest at the teaching of scientific evolutionism in French schools (O. Baudouin and C. Brosseau). All this poses a series of problems that are not only scientific but also pedagogical (C. Fortin – INRP, A. Mamecier and D. Rojat – General Inspectorate, Ministry of National Education), societal and, in the final analysis, political, in the best sense of the word. The question is raised not only in France, as we have seen (K. Padian - Berkeley), it is also a globalized issue (G. Lecointre - MNHN). A refusal of scientific evolutionism by many cultures or human communities could have disastrous practical consequences. This 21<sup>st</sup> century is effectively going to be one of unprecedented crisis on the scale of human history, affecting all aspects of biodiversity and the earth’s environment (A. Dubois - MNHN). Faced with such challenges, now more than ever before the full integration of the evolutionist perspective ought to be a fundamental issue in education throughout the world.” ■

*Professor Armand de Ricqlès*

