

The History of Science in Portugal (1930-1940): The sphere of action of a scientific community.*

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Abstract

The History of Science in Portugal (1930-1940) explains the study and the fixation of the social construction of a scientific memory, recalling Maurice Halbwachs. Practices of cultural representation, civic manifestation and festive rituals were also present in the celebration of the memories of the history of scientific activity in Portugal, the scientific community and scientific institutions, from the late 19th century to the mid-20th century. We pointed out three steps; first the memory of the history of science in Portugal through the images *manufactured* by foreigners, especially by the Italian scientific review *Archeion*; second the domestic *manufacture* of a national memory of scientific culture and the role-played by the Portuguese Group of History of Science; third moment, the Commemorations of 1940 and the 8th Congress of the History of Portuguese Scientific Activity coordinated by Joaquim de Carvalho the famous professor of Philosophy from Coimbra's University. The Portuguese scientific community entered the workshop of the History of Science just as it found it in the period (1930-1940), revealing a 'brave new world' for the field of the cultural and social construction of the scientific memory and showing us today how scientists in Portugal as professionals and intellectuals play identity games!

Keywords

Scientific Culture; Commemorations; Cultural Practices; Portuguese 20th Century – New State

1. The Memory of Science in Portugal

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The study of the social construction of memory, recalling Maurice Halbwachs (1968), was of fundamental importance for the intersection of Positivism and the historiographic recording of the social, mental, and cultural life of the late 19th century and the 20th century. An unequivocal sign of this fixation of memory by Late Modern History, marked by several series of commemorative and celebratory events, was provided by the work carried out by the French State in connection with the bicentennial of the French Revolution. The work entitled *Les Lieux de la Mémoire* (NORA, 1984-1993) also enables us to open up perspectives on the commemorative rituals of 20th-century scientific practice in the Portuguese world. We would point to recent studies by Fernando Catroga (1998; Torgal, 1996), Sérgio Campos Matos (1998), Francisco Bethencourt (1997), Maria Isabel João (2002) and Luís Andrade (2001) examining the cycles of the construction of an ideological, political and national memory.

Practices of cultural representation, civic manifestation and festive rituals were also present in the celebration of the memories of the history of scientific activity in Portugal, the scientific community and scientific institutions, from the late 19th century to the mid-20th century. Witness the 3rd Jubilee and the 2nd Centennial of the Lisbon Science Academy (1779), the 1st Centennial of the Lisbon University Science Faculty and the Oporto University Science Faculty (1911); likewise the commemorations of Pombal's Reforms at Coimbra University (1772) and the 1st Centennial of the Lisbon Geographical Society (1875). These were institutions which played a leading role in the construction of a scientific memory in the context of the public understanding of science by the Portuguese scientific community and in the public sphere. Thus, it is relevant to recall the kaleidoscopic character of the collective memory (Bethencourt, 1997), while remembering that the first steps towards the creation of a history of science and sciences in Portugal were only recently taken (Torgal, 1996). At the international level, academia points towards the practice of scientific commemoration as a subject for study with a range of potentialities (*Commemorative Practices* (1999): *Osiris; On Time* (2000): *The British Journal Of History Of Science*).

The year 1872, in Portugal, marked the beginning of a series of scientific commemorations. The resolutions issued by Júlio Máximo de Oliveira Pimentel, the Rector of Coimbra University, set out a grammar of references for the commemoration of Pombal's Reforms: European modernity imposed on the country by Sebastião José de Carvalho e Melo. Historical Memories, fashioned by the Faculties of Mathematics, Natural Philosophy and Medicine constitute a grammar of the scientific and social construction of memory, fixed by means of publications produced by Coimbra University, events, biographies and collective histories, thus the form of a scientific period: 1772-1872 was sculpted (Pimentel, 1873).

During this era, certain publications had a major impact in Portugal: José Silvestre Ribeiro's eighteen-volume: *História dos Estabelecimentos Científicos em Portugal*; and Teófilo Braga's: *História da Universidade Portuguesa*. The wave of affectivity which Teófilo Braga wrote about, which would collectively envelop the nation around the figures of Camões and Pombal, is also present in this commemorative and scientific symbolic capital, defining the origin of modern scientific culture in Portugal (Braga, 1884).

The scientific commemorations of the 1930s, a stage when the *Estado Novo* (the New State) was establishing itself, enable a survey to be carried out of the different types of knowledge and images manufactured by the Portuguese scientific community. It produced and organized the scientific collective memory with the result that the die of national identity was cast, covering the period from the

20th century back to the origins of the emergence of the Modern State: the era of the Discoveries. Looking at the past, hidden away in archives and libraries, allows for the discovery of a memory of the history of science in Portugal, and leads us to an encounter with the institutions and individuals who put past events in chronological order, in an almost invisible dialogue with the Europe of the era.

We have selected the period from 1930 to 1940, which seems to be of fundamental importance in characterizing the nature of scientific activity in Portugal. There is evidence of various research activities: some researchers went to work in Paris on scholarship, such as the physicist Mário Silva of the Coimbra University Science Faculty, who obtained a Ph.D. at Madame Curie's laboratory; research work was also carried out at the Chemistry and Physics Laboratories of the Lisbon University and Coimbra University Faculties of Sciences; some researchers received grants from the Institute of High Culture to carry out work abroad; work was also carried out at the Nucleus of Chemical and Physical Mathematics (1936-1939).¹ These are some indications of the kind of scientific activity carried out in Portugal (Fitas, 2000).

2. The Memory of the History of Science in Portugal: images *manufactured* by foreigners

Let us begin with the review *Archeion. Archivio di Storia della Scienza* (1919-1940), a repository of information that provides an understanding of the connection which was gradually established between Portuguese figures and the Europe of the History of the Sciences from the late 19th century through congresses, reviews, associations and scientific societies: the mechanisms of a new sociability, which provided an alternative to that of the science academies.

An Italian publication, *Archeion. Archivio di Storia della Scienza* was founded in Rome in 1919 by its editor Aldo Mieli (1879-1950), and had a great influence on the process for the internationalization of the History of Science in Portugal; it had a close relationship with the Paris review, *Revue de Synthèse*, edited by the historian Henri Berr. The subtitle of *Archeion* was *Organe Officiel du Comité International d'Histoire des Sciences du Centre International de Synthèse*, revealing very interesting information about the connection between the Portuguese History of Science Group and the review. In it, we find articles by the group dealing with the national scientific memory. The publication conformed to a fixed format, with four sections and a large number of contributors from different countries.

The first section comprised in-depth articles: original studies of aspects of World Science or European Science, written in French, English, Italian or German. Contributors focussed on important world figures like Newton, Torricelli, Buffon and Galileo Galilei, and existing scientific institutions, such as academies, universities, institutes and museums of science, or dealt with specific themes, such as the state of the education provided in the History of the Sciences in different European countries. The second section contained "Short Papers", brief informative items and short articles. The third section was made up of news, with articles about international events directly linked to the History of the Sciences: specialized items on the International Synthesis Centre and detailed reports from

¹ About this Nucleus, see the contribution of Fernando Bragança Gil, *Boletim da Sociedade Portuguesa de Matemática*, 2003.

international History of Science congresses held in Europe. Finally, the ‘Critical Analysis’ section provided information about international History of Science publications in the West.

The “Index of Contributors”, published annually for each volume, shows that they were drawn from all over the world: from Istanbul to Paris, Moscow to California, England (London, Oxford and Cambridge) to Spain (Madrid and Barcelona), as well as Turkey, the United States, Austria, Egypt, Japan, India, Morocco, Yugoslavia and Argentina. Portuguese contributors based in Lisbon, Oporto and Coimbra also featured in the index. Indeed, the list of contributors and subjects dealt with is as long as it is enlightening. There follows a list of Portuguese authors and the most important articles they wrote for the review: Luís de Pina, *L’enseignement de l’histoire des sciences au Portugal*; Alberto Pessoa, *Hospitais de Coimbra*; Joaquim de Carvalho, *Jacob de Castro Sarmiento et l’introduction des conceptions de Newton en Portugal*; Augusto da Silva Carvalho, *História da lepra em Portugal*; Fernando de Almeida e Vasconcelos, *Francisco Gomes Teixeira* and *Daniel Augusto da Silva et la constitution de l’astatique, Espagne*; Fontoura da Costa, *Armando Cortesão, Cartografia e cartógrafos portugueses dos séculos XV e XVI*; Arlindo Camilo Monteiro, *O prof. Ricardo Jorge. O cientista e o mestre[...]O historiador das ciências* and *Portugal: Grupo português da história das ciências* and *Les doctrines médicales de William Cullen en Portugal*.

There is no doubt that *Archeion* played an important role in legitimizing biographical models and encouraging the search for, and the systematization of, sources required for carrying out a reconstruction of the past at the national level, one which carried authority, and which was tempered here and there with a necessary dose of nationalism, order and conservatism.

One of the most important events of the 1930s was the holding of the 3rd International History of Science Congress in Portugal in 1934, which brought prestigious international figures in the field to this country. The congress had a major impact in the Portuguese cultural and mainstream press, and some international scientific publications also covered the event. In particular, let us examine the material published by the Science historian Georges Sarton in the *Isis*, a review of which he was editor. In the 1934-1935 edition, Sarton devotes considerable attention to the congress, which was held in Oporto, Coimbra and Lisbon from 30th September to 6th October: “A complete account of the Congress will eventually appear in *Archeion*, and the proceedings will probably be published in the fullness of time by our Portuguese colleagues,” he wrote.²

The holding in Portugal of this international congress, at a time when the prestigious Colonial Exhibition was also being held in Oporto, provided the circumstances for the production of a critical and ironic discourse on Portuguese society by Georges Sarton. His memories of Portugal provide an emotive (and non-scientific) record of a country criss-crossed by innumerable tourist itineraries, its capital full of enchanting features recalling the great national idols of Portuguese culture, among them Camões, Almeida Garrett, Alexandre Herculano and Vasco da Gama. Along with these impressionistic memories, Sarton recorded the names of the Portuguese figures directly involved in the organization and holding of the congress: Arlindo Camilo Monteiro, Alberto Pessoa, Fernando de Almeida e Vasconcelos, Ricardo Jorge, and Fernando da Silva Correia – in other words, the group of people attached to institutions that were active in the field of the History of Science in Portugal, and who were responsible for organizing the meetings of the Portuguese Association for the Progress of the Sciences, jointly with the Spanish association.

² Georges Sarton, “Lusitanian Memories”, *Isis*, XXII, 1935-1935, p. 440.

George Sarton's *Isis* also provides a photographic record of the event, and the emotive response of the foreigner visiting a new country is manifest, as he discovers some of the museums and areas of outstanding beauty, recalls receptions attended and scientific excursions, and recounts the history of historic-scientific buildings such as Coimbra University and its 'annexes'. Summing up his experience of the meeting in a characteristically emotional register, Sarton writes: "However, the dearest sight, the loveliest thing I saw in Portugal – far humbler than any other, but more pleasing to my soul – was the fishing village of Nossa Senhora de Nazaré, it being a feast day: the anniversary of the Republic"; this provided the opportunity for an elucidatory footnote: "The Portuguese Republic was founded on 5th October 1910. The current President, General António Oscar de Fragoso Carmona, is in fact a dictator. The Prime Minister, Dr. António de Oliveira Salazar was formerly a professor at Coimbra University; he seems to be a very wise and austere man, wholly dedicated to his task, and the main artisan of a new renaissance. He has realized that the principal requirement for a sound revival is the strengthening of the physical and mental well-being of the people. He has started a crusade for hygiene and social medicine, sports and cleanliness, which is as beneficial as it was needed"³.

Following this short note, which can be described as being journalistic in style, he recommends that for future international meetings the Portuguese scientific community should elevate the scientific debate and restrict academic ceremony, as there had been a notable excess of pomp and circumstance and a lack of scientific rigor; at the same time, the organizers were encouraged to remedy their notable lack of punctuality in programming events!

This point of view contrasts with the news coverage provided by *Archeion* and the Portuguese review *Petrus Nonius*, as we shall see below. The congress occupies pride of place in Volume 14 of *Archeion* of 1934, and the forty pages devoted to it constitute documentary evidence which can be reliably used for reconstituting the events that took place in the cities of Oporto, Coimbra and Lisbon, while also introducing the different Portuguese figures who were associated with the History of Science in this country through institutional and official channels during the period. This material was disseminated to both subscribers of *Archeion* and contributors to the review, and was used in 1937 by *Petrus Nonius* as a support consisting of memories for the legitimization of commemorative and national scientific authority in connection with the events to mark the centenary of the Oporto Polytechnic Academy and the Lisbon Polytechnic School (1937).

3. The domestic *manufacture* of a national memory of scientific culture

A perusal of the review *Petrus Nonius* and the associated annual publication, *Anuário – Petrus Nonius*, enables direct access to the institutional framework of the history of science in Portugal. The review was widely disseminated between 1937 and 1938, and together with the complementary annual (a single edition was published, in 1937), is the public face of the Portuguese History of Science Group. Arlindo Monteiro was editor of both publications, and Joaquim de Carvalho, A. A. Mendes Correia, Fontoura da Costa, Ricardo Jorge, and Fernando de Almeida e Vasconcelos were all contributors. This new publication covered a range of different types of knowledge, focussing on fields such as Anthropology, Nautical Science, Philosophy, Mathematics, Hygiene and Public Health.

³ *Idem, ibidem*, p. 450.

Aldo Mieli and Arlindo Monteiro were the main figures behind *Petrus Nonius*. Besides the many articles they contributed, the review featured articles written by Portuguese authors which had previously been published in Rome, while other articles reflected the scientific concerns of the Portuguese Group, whose members were attached to the Faculties of the Science of Medicine at the Universities of Lisbon, Oporto and Coimbra. The review celebrated the glorious success of the 3rd International History of Science Congress (1934), initiated the debate on the History of the Sciences Education and commemorated the centennial of the opening of the polytechnics in Portugal in 1937.

Let us look firstly at the *Anuário* of the History of the Sciences, published by the Portuguese Group associated with the *Académie Internationale d'Histoire des Sciences* (Lisbon, National Press, 1937). This unique publication contains neither any explanatory introduction nor any list of the names of those responsible for the Group joining the International Academy of the History of Science. It comprises seven articles focussing on the field of the History and the Memory of Science in Portugal and we again come across Fernando de Almeida e Vasconcelos (*Daniel Augusto da Silva-1814-1878*), Pacheco de Amorim, (*Nomenclatura dos grandes números*), and Luiz de Pina (*Tábuas Cronológicas das Ciências em Portugal no século XVI*).

In all these texts, the nation's past, centered on the figures of *national heroes*, provides the structure for the characterization presented, while they demonstrate a high degree of erudition on the part of the authors as regards the authorities and primary sources (both printed and manuscript) cited for the History of Science in Portugal. There are also short biographies and factual charts, and the illustrious names of the period of the Natural and Geographical Discoveries and the 18th and 19th centuries in the field of Mathematics in Portugal are revived. Biographical notes on 'illustrious Portuguese' mathematicians constitute raw material for a succession of generations dear to the historical imagination of the Portuguese Group: Anastácio da Cunha (1744-1787) *vs.* Daniel Augusto da Silva (1814-1878) *vs.* Francisco Gomes Teixeira (1851-1933).

A quick assessment would involve asking what the purpose of the *Anuário* was: did it constitute the Portuguese contribution to an international academy? First we must recognize the spirit of positivist History that the members of this scientific group introduced, seeking references in libraries all over Portugal and in some cases throughout Europe, cross-referencing information originating in different types of sources, and providing today's investigator with an extremely rich source of information. This approach enables us to understand the existence of links of intelligibility between memory, science and ideology as components of an architectural picture of nationalism, of fundamental importance for the Portuguese History of Science Group, which chose the period of the Discoveries as a commemorative **time** and the biographical treatment of the scientific figures of the 19th century as a **method** of approach.

There is a great difference between this publication and the review *Petrus Nonius* (1937-1938 edition), also edited by Arlindo Camilo Monteiro, to which the writers referred to above also contributed. It is evident that they were selected with the mediation of Arlindo Camilo Monteiro and Aldo Mieli. Little is known about the former, as he writes about the philosophical-scientific past of Portugal but never gives any indication about his specialist scientific field of intervention in Portugal in the 1930s. However, it is he who provides the most important link with the *Académie Internationale d'Histoire des Sciences*, the *Société Internationale d'Histoire de la Médecine*, the *Academia Hispano-Americana de Ciencias y Artes* and the committee of the Portuguese History of Science Group,

a role which pushes him into the forefront as regards the organization and holding of the Congresses of the Portuguese-Spanish Association for the Progress of Science in the 1930s and 1940s.

Let us return to *Petrus Nonius*, which aimed to publish documents, essays, articles on the history of the scientific disciplines, news about the Portuguese History of Science Group and similar groups abroad.

The review is divided into two parts: the first part is devoted to the documentation of the results of research carried out in the range of specialized fields of the History of the Sciences, and can be assigned the term 'Papers'; the second part is characterized by news reporting on events, books and publications, and scientific criticism, and the aim is to stimulate thought about the development of ideas in the scientific world, both at home and abroad.

The articles published are markedly erudite in tone, which is evident both from the text and the footnotes. *Petrus Nonius* established itself as a basic work of reference and a repository of information. There is a range of themes and forms of approach: biographies in context, life itineraries, for example of leading figures in the Azores, or the introduction of *sthalian* doctrines into Portugal in the 18th century, articles in the field of Medicine, and there is also an awareness of the importance of scientific sociability linked to sojourns in Portugal by European visitors.

News about scientific congresses occupies an important part of the content of the review. A prime example is the 3rd International History of Science Congress held in Coimbra in 1934, at which plans to hold the First Congress of the History of the Portuguese Expansion in the World were announced, and Manuel Múrias was named as secretary. As the mythical date of 1940 drew closer, readers were informed as to preparations in progress in the field of the history of science. 1937 was also a special year as far as commemorations are concerned, with equally important centennial celebrations: the centenary of the Lisbon Polytechnic School, the Lisbon Medical-Surgical School, the Oporto Medical-Surgical School, and the Oporto Polytechnic Academy. This provided an opportunity for drawing on the bank of information regarding the historical memory of these scientific institutions in this country. At the same time, the wave of official celebrations was of great importance to the Portuguese scientific community, with the holding of meetings, the presentation of papers and articles published in newspapers; the printing presses of scientific institutions were also kept busy, as feverish activity of a commemorative character was generated.

In the international news section of *Petrus Nonius*, the 'History of the Sciences Education' at universities was an important feature. "The Academy first pointed to the *need for the creation of History of the Sciences chairs at the main universities* at the Congress held in Paris in 1929, in the presence of the representatives of the governments of many different countries", according to the review edited by Arlindo Monteiro. International commemorations and celebrations also occupied a place of prominence, while an effort was made to make Portuguese readers feel part of a cosmopolitan scientific community. There is Lord Rutherford and his work, which the contributor of the Vice President of the Lisbon Section of the Portuguese History of the Sciences Group and ex-professor of the Naval School was responsible for coordinating; we mean Ramos da Costa, who brought the recent History of Radioactivity (1896), and the contribution made by the leading physicists of the age, such as Rutherford, Henrique Becquerel, Curie, McGill, J. Perrin and J. J. Thompson, to a Portuguese readership.

One may conclude that overall the work carried out by the Portuguese History of the Sciences Group led to the recuperation of references to the History of the Sciences in Portugal, taking into

account the cultural relations that this country had in each age. The works presented demonstrate a high degree of erudition on the part of the authors; all the articles published present a great capacity for revealing information held in libraries and archives, at the national and international level, and provide a foretaste of the kind of work carried out by Rómulo de Carvalho, as a historian of science, from 1953 onwards (Carvalho, 1997).

With regard to this era, the Lisbon Science Academy of the also reflects the way in which the scientific memory of the country was established. Tome I of the Class of Sciences (1936) launches the new series of the publication of the Memories of the Lisbon Science Academy with two works focussing on the History of the Sciences in Portugal by Francisco Gomes Teixeira and José Pedro da Cunha.

Gomes Teixeira, who had orally presented his text at the session of 2nd June 1918, praised Daniel Augusto da Silva, the 19th-century mathematician, while paying homage to the then President of the Academy, Virgílio Machado, and the President of the Republic, Sidónio Pais. His work contains a wealth of references connected with the History of Mathematics in Portugal. By carrying out a survey of Francisco Gomes Teixeira's arguments, we are able to gain an understanding of the way in which he combined the discourse of the historian with that of the mathematician, fashioning a fusion of the two while employing a plasticity of language displaying a solid cultural component, a seamless discourse involving Science, the Arts and the Humanities.

The contribution of Pedro José da Cunha, which deals with the Lisbon Polytechnic School, is based on work carried out at the beginning of the 1930s: "A contribution to the history of the Lisbon Polytechnic School. On the initial establishment of three permanent chairs in the philosophical sciences, which were provisionally established in the year of its foundation; a paper presented at the Academy sessions of 21st January and 4th February, 1937", a long title for an official and commemorative work!

There is no introduction to set the work in context, nor is it accompanied by any suggestions, considerations or frame of references, either national or international, and the only references are, in fact, to legislation and the minutes of juries, with brief circumstantial comments in order to link sequences of the various citations taken from 19th-century legislative texts. His assessment is dry in tone: "Shaking the dust off the archives, here is what we have been able to ascertain about the initial permanent establishment of the three Philosophy Chairs at the Polytechnic School, for which there was a necessity for provisional establishment in the year of its foundation."

In this 'model' of writing the history of scientific institutions, the only informative support we have is that of archive documentation, and there is no other material which might challenge the arguments presented, no notes of reflection or analysis, no criticism, and no setting of the work in context. The author, an academic and a member of the Portuguese History of Science Group, focussed his discourse on the presentation of legislative and political facts, the internal events of the Polytechnic School, which raises some doubts as to the way in which Pedro José da Cunha looked at the institutions of the era and the role that the History of Science could play in them. This was certainly a paradigm for the conception of scientific knowledge which was distanced from the one that Francisco Gomes Teixeira presented in the same volume of *Memórias da Academia das Ciências de Lisboa*, published in 1936, while written and conceived within the Portuguese context of 1918!⁴

⁴ For both authors, see *Memórias da Academia das Ciências de Lisboa – classe de ciências*, tomo I, 1937, pp. 60-362.

4. The Commemorations of 1940

The New State attached special significance to 1940; there were Commemorations to celebrate the Centennial of 1140 and 1640 and a necessity was felt for organizing a series of Congresses of the Portuguese World. The main stage for these events was the Exhibition of the Portuguese World at Belém, in Lisbon, the capital of the Empire! In the field of scientific culture in Portugal, the 8th Congress is paramount; its theme was: *Discursos e Comunicações apresentadas ao Congresso da História da Actividade Científica Portuguesa*, and it was held in Coimbra, with Joaquim de Carvalho responsible for its academic coordination.⁵ The forty-seven papers presented at the congress by a large number of the members of the contemporary scientific community in Portugal were collected in two volumes.

The *Congresso de História da Actividade Científica Portuguesa* (Congress of the History of Portuguese Scientific Activity) was held in Portugal in 1940 to mark the centennial of scientific activity in this country.

Contemporary History, a human and social discipline, has approached the cultural activities arising from the commemorations from a fundamentally ideological and political stance, relegating into the background events that do not fit directly into narrative projects describing the cultural power mechanisms used by the New State. It was with a sense of discovering new territory that a survey was conducted of the papers presented at the scientific culture sessions of the 8th Congress of the Portuguese World.

A number of those attending the Congress were illustrious figures from the 20th-century scientific world: associates of the *Academia das Ciências de Lisboa* (Lisbon Science Academy) and members of the New State political administration. They included figures such as Diogo Pacheco Amorim, José Vicente Gonçalves, Pedro José da Cunha, Herculano Amorim Ferreira, Mário Augusto da Silva, Adriano Pereira Forjaz, Achilles Machado, Branca Edmée Marques, Kurt Jacobson, Mark Athias, Celestino da Costa, Américo Pires de Lima, Anibal Scipião Gomes de Carvalho, Gumersindo Sarmiento da Costa Lobo, A. A. Mendes Correia, J. Bethencourt Ferreira, Augusto da Silva Carvalho, Paulo Merea, Hernâni Cidade, Vieira de Almeida, Álvaro Júlio Costa Pimpão, Luís de Pina, A. Amorim Girão, Luís Cabral Moncada, Hernâni Monteiro, Augusto d'Esaguy and Paulo Merêa. A brief foray into the National Library database (www.bn.pt) has produced a summary bibliographical survey of their scientific achievements and the role they played in institutional life.

In the chronological hierarchy of memory as it exists today, the Enlightenment period, the founding age of science in this country, heralds the dawn of a new modern era, at the Congress symbolically embodied in the figure of Luís António Verney (MONCADA, 1940). A process of change was begun with the reform of the University of Coimbra of 1772, and accelerated with 19th-century scientific practice; the figure of the liberal intellectual, Alexandre Herculano, stands out as an advocate of the establishment of the *Escola Politécnica de Lisboa* (Lisbon Polytechnic School) (MERA, 1940).

Two cultural and scientific generations can be discerned from a survey of ideas presented in the Congress papers. There are firstly young authors still in the initial stage of their university careers,

⁵ For this subject, we have followed *CONGRESSO DO MUNDO PORTUGUÊS (1940)*, Lisboa, vol. XII and XIII (available at <http://bnd.bn.pt/memorias/ciencia/index.html>)

as we learn from their bio-bibliographies. The other generation includes those who were part of the late 19th-century republican positivist movement: A. A. Mendes Correia (1888-1960), Diogo Pacheco de Amorim (1888-1976), José Vicente Gonçalves (1896-1985), Herculano Amorim Ferreira (1895-1974), Américo Pires de Lima (1886-1966), António Pereira Forjaz (1893-1972), Celestino da Costa (1884-1956) and Mark Athias (1875-1946)⁶.

Images of scientific institutions

In the opening speech to the Congress (C.E.C./C.M.P., 1940a, XIX: 245-249), the past was presented as an era of exceptional thought. In this typology of *history/memory*, one can trace, once again, the shaping influence of the Historical Memories of the Faculties of the University of Coimbra, dating from 1872, with the scientific commemorations of the first centenary of the Pombal reform promoted by the Rector, Júlio Máximo Pimentel.⁷ When we read about an archaeology of words and things in various papers presented, it is clear how great their influence was.

Among the institutions which carried out research were the Laboratories and Observatories, symbols of a (new) era of professional scientific practice. Each of these scientific spaces gathered together a body of organized information reflecting their common historical origins in the 18th century: that is, the Portugal of the Enlightenment period, the era of Pombal, and the reformist revival of Queen Mary I. The next chronological staging post is that of the reforms following the September Revolution (1836-1837) and which provided the impulse for the establishment of the *Academia Politécnica do Porto* (Oporto Polytechnic Academy) and the Lisbon Polytechnic School.

Let us deal first with the Observatories and the University of Coimbra (LOBO, 1940). Besides the fact that science in Portugal began from nothing in 1772, what should be noted above all was the need for bringing the field of astrophysics up to date within our scientific community. From the standpoint of the present, we can discern the great leap forward, which paved the way towards development and progress.

For the Lisbon Observatory (MORAES, 1940), we have an account of an initial memory from the late 18th century, then we move on to the time when it was a synonym for modernity at the Lisbon Polytechnic School (Ferreira, 1940); here we have the scientific history of an institution, during which, at some point, modern science was born. In the field of astronomic observations we can also include the meteorological, with special relevance for the role played by the Lisbon Science Academy, the Marine and Marine Guards' Academies. Other themes dealt with at the Congress were scientific instruments and the history of the network of international links: in this field, the cosmopolitan aspect of science was underlined, supported by an impressive list of domestic and international publications in the science collection of the Lisbon *Observatório Infante D. Luiz*. There

⁶ These were figures who witnessed 20th-century developments. The *Colóquio da Academia das Ciências de Lisboa* (Meeting of the Lisbon Science Academy), held in 1985, enshrined many of these names in the pages of the *História do Desenvolvimento Científico em Portugal até ao século XX* (History of Scientific Development in Portugal up to the 20th Century).

⁷ *Memória Histórica da Faculdade de Philosophia* (CARVALHO, 1872); *Memoria Historica da Faculdade de Mathematica nos cem annos decorridos desde a Reforma da Universidade em 1772 até ao presente* (FREIRE, 1872); *Memoria Historica e Commemorativa da Faculdade de Medicina nos cem annos decorridos desde a Reforma da Universidade em 1772 até ao presente* (MIRABEAU, 1872).

was a similar narrative for the *Observatório Meteorológico da Serra do Pilar* in Oporto (Machado/Figueiredo, 1940), with references to military institutions, the Polytechnic Academy and joint enterprises with the national and international scientific press.

Let us now turn to the laboratory as a space for the scientific practice of Physics and Chemistry. The first example of the fixing of a memory of a laboratory is an important account in the field of scientific museum studies (SILVA, 1940) dealing with the attraction in artistic and scientific terms of the instruments of the 17th-century Physics Study Room. The Lisbon scientific community presented a paper on the jewel in the crown of the capital: the Polytechnic School Chemistry Laboratory, a space for the practice of science which galvanized those responsible for the discipline of Chemistry at the University of Lisbon Science Faculty (Forjaz/ Machado/ Marques/ Jacobson, 1940): it describes the repositories of 19th-century information and demonstrates evidence of the practice and the utility of Chemistry in Lisbon from the end of the 19th century up to the present, while no university was based in the capital until the Republic was founded! Linked to the Lisbon Chemistry laboratory, there is also an imaginary dialogue between Lisbon and Oporto based on the memory of the 19th-century Oportan tradition of Chemistry (Malheiro, 1940) centered on the Oporto Polytechnic Academy (1837) and popularized at the national and international level by the chemist Ferreira da Silva, founder of the *Revista de Chimica Pura e Applicada* (Pure and Applied Chemistry Review - Oporto, 1905).

National and regional scientific identity

The commemorations had a national, nationalist and patriotic flavor designed to foster the union of the Nation-State; however, the cultural and scientific landscape at the local and regional level was also represented in this portrayal of scientific activities. Papers presented enable us to identify the most important developments in Science in relation to only three cities: Lisbon, Coimbra and Oporto; or rather Coimbra and Lisbon/Oporto! A closer examination reveals the search for elements of local scientific autonomy in a number of papers which celebrated the history of the scientific culture of the cities of Lisbon and Oporto. Meanwhile, the University of Coimbra was superimposed on this North/South background; in the national imagination, the university has always been paramount in the field of science and the leading higher education institution in this country (Carvalho, 1942: 55-63).

In this account, Oporto is characterized by a set of attributes associating certain aspects of knowledge with science at the local and regional level, as if this was a cultural specificity belonging solely to the members of the Oporto scientific community. Thus, we have a history of Mathematics in Oporto and a history of the professorship of Francisco Gomes Teixeira, which stand out among contributions focussing on mathematics and mathematicians at the national level (Amorim, Cunha, Gonçalves, 1940). There is also the construction of a scientific identity in the field of Botanic Studies, based on Drawing classes, in which an encyclopedic knowledge of species was cultivated, at the *Real Academia de Marinha e Comércio* (Royal Naval and Commercial Academy) in the early 19th century, and associated with the art of Domingos Sequeira and Vieira Portuense. Finally, Oportan science is represented by the only two scientific institutions in this country: the *Instituto de Zoologia* (Zoology Institute) and the *Estação de Zoologia Marítima* (Maritime Zoology Station), founded by Augusto

Nobre (Guimarães, 1940), the important late-19th century naturalist who carried out a great deal of scientific work in the first half of the 20th century.

Sectorial memories *vs.* the exchange of knowledge

There are clearly two main branches of the History of Science: the History of Mathematics and the History of Medicine in Portugal (Silva, 1999; Lemos, 1999). In the former field, the papers presented (Amorim, Cunha, Gonçalves, 1940) continue the tradition of the historical memory of Mathematics, from the writings of José Anastácio da Cunha and Garção Stockler to the reference works edited by Rudolfo Guimarães and Francisco Gomes Teixeira, and the pioneering work of Pedro Nunes, thus establishing a link with the Congress of the History of the Discoveries and the Congress of the History of the Expansion, which were held as part of centenary commemorations.

In the field of the History of Medicine (Fontes, 1940), the collective memory was built in a singular manner. Firstly, the role assigned to the medical glories of Portugal is dealt with on an individual level: Amato Lusitano and João Rodrigues; then there is the prominent role assigned to the Jewish medical community; and especially the role of António Nunes Ribeiro Sanches in the exchange of knowledge between communities, in which Jewish and New Christian medics were the heroes of science in Portugal, in 1940! (Carvalho, Dias, Esaguy, 1940).

Papers on the History of Medicine also highlighted the pioneering role of the Medical-Surgical Schools of Lisbon and Oporto, in contrast to the Faculty of Medicine of the University of Coimbra (Monteiro, Vilhena, Figueira, 1940). Marking a new stage in scientific development, new paths were explored for the advancement of Medicine, links being established with Radiology, Laboratory Analysis and Bacteriology, leading to the emergence of public health as a national scientific concern.

Focussing now on papers in the field of the History of Medicine within the framework of a theoretical approach to the Science of the Empire, we discover how the memory of the Medical-Surgical School of Goa (Melo, 1940) can be regarded as the key to a different scientific intelligibility: the identification of a Portuguese Anthropological School and the way it operated in the Empire (Correia/S. Serra, 1940; Tamagnini/ Serra, 1940).

Also linked to the dissemination of Science throughout the Empire, two new areas were covered by this historiographic survey: branches of science with a memory which is still comparatively short – Geology and Geography (Girão, Costa, 1940). For these fields of knowledge, the territories of the Empire constituted a laboratory for experimentation *par excellence*. Geological and geographical expeditions to the colonial territories formed part of the work of geographers and geologists, and the huge potential for such activities contrasts with the sparse repository of information constructed in these two fields. These papers set out guidelines for scientific practice to be applied both in the Portuguese home country and in the colonies as part of a scientific mission which can be designated as *Science for the Home Country*.

In the decade from 1930 to 1940, the Portuguese scientific community was invited to look retrospectively at the different fields of scientific knowledge in which it operated. The Congress of the History of Portuguese Scientific Activity, the 8th Congress of the Portuguese World, was innovatory in its selection of a thematic and temporal memory of the history of science in Portugal. Rejecting the maritime discoveries – scientific and technical aspects, and national heroes – it opted to focus on the 18th century as the inaugural period of scientific knowledge. In contrast with the reviews, *Archeion*

and *Petrus Nonius*, the two thick volumes of the proceedings of this Congress do, in fact, contain a different memory of science in Portugal, which is more dynamic, engages to a greater extent with European historical experience and above all attempts to construct – manufacture – an image of scientific knowledge legitimized by modernity and the construction of knowledge. The Portuguese scientific community burst in on the History of Science and took on the subject just as it found it in the period (1930-1940), discovering a ‘brave new world’ in the field of the cultural and social construction of scientific memory.

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