

Negotiations of meanings, audiences and apparatuses in the Museums and Science Centres of the 21st century

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Abstract

Several themes, which are nowadays very familiar to historians and sociologists of sciences, have not yet been the objects of scholarly research on museums and science centres. Moreover, several analytical tools seem not to have showed their utility to the reflection on such spaces of scientific culture. As far as the authors understand it, the historical perspective over these spaces is one out of multiple possibilities open for reflection on which roles should museums and science centers play facing the challenges set by contemporary times.

The present article resumes some of our previous research themes and will be developed by choosing three of those which are familiar to the study of sciences: negotiations (the creation of institutions of scientific production in relation to the activities of communication), informed consent (the museum audience and the access to information), and apparatuses of scientific character (instruments and techno-scientific apparatuses as scientific concept and museological presentation).

Introduction

The boom of Science Centres all over the world in the 30 last years and the perspective of presenting them as the museums of the future are an irrefutable fact. Despite the fact that the considerations about the roles, which also concern these institutions under different perspectives, have grown, it is true that the inclusion of historical perspectives have not been a characteristic feature of these reflections. Neither has it been a trait of the main currents of understanding of scientific concepts, which have been more consolidated and influential, in the fields of projects, practices and studies proposed in terms of museums and science centres¹.

Thinking about the History of these museums and science centres – which can also be understood as historical artefacts that materialise, institutionalise, and musealise the social, cultural, scientific and political contexts in which they are forged², has been a challenge which some of our researchers have been responding to for some years now (Lopes, 1990).

In this article, we refer to museums and science centres, making use of a wider meaning for the terms ‘museums of sciences and technology’, to include ‘all’ kinds of museums of natural sciences and not only the conventional museums of science, the museums of industry, the *ecomuseums*, but also those ‘*exploratoria*’ and interactive centres, which, despite not being commonly named ‘museums’, they have plenty in common with such old institutions³. Many of these new institutions, which do not regard themselves as museums, appeared more recurrently in the end of the 1960s, as a counterpoint to what they considered to be a heavy and austere means of communication, which kept the visitor out, so characteristic of Museums. However, the science centres are regarded in the category of Museums by the organism, which defines the museological institutions, the International Council of Museums (ICOM). Besides, it is irrefutable the effort made by many of the people responsible for the museological initiatives of the Science Centre type to get closer to the connotation of *Museum*, to be seen as a reference which is already consolidated.

Even, going back, the museum was criticised for being an institution, which failed to keep up with the movement of renewal of the society, but it still continue to keep a power of status reference to the knowledge it transmits. Since then, many Science Centres have appealed to be included in the list of Museums of Science and Technology. There have been many records of such movement, like the one left by Douglas M. Omand, from the back then newly created Ontario Science Centre, in Canada, during the examination held by the International Committee of Museums of Science and Technology – *CIMUSET* – of *ICOM*, about the educational character of the Centre, in 1971 (Bose, 1975). But this is obviously an aspect, which still represents a reason for debate (Donahue, 2004).

The historical perspective about such spaces is one among the multiple approaches opened for reflection, addressing the role which museums and science centres have to play, taking into account the challenges set by the contemporary times (Lopes, 2003). The continuity suggested by the sequential origin of these institutions is superficial,

only. The search for and the reflection on the continuities and ruptures, the times and places which mark these processes, in which institutional models and theoretical concepts many times are conserved under pretence or new expographic processes, have been one of the features of our investigations⁴.

It is interesting to observe, in this extent, that the criticism done today against the so-called Science Centres was expressed before, as they were seen with suspicion in their origin (Kuba, 1975). However, they were spread and remain as consensually accepted models, since they have been indiscriminately copied, mainly in countries of emerging economies. Such fact allows us to perceive a desire of approximation with models of countries whose political and economical power is still a goal. In some of these countries, which have promoted massive investment in education, the exhibitions, dated 30 years ago, were carried out based on a museography of the 1960s and the 1970s, loaned from other countries without any kind of renewal and the scientific concepts transferred without revision and dissociated from local culture. Attitude which seems to reflect a need of approximation with societies that have been successful and where museums played a crucial role in the diffusion of knowledge.

Since the 17th and 18th centuries⁵, museums were institutions which have built and consolidated the Natural History and, later, several modern Natural Sciences in the western world. And, it is not supposed to be dissociated from these initiatives even nowadays. Lorraine Daston (1988), when discussing the '*factual sensibility*' in the origins of collections and in the construction of the modern sciences, questioned how extent collections were secondary in these processes and in what the promotion of the roots of Natural History was based exactly in its material references. Her questions, who collected, when, why and what, increased by ours, who and how appropriated, who bought, who paid – properly conceptualised, are the ones which we must repeat if we are willing to comprehend even the contemporary processes of construction of the sciences and social inclusion in the museums and interactive centres.

Among several themes, which are nowadays very familiar to historians and sociologists of sciences, have not yet been the objects of scholarly research, on museums and science centres. Moreover, several analytical tools seem not to have showed their utility to the reflection on such places of scientific culture. What can be seen,

approximating the case of the concept of museographic arrangements in institutions that, most of the time recover models which are already out of date or improve aspects which meet a perspective of an authoritarian and fragmented science in consonance, above all, with a certain concept of science, without the absorption of questioning perspectives of scientific culture which have, today, been more widely explored by the museums in developed countries. (Cameron, 2005). Actually, such questioning has been far from being taken into account. This lack was observed in the *provocative papers* presented in the IV World Congress of Museums and Science Centres⁶ that took place in April 2005, in Rio de Janeiro.

The present article resumes some of our previous research themes and by choosing three of those related to the studies of sciences – negotiations, informed consent and apparatuses – we are considering them from different time perspectives. Using primary sources such as correspondences, travel reports and the documentation of museum foundation, some issues are raised as for the discussion on the importance of the inclusion of museums in the reflections of science historians.

1. Negotiations –

The creation of scientific institutions in relation to the activities of communication

In the end of the 19th century, the ‘evolutionist’ museums (Bennett, 2004) were reinvigorated and multiplied by the controversy around the Darwinian theories. The sciences of life historiography, of reductionist features, preferred to make believe, by granting an exaggerated importance, on the topic of transforming the museums into laboratories and the replacement of the Natural History by Biology. Contrary, on the Nyhart (1997, p. 435) point of view, regarding such changes as ‘the’ institutional transformation in Biology is not grasping the whole picture.

Whereas in the end of the 19th century a intense specialisation of the experimental biology was being carried out, and in several German and North American universities new laboratories were being built, palaeontology discipline was still under a time of expressive production and not only on the vertebrates. By stimulating research and the construction of museums, reinvigorated by the fabulous bones found in the North American Rocky Mountains, the Argentinean Patagonia, and the North of Africa,

Palaeontology kept advancing and attracting the interest of the audience and museum specialists, despite progressively losing its prominence in the field of the biological sciences and consolidated its position among the geological sciences, specially the stratify ones.

The period when the dinosaurs arrived at the museums, to remain as their main attraction until our days, when museums became fundamental spaces for the construction of the palaeontology and the scientific controversies over the determination of the Patagonia stratify take place still suggests current themes.

In a view of correspondence kept up between Herman von Ihering, from the Museum Paulista, in São Paulo, and the emblematic Argentinean palaeontologist Florentino Ameghino, the controversy over the Patagonia (Lopes, 2000, 2002) highlights, among several aspects, that the theme of the establishment of the boundaries between the scientific and commercial interests was crucial for the definition of validated and non-validated practices. Far from meaning, the banishment from science who sold their fossils or did not exhibited them, this distinction implied a pretence subordination of the private interests to the scientific criteria and to the acknowledgement of the authority of the scholars (Podgorny and Lopes, 2008). The institutional space of museum played a central role in the mediation between private collectors, commercial institutions and professional scientists. The sale of collections – even causing museum directors to face charges and lawsuits⁷ – was fundamental to make South-American Palaeontology an international reference to be followed, questioned and debated⁸.

The historical, sociological and anthropological analyses of the sciences have questioned the independence principle and the preceding of the scientific production related to the activities of communication. If we also understand the current museums and science centres as knowledge-producing spaces, they can also constitute privileged places to remind us that the scientific works are passed and supported by relations and activities, which transcend the laboratory, the discipline field, the university and the research institutes. These places, where several agents interact, can be considered *trans-epistemic* arenas – using the classic term of Karin Knorr-Cetina (1982) – marked by the needs of translations and negotiations, which emphasise the disputes and interest games, implicated in the activities. Many of these arenas, which impose directives, cause constraints,

embarrassments and set trends, can be considered neither ‘merely’ scientific nor non-scientific. Among them, there are sponsors or philanthropic agencies, administrators, industries, directors of the institutions, suppliers, the media, companies specialised in exhibition design and standard experiments, sellers and so on.

The negotiations move and change from time to time in different places. Today the agents involved in a museological venture are innumerable and from diverse origins and backgrounds. The earlier curator – responsible for the collection, study and diffusion of knowledge – gives today, more than ever, rise to a negotiation with different audiences. In order to do so, the museum communication resources become more and more sophisticated, so as to provoke a more active participation of different segments of the society.

What may impulse the tone of the museum exhibitions and activities, is start to privilege the debate on controversial themes. A more active participation of the society may lead science to bow to the pressures of social order, as well as to abandon programs, which channel funds and resources used, in many instances, in projects that are regarded as highly risky by people. It is quite recently but still not a unanimous acknowledgement, that the sciences and technologies are an integral part of the cultures. However all the polemics which followed the processes of its acceptance or not turn museums and science centres into an interesting subject for us, science historians.

Focusing on the build and conservation of knowledge, the early issue of defining the line between commercial and scientific interests which pass by the relation between museum and audience remain very present. Although it is not debated enough in the evaluation of museums and science centres, everyone who has some familiarity with these places knows how the commercial mechanisms involved in the acquisitions of *kits*, travel exhibitions, experiments and even collections play a considerably important role in terms of homogenisation of institutional models. This can be easily evince by many generic science centres spread around the world which are hard to distinguish one from another – as we can read in one of the *provocative papers* presented as reference for debate in the *IV World Congress of Museums and Science Centres*, organized in Rio de Janeiro, in 2005.

An example of such initiatives is the *Techniquet*, dated 1986, considered by many the first science centre model installed in United Kingdom. It was designed for explore along with the visitors the construction of science through discovery, making use of

interactive apparatuses. The success achieved with the public motivated the venture to expand and it became an enterprise in 1989, manufacturing, selling or leasing apparatuses and exhibitions of scientific matter to museums and science centres all over the world. Stimuli such as *'a depth of experience with all the skills required to design world beating interactive for you'* or *'out of TECHNIQUEST's success we have built an organisation to help you achieve your goal quickly and efficiently'* (advertising leaflet from TECHNIQUEST Enterprises Ltd.) invite those interested from different corners of the world to acquire successful models.

Most of the time exhibitions, shows, circuses, science spectacles with experiment demonstrations and technological devices of the last generation, used in an indiscriminately way, have been responsible – as were in the past the museums of the 18th and 19th – for the conservation and increase of the range of universalising models of sciences. About which, currents of sociology and history of sciences have attempted to question and debate the strength and the capacity of these powerful instruments of conservation.

Scientific knowledge – as any other knowledge – flows, not due to the fact that it is naturally universal, but because it circulates. It is reutilised in different contexts and receive in times new meanings, in which is conferred the attribute of universal quality and it is presented like this (Pestre, 1995). The belief in the universality of science is also preserved in its capacity for mobilisation, being it the collections in the 19th century or the techno-scientific apparatuses in the 21st century.

Related to the idea of the universality of science museums, this issue can be explored, observing Asian museums. In this context an example is pointed out, it is the Chinese Museum of Science and Technology, in Beijing. Its policy of approximation with the Western world is a motivation to display its main exhibition in an aseptic, rootless manner, without context and timeless, as well as several Western museums. Thus, the Museum reinforces the universal character of science, which must be accepted by all. The Museum keeps in one sector and in an isolated way (four floors up the main exhibition) its collection of old scientific instruments, what represents the foundation of the Chinese science construction, as something distant and without interest for the present moment. In this sense, it replaces its culture for foreign exhibitions. Understanding the reproduction of

science in the Science Centres in an imported, non-historical manner, suggests the permanence of an attitude which separates the sciences from society and perpetuates the scientific knowledge as authoritarian, a-critical and dogmatic. Attitude that belittles local forms of construction of knowledge, instead of considering regional nature issues, for instance.

How to share, without deep questioning statements, as that one expressed, during the seventies, by Professor Hermann Auer from the Deutsche Museum in Munich, who said: '*studying physics is studying science*'? Which seemed to be corroborated by the Director of the Birla Industrial and Technological Museum in Calcutta, India, who add to it his endorsement, saying: '*well-supported maxim accepted by a great number of people among us*'. (Bose, 1975). These words are related to the analyses done on museological institutions of science and technology which, since the 1970s, constitute important issues to be debated in the museology field and which cannot be understood unless associated to a hegemonic and predominant policy of scientific and technological research.

3. Informed Consent -

The museum audience and the access to information

The importance of the audience, a theme that is a commonplace in the communication of the museums and science centres, was also a historically built process, which keeps the contexts features of the several circumstances in which it occurred. In different moments, museums, where science is practiced, mixed deeply elitist connotations and profound social divisions, with intentions of democratic actions and generalised access to education, presented themselves as characteristic institutions of communication and control.

The historical perspective on the themes of education and communication can also be a relevant contribution to broaden the approaches to museums and science centres. From the 1930s to the 1950s, the contradictory articulation between scientific research and education – which marked the world of museums of sciences since the end of the 19th century – started more and more to regard to education/communication as one of the core roles of museums, and it was, and has been, widely used to justify its existence, to the point

of being wrongly considered - in the 1970s - as a powerful and competent instrument to replace the school.

In the mid-1930s, under the directorship of Roquette Pinto, the Rio de Janeiro National Museum also innovated by creating the so-called *Educational Services in Museums*. During this renovation a scientist of this Museum, Bertha Lutz, a renowned Brazilian feminist, biologist and one of the only specialist on Museums of Sciences, in the country at that time, was returned from a long journey through 58 North American museums. From this experience she underlined the contemporaneity and the modernity of the international scope of references that she found there and which travelled the world of museums as much as, or more than those directors who wanted to be part of that universe.

Although she was aware of the fact the Deutsche Museum in Munich was considered at that time *'the pioneer and the maximum accomplishment of the modern theory of Museums'*, Bertha Lutz referred to the *'new theory of Museums'*, inscribed in one that was synthesised for the first time through the expression *'the new museum idea'*⁹, coined by Sir William Flower, in his *Essays on Museums* (London, 1898) – an extremely influential text since its publication at the end of the 19th century. Inspired on an *new theory* Lutz affirmed, in a language deeply marked by metaphors from the Physics field, that *'a museum should be elastic, dynamic, but mainly remain accessible to the major part of the population, broadening and disseminating culture in the core of the nation'*. (Lutz, 1939).

Elitists and hierarchical, Flower's museums (British Museum - Natural History) not only acclaimed the division of the objects of the collections between research and exhibition to the public, but also strongly segregated the audience. In *'two words, research and instruction (separated) constituted the definite end of museums.'* (Flower, 1890-91:11-12). The importance given to this double function of museums is crucial in Flower's discourse. According to him, the modern museums served to two classes of men: the instructed scholars capable of making science progress and another class of men, much more numerous, to whom museums are, or should be, a powerful means to acquire knowledge. Such articulation musealised in the exhibitions, laid the foundations of a whole

discussion about concepts and proposals of separation of collections for research from those for instruction of the lay public.

The musealisation of the rupture between science and education/communication was very well characterised in Brazil, by Valdisia Russio (1979) from the notion of '*Appendix Museums*', which was conceived as storehouses more or less open to the public and organised with collections for sciences research, approved in the new research institutes which were multiplied in São Paulo. What took place during the same moment, from the 1930s to the 1950s, that Planetariums, dynamic museums of sciences and pedagogic museums were set up (Lopes, 1996).

The same scenery persists, along the last decades, as a recurrent issue, which evinces the tensions of comes and goes of the construction of knowledge. '*Must a museum of S&T be a well equipped popular university or must it, by its own nature, embrace the evolution of the sciences and techniques, by means of its testimonies/collections?*', was the question posed by Josef Kuba, ex-director of the Narodni Museum Tewchnicke Muzeum in Prague (1975) on the occasion of a debate about museums of science and technology. In another question: '*Is the main objective of its (museum) existence to collect or to inform?*' was the issue raised by Paul Danahue, ex-executive director of the Canada Science and Technology Museum during the debates about the definitions of *Museum* organized by the International Council of Museums - *ICOM* (2004). What is observed is that the old models remain in the museums, and many of the concepts presented there were assimilated and rooted by the significant processes of the relations among museums-sciences-education-public, which were consolidated and continue until our days in the institutions of different museological features.

Others subjects, such as the different interest of boys and girls in the museums of sciences, present in the international bibliography or in the reflections, which involve the dimensions of gender, still remain excluded from the considerations on the museum public, for instance, which mark the field studies in Brazil¹⁰. More attentive looks have allowed realise how much educational and extremely influential exhibitions, also embody the engenderment of nature, in a very subtle or explicit way, using an a-critical and without time references reproduction of the relationships between the human forefathers, and representations of femininity and masculinity. The hypothetical recreation – from the

footprints of individuals of different sizes walking side by side, preserved in the Tanzania lava (as it was a couple, in which a bigger and protecting male involves a smaller female by the shoulders) - prepared for the exhibition *Human Biology and Evolution* held in the New York Natural History Museum in 1993, for example, was a subject matter of analysis on the a-critical embodiment of stereotypes of masculinities and femininities in museum exhibitions (Schiebinger, 1999)¹¹.

Turning to the considerations brought by Barnes (1996) about '*informed consent*', can be said that nowadays, many papers presented during audiences and events in museums multiplied the fallacy which attributes to several agents – among them the museums and science centres – the functions of mediation facing the growing of the complexity of scientific and technological concepts. Generated by the liberal democracies, this belief is an opportune linguistic metaphor to keep the sciences' boundaries carefully fixed by the 'scientists' to protect its 'purity' from any contamination (Féher, 1990). The value of the scientific authority is precisely based on the maintenance and defence of the sciences' boundaries, against any possible, undesired invasion.

To insist on affirming – as many keep doing to justify the new proposals or reformulations of the museums and science centres – that a significant part of the population know nothing about science, about its postulates, benefits and evil activities, and consequently the need of such spaces (museums) which favour now, in the beginning of the 21st century, the social inclusion, is something not to be affirmed, but to be debated. Once it only evinces that social mechanisms of knowledge control are in action, in the sense that they are allowing (or not) to specific social groups, the incorporation of these cultural elements to its cognitive universe. In contrast with others museums commitment perhaps it should be too much to demand museum to allow such inclusion, not to mention the amount of sociological and historical studies on the role of institutions.

Likewise, there are several trends in favor of the hegemony of the scientific thought, which maintain the scientific conservative structure of these places, and take into consideration the difficulty to musealise the scientific controversies and extraordinary sciences (which is justifiable, since to present controversies would be perhaps a contradiction). In this sense to amplify the discussion of presenting controversies and introducing the link with the next topic, it is opportune to quote Pestre (op. cit.) once again,

he argue that *'the dynamic of the sciences cannot be reduced to a controversy-consensus dialectics, but it is supported, above all, in the circulation of objects and the different know-how which allow to operate them'*.

4. Instruments and techno-scientific apparatuses – Scientific concepts and museological preservation

The emerging of museums and science centres in Brazil, in the 1980s, happened, in local terms, in the context of the processes of democratisation of the country, when the National Research Council (*CNPq*) adopted aggressive policies to support museums and science centres. At the same time the institutionalisation of disciplines such as History of Sciences and Scientific Divulging was taking place. At that moment, the Museu de Astronomia e Ciências Afins (*MAST*) participated in the *I National Seminar on History of Science and Technology* (Brazil-1986), presenting a paper, which still sounds extremely contemporary for discussion. The paper was not revolutionary, but pointed out different possibilities to incorporate the History of Sciences in an articulation with museums and centres which were being created. Whereas, many of the institutions which were involved in the effort to multiply museums and science centres opted to create the impression that those initiatives came out of the blue, as a development independent and innovative result of something detached from historical references, *MAST* examined the possibility of thinking the History of Brazilian Scientific Culture in the 19th century. Moreover, such venture could be undertaken through an exhibition and by analysing the scientific instruments, in a *museal* space.

The department responsible for the collection of *MAST* was a counterpoint to the *'Brazilian museums in general, which qualified in an inadequate manner, refuse a history connected to a scientific and technological reference. The absence of this vision gives rise to a fractioned reading of reality'*. Contrasting, the Museum had as a proposal to its *'Museological and Museographic plans to deal with the collection by displaying it in exhibitions, from a context which allows to establish, with the audience, a series of contacts, stimulating it to participate, to reflect from a broader perspective on science and technology, on the history of science from yesterday as well as today. Without crystallising*

the past, but thinking the present critically, and establishing a link with the future.' (Schvarsberg and Valente, 1988).

But, to turn historic Brazilian astronomic and geodesic instruments into objects of interest to be exhibited, and put them together with the reproduction of interactive techno-scientific apparatuses, it would be necessary to make use of other theoretical and methodological references. Today we can see such proposals based on the integrated methodologies discussions from the *museological science* of Pickstone (1994), who concentrate the reflection in an unite and priority way, understanding the artefacts and their processes, rather than an usual reflection on the history of technology restricted to the production of artefacts. So, it is important to underline that, at that time, the innovative appropriation of the History of scientific instruments was extremely challenging.

The History of scientific instruments which is still posed as one of the most promising research fields change its direction, interfacing so diverse areas, as History of material culture, industrial archaeology, economic History, History of science and technology and History of collections and museums. It had stopped (since the 1960s and 1970s) to treat the instruments and apparatuses as non-conceptual, objects which merely help to quantify concepts, but do not contain them, or are incapable of generating concepts, or as objects determined by theories whose main purpose was to confirm them. Trends of History of scientific instruments started to challenge the views, which conveyed that the scientific principles resided in the theory and perhaps in the experimental method, but never in the instruments or the collections themselves.

In order to assume the whole complexity of the role of instruments in the inter-relations of the sciences and the experimentation, it was necessary to remove the instruments from the subordinate space. So, taking them from mere illustrators of conclusions obtained by the good Physics, made *a priori*, (by logical reasoning whose highly influential idealistic concepts are present until our days) that had kept them in confinement for long years¹², hiding the networks of their circulation and their validations of science, both done around the world. Giving the prominence in the constitutive processes of the modern sciences back to the instruments and the collections have implied in a rupture, to widen the range of the histories of the sciences which are traditionally oriented

to the study of texts and to disregard the iconography and the collections of any kind as possible generators of research.

If the modern sciences have also characterized, since the 16th and the 17th centuries, by their intervention in the world and by the transformation of observations and experiments into instruments, with potential to circulate freely out of their specific locations of construction, and this circulation is a dimension inherent in these knowledges, these acculturations can provide another perspective to interpret science. By this view, the instruments of the 19th century or the apparatuses of the 21st century assume a privileged dimension and the studies of the circulation, networks and the validation of these devices are set in a place of expressive interest. If the objects are fundamental in the consolidation of the belief in the universality of science, they can likewise be used to pose questions addressing to the conceptualisation of such belief.

Highlighting the historicity of the scientific practice, the History of instruments studies have incorporated and critically improved the geophysical instruments of analogies of nature – the earthquake simulators which are so common in science centres, the microscopes and telescopes, extensions of senses, the energy generators, etc. In Brazil, for example, is not rare to find in display in museums and science centres, techno-scientific apparatuses of the modern world, which could be questioned.

In the diffuse field of museums and science centres, what perhaps lacks is a confident attitude, from historians and others researchers, to propose creative and question/critical appropriations and policies which aid to open room and allow the inclusion of different scientific culture approaches.

Notes

¹ An initial version of this article was presented by Maria Margaret Lopes in the IV World Congress of Museums and Science Centers, Rio de Janeiro, 2005.

² Since the beginning of the 1980s, a deep approach to the intersections between Museology and the History of Sciences has led to an unfolding of the interest, which the museums started to raise among the science historians. This growing interest is finally, in the beginning of the 2000s, attributed to the acknowledgement that the historical studies of museums have constituted an issue of its own. The volume 96 published in 2005 of *ISIS*, the most renowned periodical in the field of the History of Sciences, dedicated its “*Focus*” section to Museums and History of Science. The articles by renowned experts on the field gather a reasonable analyses into the research area, most of it in the English language, though. Following the same line of thought, papers

on historical Museology, such as the ones by Morales Moreno (1994), and Brigola (2000) were already calling our attention to the consolidation of the area of studies and to the fact that several topics which are familiar to the historiography of sciences have not yet received appraisal from a perspective which contemplates the museum.

³ Concerning this already old discussion (yet with questioning and still present approaches) on the extensiveness of the museums of sciences and technology and their meanings while historical artefacts, their relations with the audience and with the financing and supporting entities, see, among several articles, the introduction by Schroeder-Gudehus (1993) to the special volume of *History and Technology*.

⁴ Maria Margaret Lopes thanks the support by the *CNPq* – National Council for Scientific and Technological Development – to her research projects, especially *The History of Museology and its contribution to the Brazilian scientific culture analyses (A Museologia Histórica e sua contribuição à análise da cultura científica no Brasil)*. Research Productivity Scholarship, 2004-2007.

⁵ For a general view on this discussion, see the classic work by Impey and MacGregor (1985), which originated the *Journal of the History of Collections*. Oxford University Press, from 1989 on.

⁶ See the special issue of the journal *História Ciência Saúde, Manguinhos – Museus de Ciências*, volume 12 Supplement 2005, which gathers these articles in the dossier of the *IV World Congress of Museums and Science Centres*.

⁷ This was, for instance, the case of Herman von Ihering, who donated his correspondence with Ameghino and sold his collections to the Buenos Aires Museum, when he was forced to leave the directorship of the Paulista Museum, in São Paulo, in 1916. His departure from the museum was followed by an investigation, as he was accused of collection theft (Lopes and Figueroa, 2002-03).

⁸ Ameghino systematically sold his collections to American and European museums and, with these funds, he financed his research works, as corroborated by his vast scientific correspondence.

⁹ For a broader discussion about how many of the museographic changes from the second half of the 19th century on were debated in terms of the ‘*new museum idea*’ and how these terms were used in different contexts, to justify a diversity of institutional structures, administrative policies and architectonic proposals, see Beckman (2004). For a discussion about the appropriation of these terms by the Argentinean museums, see (Lopes and Murriello, 2005).

¹⁰ However, not forgetting that these issues can be found in more comprehensive works, such as the Phd thesis done by Sibele Cazelli and the not so recent thesis done by Denise Studart, informing on the theme they only deal with the topic in a superficial way and are, therefore, it is still an isolated contributions.

¹¹ Gender analyses of the New York Natural History Museum were also carried out by Donna Haraway (1989), especially in the chapter ‘*Teddy Bear Patriarchy*’. Public Exhibitions of human beings in the popular fairs and International Exhibitions characteristic of the 19th century, in which the studies on the ‘*Venus Hottentots*’ stand out, have also been the object of gender analyses, such as the already classic study by Fausto-Sterling (1995). ‘*Museums and Women*’ has also been the focus of attention of a thematic issue of the periodical *Museum* in 1991 that, among several aspects, verified with a ‘*certain surprise*’, that women have acted, in a decisive way in museums for centuries, in spite of the fact that their performance have not exactly been acknowledged (Skjoth, 1991).

¹² About this discussion, see the volume *Instruments. OSIRIS*, 1995, edited by Van Helden and Hankins.

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