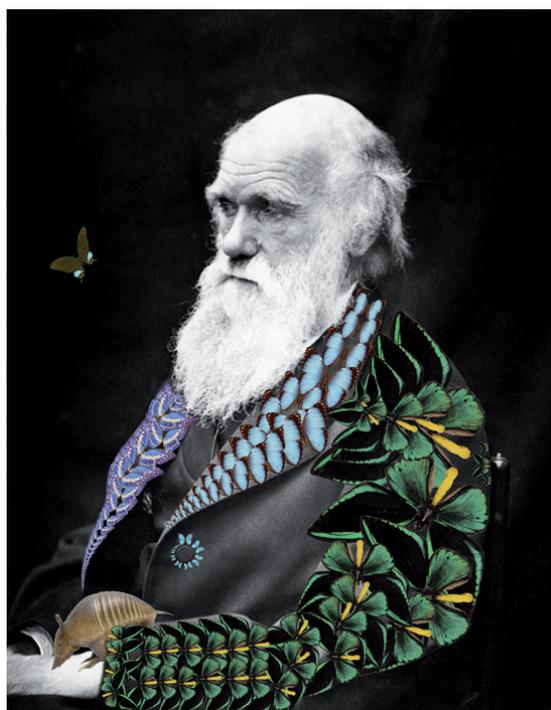


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DYNAMICS AND SINGULARITIES OF SCIENTIFIC APPROPRIATION: DARWINISM IN THE AZORES

When dealing with the reception of a new scientific theory in Portugal, usually it means the allusion to resistances and difficulties of participants to integrate new concepts and practices. To start with I would like to introduce a different point of view.

Firstly, by assuming that science is a slow, vast and collective construction of facts and practices, some associated with well-known people. The practice of scientists is the living proof of this argument. Historians have arrived at a similar understanding through the identification of the circulation and production of knowledge in courts, universities, scientific societies, and other intellectual circles. It is from the continuous dynamics of these mechanisms of anonymous contributions that, occasionally, and in articulation with a set of external factors to science itself, episodes which come to be seen as crucial, and the great personalities which are often associated with grand scientific narratives, emerge. Although not always evident, the Portuguese are also part of such history because they have always belonged to the pathways of a primeval Republic of Letters which was the structural cradle at the origin of modern scientific networks.¹

Secondly, underlining the active participation of the Portuguese in scientific works, I would like to introduce the concept of *appropriation*. A very common idea prevails that well-equipped centres, with infrastructures, means and critical mass, produce the major scientific innovations which are later diffused and received in the so-called peripheries, less gifted with people and means. This perspective, based on the *separation* between production and distribution,² treats scientific knowledge as if it were a material asset, something that is produced there and used here. This conception, which, furthermore, takes for granted the implicit weakness of the peripheries, ignores an important aspect of the transmission of knowledge: “that ideas and techniques are, more often than not, transformed in unexpected and sometimes startling ways when introduced in a different social and educational context.”³ Peripheries are epistemologically active

¹ Ana Simões, Ana Carneiro, Maria Paula Diogo (eds.), *Travels of Learning. Towards a Geography of Science in Europe*, Dordrecht: Kluwer Academic Publishers, 2003; Maria Paula Diogo, Ana Carneiro, Ana Simões, “The Portuguese naturalist Correia da Serra (1751-1823) and his impact on early nineteenth-century botany”, *Journal of the History of Biology*, 34 (2001) 353-393.

² Kostas Gavroglu, Manolis Patiniotis, Faidra Papanelopoulou, Ana Simões, Ana Carneiro, Maria Paula Diogo, José Ramón B. Sánchez, Antonio Garcia Belmar e Agustí Nieto-Galan, “Science and Technology in the European Periphery: Some historiographical reflections”, *History of Science*, 46 (2008) 159.

³ *Idem, ibidem*, 159.

regardless of their constraints. Peripheries appropriate new theories, new techniques, and new models and become part and parcel of the history of these new practices. Appropriation is, by itself, a process of production of knowledge⁴, which includes cultural diversity and intellectual creativity of its recipients, and the different directions taken by scientific interactions. Furthermore, appropriation integrates cultural dialogues stretching beyond the laboratory space over society as is so well illustrated by the case of Darwinist evolutionism.

These considerations were essential to trace the conceptual framework for my interpretation of the reception of Darwinism in the Azores. However, to look at the Azores, it is mandatory to introduce in our narrative Júlio Henriques, a central figure of Darwinism in Portugal, for two reasons: firstly, to identify him as a case of scientific appropriation in a country of the European periphery; secondly, because he was a mediator, that is, one of the agents of the reception of Darwinist evolutionism in the Azores. As it is often the case, this process was neither linear nor single voiced, but it occurred through national and international dialogues of a more or less scientific character, as well as through local controversy and cultural appropriation.

As it is well known, Henriques played a founding role in the reception of evolutionism by natural selection in Portugal. As an answer to the question *Are species changeable?* (1865) Henriques summarises very well the basis of Darwinism and does it to the point of even sharing Darwin's doubts.⁵ Although the articulation of the four stages of Cuvier's animal organization with the prototypes presented by Darwin was already an imaginative solution for the compatibilization of different scientific models⁶, Henriques' appropriation of Darwin's theory reached a higher level of creativity. In the last chapter of his thesis, "Henriques did not avoid to consider man a product of the same evolution as other animals"⁷— a development only stated by Darwin in 1871, while Henriques phrased it in 1866, in *Antiguidade do Homem (The Antiquity of Man)*. This is a case in which someone who was not involved in the seminal work of Darwinism appropriated its ideas and arguments to contribute to its development and consolidation.

The construction of a new paradigm is not the work of a single person, as Darwin knew so well. He had always the intellectual honesty to make it clear. The construction of a paradigm does not dispense the scientific creativity of its recipients. In Portugal, many other recipients of Darwin's evolutionism published works which illustrate precisely the plural dynamics of scientific appropriation and are a testimony to Portuguese participation in the construction of evolutionism by natural selection.⁸

The evidence of diversity in the appropriation of a theory can also be captured by the ways a theory permeates into a certain community. In Portugal, the introduction

⁴ Idem, *ibidem*, 161.

⁵ Carlos Almaça, *O Darwinismo na Universidade Portuguesa (1865-1890)*, Lisboa: Museu Bocage, Museu Nacional de História Natural, 1999, pp. 34 and 37.

⁶ Idem, *ibidem*, 38.

⁷ Idem, *ibidem*, p. 39.

⁸ Ana Leonor Pereira, "A recepção do Darwinismo em Portugal", in Ana Leonor Pereira *et al.*, *A Natureza, as suas Histórias e os seus Caminhos*, Coimbra: Imprensa da Universidade de Coimbra, 2006, pp. 14-19.

of Darwinism through French translations of *The Origin of Species* is taken as part and parcel of the received view.⁹

As the writer Eça de Queirós beautifully expressed “By Railways, which crossed the Peninsula, torrents of new things, ideas, systems, aesthetics, forms, feelings, humanitarian interests broke down daily from France and Germany (through France) (...) Michelet, Hegel, Vico, Proudhon, Victor Hugo and Balzac, Goëthe as vast as the Universe; and Poë, and Heine and, I believe, Darwin as well, and many others!”¹⁰ However, that new world “which the North sent us in packages”¹¹, did not always come by train and did not always speak French, as I will argue concerning Darwinism in the Azores.

The memoirs of Eça de Queirós reporting the intellectual turmoil of Coimbra from 1862 or 1863, take us, precisely, to the years in which Henriques was a university student; a student who loved botany more than the rebellious gatherings of Coimbra, since he was a regular collaborator of an Azorean, graduate of medicine, high school teacher, and assistant of the Botanical Garden, named Carlos Maria Gomes Machado. Machado was in charge of the phytological survey of the country,¹² and one of his collaborators, who collected and drew specimens for the *herbarium*, was precisely Henriques. Most probably this partnership gave way to interesting conversations on scientific novelties, and namely on Darwin’s theory of evolution, which Henriques was to advocate in his dissertation thesis.

When, in 1870, Machado decided to go back to the island of S. Miguel, he took with him the naturalist experience and those new ideas. In Ponta Delgada, he became a high school teacher and there he reorganised the natural history cabinet. In this process, which exceeded didactical aims, Machado found new collaborators. One of them was a young autodidact in his twenties called Francisco de Arruda Furtado. The natural history cabinet gradually led to the installation of the Natural History Museum and Arruda Furtado, at first an immature young man eager to learn, became an experienced naturalist with well defined scientific objectives, owing to Machado’s guidance.¹³

The network of personal relationships which connected Coimbra to Ponta Delgada was one of the paths through which Darwinism entered the Azores.¹⁴ A good working hypothesis is that Furtado came to its acquaintance through Machado, but not by reading a French translation of *The Origin of Species*. Furtado not only read the book outside the usual academic context but he read it in the English version of 1878. This fact can be verified in the very same book that belonged to him, which is held at the Library of the Museum of Science of the University of Lisbon.

⁹ The date of the first French translation is 1862. See: Ana Leonor Pereira, *op. cit.*, p. 11.

¹⁰ Eça de Queirós, “Um génio que era um santo”, in AA. VV., *Anthero de Quental. In Memoriam*, Edição *fac-simile*, Lisboa: Ed. Presença e Casa dos Açores, 1993, pp. 484-485.

¹¹ *Idem*, *ibidem*, p. 485.

¹² Carlos Machado published the “Catalogo methodico das plantas observadas em Portugal” in the *Jornal de Sciencias Mathematicas, Physicas e Naturaes*, between 1866 and 1869. While incomplete, this Catalogue was one of the sources of *Pharmacopêa Portuguesa* edited in 1876.

¹³ See autobiographical article of Arruda Furtado, “Sciencia e Natureza”, *Era Nova*, 1 (1880-1881) 83-88.

¹⁴ Besides Machado, Henriques influenced many others Azorean students, namely Bruno Tavares Carreiro, a graduate of medicine who returning to the Azores brought with him the passion for botany and the friendship of the botanical garden’s director.

In what follows, let us find out who Furtado really was. But before proceeding I want to stress that during 2009, after a century of silence, suddenly, Furtado became a public figure, and a prominent reference in the context of the Darwinian celebrations. But in my opinion, his name was invoked for equivocal reasons: the Azorean naturalist is presented as an almanac curiosity whose importance is reduced to the circumstance of having been the single Portuguese person to have corresponded with Darwin. And people assess his brief exchange of letters with Darwin completely out of context, ignoring the scientific correspondence that Furtado maintained, during almost seven years, with more than 70 correspondents.¹⁵ The idea conveyed to the public is, wrongly, that Furtado's scientific research was originated through the Master's recommendations. Finally, nothing is said about Arruda's scientific work, which is completely ignored. The recent publication of his scientific publications calls for a thorough analysis of his scientific contribution using the standards of international historical scholarship.¹⁶

Actually, Darwin was not Furtado's first correspondent. In his first letter to Darwin of June of 1881, Furtado already had very clear ideas of his scientific objectives. For instance, in 1880, when he wrote to the arachnologist Eugène Simon, explaining his option to study terrestrial molluscs, he states: "... and since I was very interested in the question of the origin of species, I threw myself into the study (mainly of internal anatomy) which is the most adequate to my taste and, regarding endemic species, completely new."¹⁷ Furtado wanted to produce new knowledge within the theoretical framework of Darwinian evolutionism. He knew the importance of the insular environment to study evolutionary speciation and very early he identified some endemic species. Therefore, he plunged into dissection, description, anatomic illustrations, and systematic comparison with other malacological studies, with special attention to those referring to other Atlantic archipelagos. Simultaneously, he sought for support and scientific guidance from reputed researchers. Furtado not only received positive answers, offers, and requests for sample exchanges, but also providential material and scientific support from two researchers of Yorkshire College in Leeds: the chemist T. E. Thorpe who briefly stopped in S. Miguel and made his acquaintance, and the biologist L. C. Miall. In fact, the latter turned into a tutor for Furtado, sending him not only books, a microscope and drawing material, but also translating into English Furtado's article "*On Viquesnelia atlantica*, Morelet & Drouet" and publishing it in the *Annals and Magazine of Natural History* (1881). This small work described, for the first time, the internal anatomy of a rare species collected in S. Miguel of a *genera* which at the time was only known alive in India and as a fossil in France. The following year it was published in Portugal, in the *Jornal de Sciencias Mathematicas, Physicas e Naturaes*, under the auspices of the Academy of Sciences.¹⁸ Thus, this article stood as

¹⁵ *Correspondência Científica de Francisco de Arruda Furtado*, Introdução, levantamento e notas de Luís M. Arruda, Ponta Delgada: Instituto Cultural, 2002.

¹⁶ *Obra Científica de Francisco de Arruda Furtado*, Introdução, levantamento e estudo de Luís M. Arruda, Ponta Delgada: Instituto Cultural de Ponta Delgada e Instituto Açoriano de Cultura, 2008.

¹⁷ *Correspondência científica de Francisco de Arruda Furtado*, doc. M.C. 5 [7], p. 29.

¹⁸ Arruda Furtado, "*Viquesnelia atlantica*, Morelet et Drouet", *Jornal de Sciencias Mathematicas, Physicas e Naturaes*, 32 (1882).

the recognition by his peers of Furtado's work, first in England and then in Portugal. Meanwhile, Miall provided Darwin's contact to the young Azorean.

Darwin was already 72 years old while Furtado was a strong-willed 27 year old man. However, there was a deep understanding between them. As usual when speaking to a well-known scientist, Furtado asked Darwin for practical and scientific advice. Nevertheless, he clearly stated his will: "My purpose is to establish comparisons with the continental American and European fauna, in order to throw some light on *the origin of Azorean species*." To which he added: "I try not to discard any single fact which may bring about proof, as weak as it may be, to your theory."¹⁹ This sentence bears witness to a pro-active attitude of appropriation of a new theory, and is far from translating uncritical adulation of the disciple towards the master. Thus, Furtado expressed his will to participate in the process of scientific construction of evolutionism by natural selection. It is obvious that the methodological advice he received from Darwin held great scientific significance and a particular personal meaning, but let us not mix scientific admiration and lack of intellectual autonomy. The critical and historical analysis of Furtado's work will show, in due course, Furtado's strong personal identity.

Before concluding, I want to argue the case for the phenomenon of appropriation of Darwinism in the Azores via British agents, not via French, as usually assumed. I have already mentioned the English edition of *The Origin of Species* (1878) held in Furtado's library; but I want to add that long before the young malacologist enrolled in the process of scientific appropriation of Darwinism, the islanders of S. Miguel had already begun their own socio-cultural appropriation. The local intellectual elites, who kept in close touch with the literary, philosophical, and scientific novelties, brought them back home from their travels abroad or ordered them from their usual book shops. Thus, from a search at the Public Library of Ponta Delgada, I found nine copies of *The Origin of Species* (editions between 1866 and 1906): of those only three were French, one belonging to Teófilo Braga, and the others were all English. The oldest edition dates from 1866, is in English, and belonged to José do Canto, an important and notorious land owner. Another remarkable fact relates to the Darwinian collection of books in José Bensaúde's library: they add up to eight books by Darwin, all in English, except for one. These books were gathered by a curious businessman, in the past a young close friend of Antero de Quental, who dreamed of being a poet, but owing to lack of resources never managed to get a university degree. His Darwinian library tells us something about the social appropriation of Darwin's work in S. Miguel.²⁰

We have to find explanations for the English path to Darwinism's appropriation in the Azores. Besides the cosmopolitanism of social elites, one was, no doubt, the direct commercial flux connecting for over a century the English ports to the Azores.²¹

¹⁹ *Correspondência Científica de Francisco de Arruda Furtado*, Letter from A. Furtado to C. Darwin, June 13, 1881, doc. M.C. 32 [43], p. 107.

²⁰ Some of these books belonged to other members of the family, namely Alfredo Bensaúde, the founder of the Instituto Superior Técnico, who returned to S. Miguel to succeed his father in the family business administration. The so-called José Bensaúde's library is housed at Public Library of Ponta Delgada (BPARPD).

²¹ From the last quarter of the 18th century until the 1870's, there was a regular flux of orange exportation from Azores to England. See Sacuntala de Miranda, *O ciclo da laranja e os "gentlemen farmers" da Ilha de S. Miguel: 1780-1880*, Ponta Delgada: Instituto Cultural, 1989 and Fátima Sequeira Dias,

Other factors to be explored are the impact of regular cargo ships and passengers' ships connecting Europe to America and stopping at the Azores, and the impact of the ships of the English Royal Navy surveying the Atlantic and frequently scaling the islands. The naval crews had a high level of technical and scientific training and, while on land, they looked for intercourse with similar social circles; in turn, they were sought for by naturalists and occasional explorers arriving there. Finally, I refer to two cases of travellers who did not reach S. Miguel neither by railway, nor speaking French – the chemist Edward Thorpe who was the mediator of Miall's scientific protection to Furtado, and the *Challenger* expedition, well documented for its stops in the Azores.

Although this work is the result of an on-going research, it already brings forward a fresh stand-point to be taken into account by the new historiography of appropriation of Darwinism in Portugal.²²

“A importância da ‘economia da laranja’ no arquipélago dos Açores durante o século XIX”, *Arquipélago – História*, 1 (2) (1995) 189-240.

²² The author wishes to thank the collaboration of her FCUL and CIUHCT colleague Júlia Gaspar in the translation of the text into English