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Introduction: Science in Latin-American Contexts – Historical Studies

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This issue of *Science in Context* presents a collection of historical studies on various aspects of science and its practice as developed in Latin-American contexts. Relatively few scholars working in the history of science, and even in the more general field of "science studies," have devoted their research to this field. Likewise, relatively little research has been done by scholars of Latin American studies on the cultural, political, and social impact of science, a field that is usually considered to be one of the central, defining aspects of modern, Western civilization.

Seen from a more general perspective, the history of science in Latin American contexts is typically categorized under a topic which is referred to as "science in the periphery," and which focuses on the study of the conditions that encouraged or discouraged the reception of European or North-American science, or, alternatively, the production of autochthonous science, in any "peripheral" region or country. An additional, traditional focus of interest of studies of this kind concerns the roles played by scientific ideas and institutions in consolidating national and regional identities as well as in forming local elites and centers of political and military power.

It must be remarked however that, though relatively few in number, there have been indeed interesting and high-quality publications in this field in recent years. The bibliographical sources mentioned in the various articles of the present collection provide an informative overview of some of the relevant, existing literature on the topic. They will be highly useful for anyone intent on pursuing further reading and research in the field. Some additional, interesting works might be mentioned to help place the present collection within a somewhat broader perspective. I start by mentioning Lewis Pyenson's pioneering study *Cultural Imperialism and Exact Sciences: German Expansion Overseas, 1900–1930* (Pyenson 1985). Within a broader discussion of the role of science within Germany's expansionist and colonialist strategies at the beginning of the twentieth century, Pyenson describes the arrival in Argentina of the German physicists Jakob Laub and Richard Gans, and the creation of a distinguished center for theoretical physics in La Plata, Argentina. In describing a classical case of knowledge transfer to what was then a scientific backland that subsequently produced decades of important research and generations of advanced students, Pyenson's study is exemplary for the delicate balance it provides between the purely scientific and the broader political and social factors underlying the story. A more or less contemporary

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process in a totally different field of scientific activity with enormous, direct cultural resonance is the topic of a more recent monographic study by Mariano Ben Plotkin, *Freud in the Pampas: The Emergence and Development of a Psychoanalytic Culture in Argentina* (Plotkin 2001).[1] Here we are faced with transfer mechanisms and reception processes that are totally different from those underlying the arrival of theoretical physics in Argentina at the turn of the century. Nevertheless, the two studies offer important examples, each in its own way, of the questions that any researcher in the field is likely to pursue. These questions pertain to the conditions in both the "exporting" and the "importing" countries that facilitated the flow of ideas, the adaptation to local conditions, and the creation – under local social, cultural, and political conditions – of institutions and elites that engaged in scientific research and dissemination of ideas.

Some scholarly journals have recently devoted issues to the history of science in Latin American contexts. From the side of science studies one can mention a collection of articles edited by Roy MacLeod entitled *Nature and Empire*, published in 2000 in *Osiris*. As the title clearly indicates, the geographical contexts covered by this collection go beyond the Latin-American ones and include such colonial contexts as the African and Indian, and even the Canadian one. On the other hand, by focusing on the question of the role of science within the colonial project, it a-priori delimits the scope of the time period considered. Within these boundaries, this collection provides a good example of the kinds of questions addressed by historians when looking at science in Latin America, and a useful entry point for those who want to become acquainted with the field. From the side of Latin American studies journals there are two recent collections devoted to science. (1) *The Americas* published in 2002 a collection of four articles devoted to "Field Science in Latin America," edited by Marshall C. Eakin; and (2) *Estudios Interdisciplinarios de América Latina y el Caribe* (*EIAL*) published in 2003 yet another collection edited by myself. Of course, there are also journals of both specialties that occasionally publish ongoing research on this topic, including *Science in Context* (see López-Ocón and Badia 2003).

University departments and scholarly associations in several Latin American countries are devoted to the study of the history of science in general. Over the last three decades, some of their efforts have been directed toward investigating the history of science in their local contexts. An interesting example worth mentioning is the international journal *Quipu*, edited between 1984 and 1996, by the Sociedad Mexicana de Historia de la Ciencia y de la Tecnología. *Quipu* is devoted to the history of science and technology in Latin America. It would be fair to say, however, that research published in this venue, and in some other similar ones, did not make a lasting

[1] In 2003 the book appeared in Spanish translation (Plotkin 2003a). Also a collection of related articles was published that year (Plotkin 2003b).

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impact on the work of the international community of either science studies or Latin American studies.

The present collection includes five original research articles dealing with various aspects of the history of science in Latin-American contexts. Also, following a common practice of this journal, we have included an English translation of a classical text related to the topic of the collection, with a bio-bibliographical introduction and comments.

In the first article, "Melancholia, Slavery, and Racial Pathology in Eighteenth-Century Cuba," Adrián López Denis analyzes the complex and rich interplay between pathological, racial, and social conceptions manifest in a little-known eighteenth-century medical treatise written by Francisco Barrera y Domingo, a Spanish surgeon of modest origins who worked in Havana. Barrera's *Reflexiones* was an ambitious study of the medical consequences of slavery which at the same time implied a social denunciation of this institution. Focusing on the highly illuminating contents of this unique text, López Denis discusses the transfer of Europe-centered medical concepts, such as nostalgia, into the setting of the Caribbean Enlightenment and shows how, by placing European soldiers and African slaves at the same clinical level, Barrera rejected the most fundamental assumptions of contemporary medical practice that included racial typologies and climatic determinism.

The second article in the collection also deals with the Enlightenment period, but moves to the Luso-Brazilian Imperial context. In fact, this is one of two articles dealing with the Brazilian context, on the one hand looking at the close relationship between naturalists' research in areas such as geology, botany, and zoology, and on the other hand showing how political identities, ideologies, and interests developed in the area. By mainly focusing on the figure of João da Silva Feijó (1760–1824), a naturalist who explored the area of Ceará from 1799 on behalf of the Portuguese crown, the authors, Maria Margaret Lopes, Clarete Paranhos da Silva, Silvia Fernanda de M. Figueirôa, and Rachel Pinheiro illustrate how the ideas and practices of Portuguese enlightened science were transferred to the colonies. Scientific and naturalistic research was put directly to the service of Portuguese imperial interests, such as surveying the existence and location of mineral resources. At the same time, such enterprises helped establish local scientific traditions and institutions in Brazil. Although the work of Feijó had been temporarily forgotten, interest was revived in the mid-nineteenth century, with the increased activities of such local institutions, but now within a different political and ideological context, namely that of the emerging discourse of Brazilian nationality.

A second article about Brazil takes up, as it were, the thread of the previous one by focusing on the tremendous influence of the contemporary scientific work of Euclides da Cunha at the time when he wrote his classical epos, *Os sertões*. José Carlos Barreto de Santana analyzes in detail da Cunha's scientific background and his personal relations with the local scientific figures and institutions. Against this background he further clarifies the intricacies of the continued harnessing of natural science, its results, and its

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discourse, on behalf of consolidating a burgeoning Brazilian nationality. In doing so, this article contributes a striking, very broad perspective on what is acknowledged to be one of the most important books of all times in Brazilian literature.

The next two articles discuss the connections between scientific discourse and practice, on the one hand, and the pursuit of national policies and the consolidation of national identities, on the other hand. They deal with two different periods of time and two different areas of scientific interest in Argentina. First, Irina Podgorny's "Bones and Devices in the Constitution of Paleontology in Argentina at the End of the Nineteenth Century" focuses on important scientific questions discussed by late nineteenth-century naturalists in the international community, and for which the specificity of the sub-continent seemed to offer important clues. Prominent among these was the question of "man's antiquity." Around 1900 claims were announced of evidence for pre-Paleolithic human vestiges in Buenos Aires and in Patagonia, thus giving rise to important debates among leading pre-historians and anthropologists. Podgorny discusses the scientific background of these debates and the related research of Florentino Ameghino. Ameghino became an internationally acknowledged authority on South American fossil animals, yet his views on Argentina as the cradle of humankind came under intense criticism from prominent scientists both in Argentina and abroad. Podgorny relates Ameghino's ideas on human evolution with his paleontological and geological work, and shows that the criticism directed at him cannot be explained by merely assuming a tacit division of labor under which it was legitimate for Latin American scientists to provide raw materials but not to interpret the fossil record. Podgorny shows how the rise and fall of the idea of "local ancestors of man" was connected, among other things, with the search for the legitimate place of science in late nineteenth-century Argentina, as well as with the ongoing processes of disciplinary demarcation across fields such as archeology, geology, and anthropology.

Diego Hurtado de Mendoza's contribution focuses on post-World War II Argentina and the various attempts to develop nuclear technologies in the country. This is a story of complex interactions between scientific, political, military, and industrial establishments, each espousing its own interests, its own ideologies, and its own views about the adequate way to approach and develop the nuclear question in a country like Argentina. The story starts in 1949 with the Perón government's decision to support a highly secret, and absolutely unlikely, project of energy production based on controlled fusion that ended as a total fraud. The project was led by an Austrian physicist, Ronald Richter, and it was opposed by the local scientific community from its inception. The alignment of forces between the military and the scientists undergoes many changes along the way, and Hurtado's article leads us through the story of the varying roles of local leading scientists, such as Enrique Gaviola, José Balseiro, and Jorge Sábato, of visionary Navy officers, like Oscar Quihillalt, and of the many important governmental and scientific institutions created throughout the years, such as the *Comisión Nacional de Energía Atómica* and the *Instituto de Física Bariloche*. The story ends in 1957, with the decision not to buy research reactors, but rather to follow the autonomous way and

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build one in Argentina, with the collaboration of the USA-sponsored Atoms for Peace program. Underlying the story is an allusion to the incipient clash between Argentina and Brazil over nuclear hegemony in Latin America.

Finally, this collection includes a translation of a classical text, "The Size of Space (An Essay on Mathematical Psychology)," published in 1921 by the influential Argentinean intellectual Leopoldo Lugones. As the translators, Diego Hurtado de Mendoza and Miguel de Asúa, point out in their introduction, Lugones' article was the main vehicle through which the educated public in Argentina first became aware of Einstein's recent work on the theory of relativity. In fact, until quite recently the article has been praised as a brilliant, and technically competent, presentation of the subject. Nevertheless, while Lugones displayed in this text all of his outstanding rhetorical talent, a critical eye readily discloses essential misunderstandings, and even sheer ignorance, concerning all scientific ideas discussed. Lugones' text thus offers an intriguing example, almost unknown today even to Spanish-speaking audiences, of the general public's fascination with Einstein and his ideas from very early on, and of the attempts to cope with these ideas through the mediation of self-appointed, and not always reliable, interpreters. As in other geographical and cultural contexts at roughly the same time, however, this kind of mediation turned out to be very powerful in promoting the idea of relativity as a fundamental breakthrough in our conception of the universe, and of Albert Einstein as the great hero of modern science.[2]

We make no claim that this collection is exhaustive or even representative of current research in the field, and much less so of potential directions of research. For one thing, only three countries appear here as the geographical contexts of the stories told, and not surprisingly Argentina and Brazil are among them. As in the general historiography of the continent, also for the case of science these two countries have attracted much more attention than any other (except perhaps Mexico) and much more has been written about them. Not only additional countries, but also additional scientific disciplines and additional periods of time no doubt pose intriguing historical questions related to science, its development, and its influence in the sub-continent. To take just two examples of periods that have been barely investigated in this regard, the colonial and the pre-Columbian periods, each raises highly interesting and totally different questions that need to be approached in different terms and from totally different methodological perspectives, using different conceptual tools, and starting from diverging basic assumptions. It is to be expected that both historians of science and historians of Latin America will increasingly turn their efforts to the broad and promising field of research to which this collection represents just a further contribution.

[2] This fascination is also manifest, for instance, in the works and writings of prominent European artists in the early twentieth century. The reader interested in a survey of works dealing with this topic may want to consult a recent topical issue of *Science in Context*, December 2004, 17(4) *Writing Modern Art and Science*, and particularly Linda Henderson's introduction to that issue.

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