

SCIENCE AND EMPIRES

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SCIENCE AND EMPIRES

Historical Studies about
Scientific Development
and European Expansion

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Foreword

SCIENCE AND EMPIRES: FROM THE INTERNATIONAL COLLOQUIUM TO THE BOOK

Patrick PETITJEAN, Catherine JAMI and Anne Marie MOULIN

The International Colloquium

"Science and Empires - Historical Studies about Scientific Development and European Expansion" is the product of an International Colloquium, "Sciences and Empires - A Comparative History of Scientific Exchanges: European Expansion and Scientific Development in Asian, African, American and Oceanian Countries". Organized by the REHSEIS group (Research on Epistemology and History of Exact Sciences and Scientific Institutions) of CNRS (National Center for Scientific Research), the colloquium was held from 3 to 6 April 1990 in the UNESCO building in Paris.

This colloquium was an idea of Professor Roshdi Rashed who initiated this field of studies in France some years ago, and proposed "Sciences and Empires" as one of the main research programmes for the REHSEIS group. The project to organize such a colloquium was a bit of a gamble. Its subject, reflected in the title "Sciences and Empires", is not a currently-accepted *sub-discipline* of the history of science; rather, it refers to a *set of questions* which found autonomy only recently.

The terminology was strongly debated by the participants and, as is frequently suggested in this book, awaits fuller clarification. Moreover, the very consideration of "sciences and empires" as an autonomous problem in the history of science, suggests an approach divorced from the two traditional perspectives of analysis: the "geographical" ("science IN the empires" viewed as a value-free activity) and the utilitarian-political ("science FOR the empire" or "the tools of empire", where science is considered as a mere instrument for colonial and imperial domination).

But the importance - the necessity even - of treating this topic autonomously is not dictated only by the logic of the history of science.

Epistemology also plays a role. The many questions raised in the discussions were sometimes epistemological and other times historical. **Epistemological questions** such as the definition of "European science"; the generic links between classical science and modern science; the integration of various forms of scientific knowledge; the crossing of cultural borders by science; and the influence of the worldwide expansion of science on cognitive processes are presented and discussed at length, particularly in the opening conference by Professor Roshdi Rashed. **History**, on the other hand, is primarily concerned by questions bearing on the formation of national scientific communities; the creation of indigenous institutes and the emergence of national scientific traditions; the role of ancient traditions; and the various modalities of scientific development (disciplinary distribution; "pure" science versus "applied" science; the role of the State; ...). These questions in turn generate new, and more controversial, questions concerning the choice of models and cultural allegiance to foreign countries, and meet **contemporary political issues**. If one hopes to understand the difficulties encountered by scientific development, these are the questions one must address. In many Third World countries, science is in a marginal position in relation to both international "mainstream science" and the indigenous socioeconomic system. This is the widely discussed problem of science and development.

These discussions encompass diverse cultural contexts and historical periods for the origins of modern science in Third World countries. The contextual diversity offered by the comparative approach is an unvaluable source of information and provokes reflection. This was the guideline for setting up the sessions of the colloquium. Yet it also complicates the task of unravelling the associated trends and homogenous treatment of available material. This work seeks to develop a novel perspective on "sciences and empires" which is simultaneously holistic and militant; which might in turn guide new policies for scientific development.

In addition to our specifically scientific objectives, we envisioned this international colloquium to be a means of assembling an international body of scholars and researchers representative of the very diversity we were to study. The meeting was a great "**première**".

One hundred twenty scientists of more than twenty nationalities attended. Many were from India, China, Japan and Latin America (mainly Brazil), though France and Spain were also represented.

To encourage cross-cultural comparisons, only two of the nine sessions were limited to distinct cultural areas: Brazil and the Far East. The other sessions focussed instead on a theme intrinsic to a particular discipline (botany, medicine, technology, science policies, and scientific institutions) or dissected various aspects of European scientific expansion (missions and expeditions, policies for colonial and imperial science, and institutions of colonial and imperial science. Panellists animated two round table discussions on the general problems of "integration" (classical science versus modern science) and the expansion strategies of the European powers for "exact" sciences. The final session, which aimed at coordinating conclusions and organizing the future, focussed on the question: "what can the history of science bring to help the "policy-makers".

A rapid survey of topics shows that the communications distributed themselves between the two poles of interest represented by the round tables. They reflected a complete spectrum of methodology and content. Some invoked a traditional approach and operated with the classical "diffusionist" hypothesis (travellers and botanists, the reception of mathematics, etc.). A similar approach analyzed the transformation of modern science in different cultural, social or ideological contexts. Others turned to controversial political questions such as creole science versus metropolitan science, science and the birth of nationalism, and science and discrimination. Some participants drew parallels between two periods (for the same country and discipline), or between two culturally-similar countries. Still others compared the models provided by the leading European countries for scientific institutions and policies. A final group worked on the import-export strategies from metropolis to periphery.

A few general models were suggested, either for the European strategies to export "exact" sciences outside Europe, or for the conditions of the scientific development in Third World countries. The predictions from these models were submitted to strong critics. The integration of both classical science and modern science was put into sharp focus.

From these studies, it became evident that integration is indeed a complex process that cannot be understood simply by looking into the "internal" logic of scientific knowledge. Science is never isolated: it is always part of a process that is at once political, economic, social and ideological. The era of political independence is crucial in that respect,

whether or not the attempt to construct a national scientific tradition is successful.

The publication of the colloquium proceedings is a step towards the elaboration of further analyses of "sciences and empires" and to the extension of controversies beyond the circle of experts. An international network of historians of science working on this subject is being formed and will publish a Newsletter. This network is being coordinating both by REHSEIS in Paris and NISTADS (National Institute of Science, Technology And Development Studies) in New Delhi.

The book "Science and Empires - Historical Studies about Scientific Development and European Expansion"

Although this book is rooted in the colloquium, it is not drawn from the proceedings in the usual way. Unable to publish all the communications, we have chosen two main directions: first, the problems about the integration of classical science and modern science; second, the overlap between political strategies and European scientific expansion. Consequently, we have not included communications on scientific expeditions, the Enlightenment period or even contemporary cases. We tried to balance contributions from different countries. We hope the contributors will forgive this selection. We have listed at the end of this book all the colloquium's contributors whose work did not find space in its pages.

While French, English and Spanish were used during the colloquium, we have translated the Spanish papers. The book is thus bilingual, French and English. We thank the publisher for tolerating this unusual format. Furthermore, we did not impose a particular style upon the vernacular forms of the American or Indian English, or the Canadian French. We trust that the reader will enjoy this additional proof of diversity.

Aknowledgements

Our thanks go in the first place to the International Scientific Committee that supported this international colloquium and allowed us to benefit from an unusually broad international audience. This committee was composed by Professors Ubiratán d'Ambrosio, Ruy Gama, José Goldenberg, Christian Houzel, Ekmeleddin Ihsanoglu, Iyanaga Shokichi, José Leite Lopes, Nakayama Shigeru, José-Luis Peset, Lewis Pyenson, Abdur Rahman, Roshdi Rashed, Nathan Reingold, Alain Ruellan, Ignacy Sachs, Juan-José Saldanña, Claire

Salomon Bayet, Brigitte Schroeder Gudehus, Darwin Stapleton, Arnold Thackray, G. Thyagarajan, José Israël Vargas and Peter Weingart. The Director of our group, Professor Roshdi Rashed, has initiated and personally encouraged this research trend; his involvement and his advice have been invaluable to the preparation of both colloquium and book.

Many thanks also to all those who assisted with the colloquium's organization: above all, Annick Horiuchi whose contributions have been indispensable, and Catherine Harcour whose help has been constant all the way from the colloquium preparation to the edition of this book; and also, Marie-Noëlle Bourguet, Maria Amelia M. Dantes, Inés Harding, Ilana Lowy, Denise Ogilvie, Michel Paty, Xavier Polanco and Jean-Jacques Salomon.

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The publication of this book was made possible by the financial support from the *Ministère de la Recherche et de la Technologie* and by the technical (and computer) assistance from the *Centre de Recherches Nucléaires de Strasbourg*. Kim Pelis, Jim Ritter and Maria Luisa Ortun assisted us with the translations from Spanish or the editing of English texts.

Finally, we are grateful to Professor Robert Cohen, who accepted this book into his well-known series, *Boston Studies in the Philosophy of Science*. In this, Professor Cohen has again demonstrated his commitment to the themes of the colloquium. Thanks to him, we hope to reach a wide audience that extends beyond professional historians and philosophers of science to all readers interested in the many provocative issues raised by past and present scientific development around the world.