

Giuseppe Sergi, “champion” of Darwinism?

Alessandro Volpone ^{1,2}

1) *Seminario di Storia della Scienza, Università degli Studi di Bari, Piazza Umberto I, 1, 70121 Bari, Italy*
e-mail: a.volpone@filosofia.uniba.it

2) *Unità di Storia della Scienza e Archivio Storico, Stazione Zoologica Anton Dohrn di Napoli, Villa Comunale, 80122 Napoli, Italy*

Summary – *The Italian anthropologist, psychologist and evolutionist Giuseppe Sergi (1841-1936) may be regarded in some respects today as an “atypical” Darwinist, but, almost paradoxically, he was considered a “champion” of Darwinism by colleagues and commentators of his own time. Probably, two aspects of his work are responsible for this apparent anomaly: his faith in the so-called soft inheritance and his claims regarding a theory concerning the polyphyletic origin of human races. The soft inheritance theory, however, was needed by Sergi to support ideas regarding the complexity of inheritance in man, a fact that, in his opinion, could not completely be put down to mechanical laws, and polygeny was useful when trying to rectify the problem concerning the incompleteness of the fossil record. In both cases, it is possible to show that he was involved in supporting Darwinian theory during the most severe crisis of its consensus in Italy and at International level, between the end of the 19th century and the beginning of the 20th. Finally, the apparent unorthodox features which can be found in Sergi’s ideas appear to be, in Kuhnian terms, ad hoc hypotheses put forward by Sergi himself in order to support the paradigm.*

Keywords – *Natural selection, Soft inheritance, Acquired characters, Panselectionism, Transitional fossils, Polygenic theories of evolution.*

Introduction

Giuseppe Sergi (1841-1936) was one of the fathers of (physical) Anthropology in Italy. However, this was the culmination of an eclectic and varied long professional career. He is also considered one of the founders of psychology in our country, and in particular was involved in the development of the experimental approach (being among the first to adopt such a system in Europe). Attracted by the debate concerning Darwinism, he was initially interested in psychology from a physiological point of view. He even cultivated philosophy and education. Sergi should be regarded as an intellectual who was fully active in the positivist and reductionist phase in which scientific thinking was going through in the early decades of the ‘800 and ‘900. In fact, he

can be considered to be a faithful interpreter of the guidelines and impulses of his era.

As a high school teacher in Milan, initially, he held a position of theoretical philosophy. In 1880, he began to teach anthropology at the University of Bologna, and a year later the psychiatrist Enrico Morselli (1852-1929) called him up to become a member of the editorial board of the *Rivista di filosofia scientifica* (1881-1891), the leading journal of Italian Positivism. In 1881, he edited the Italian version of *The Data of Ethics* (1879), by Herbert Spencer (1820-1903). In 1884, he went to the University of Rome, the new capital of the Savoy Kingdom of Italy (following Turin and Florence), to become chairman of anthropology at the Faculty of Sciences, University “La Sapienza”, where he established

the Institute of Anthropology and organised a remarkable Museum.

The second half of the nineteenth century is precisely the moment when, across Europe and overseas, ethnographic, anthropological and prehistoric museums were being founded (in a physical anthropology sense). This was, in fact, the era of Paul Broca, who taught anthropology in Paris and who spent his time trying to lay the foundations for an anthropometry which can be considered a real science: a science that can be reproduced, because it is based on "standardized" – as we would say today – measurements and indices. This is also the time when the well-known anatomical-pathologist Rudolph Virchow and Gustav Schwalbe, a paleoanthropologist, were working in Germany (Bernard, 2002; Fabiatti, 2000). The latter is perhaps the true father of human palaeontology (since he happened to study a Neanderthal skeleton found in 1856, and the remains of a pithecanthropus found in Java in 1891). Returning to Italy, this is also the time of Paolo Mantegazza (1831-1910) e Giustiniano Nicolucci (1819-1904). Together with Giuseppe Sergi, they are the great "fathers" of (physical) anthropology in our nation, the first based in Florence (from 1869) and the second based in Naples (from 1880). Genuine "schools" of thought and scientific activity were created around them, which dealt with the natural history of man. In Turin, however, and other Italian cities, this role was assumed by zoologists such as Filippo de Filippi and Michele Lessona, or anatomists such as Antonio Garbiglietti (Manzi, 1984-85, 1987; Cresta *et al.*, 1993; Facchini, 1993; Pogliano, 1993; Puccini, 1991, 1993).

In 1893, Sergi established the Società Romana di Antropologia (the name was later changed to Istituto Italiano di Antropologia) and started the publication of the Proceedings of the Society, entitled *Atti della Società Romana di Antropologia* (1893-1910; later *Rivista di Antropologia*, 1911-2003, and now *Journal of Anthropological Sciences*, 2004-), a journal which tried to introduce innovative trends in anthropological investigations performed through interdisciplinary approaches.

Soon after the foundation of the Società Romana di Antropologia, there was a fracture with Paolo Mantegazza, who had previously been Sergi's mentor for about twenty years. There are two trends in late nineteenth-century Italian study in anthropology: a philological-linguistic one, based on cultural aspects, and a medical-biological one, based on the analysis of physical characteristics. The two trends remained united, as an epistemological integrated whole until the outbreak of World War I. However, right from the very beginning, many authors were inclined towards one trend or the other. Sergi's professional activity followed the second trend, along with that of his master, Mantegazza, and his colleague Cesare Lombroso (1836-1909). From an institutional point of view, Mantegazza had a very centralist attitude, while intellectually he narrowed the general field of anthropology to more purely biomedical aspects. Sergi, while remaining within the limits of "physical" anthropology, also considered the environmental and historical-cultural aspects of individuals, populations and races of man. In this respect, he aligned particularly closely to the positions of Lombroso, with whom he shared the idea that Darwinism had to consider anatomical and physiological characters, without, however, neglecting the cultural and behavioral aspects (Frigessi, 2003). In 1896, Sergi publicly declared that he no longer considered himself to be a disciple of Mantegazza. In fact, he resigned from the Società Italiana di Antropologia of Florence, the first Italian society of anthropology, founded by his master (Pasini, 1999; Chiarelli & Pasini 2002). Like Nicolucci and Mantegazza in Italy, and many authors abroad, Sergi considered the analysis and classification of the skull as the most significant point for the distinction of human races and proposed new descriptive methods in craniology, arguing that the better the morphological examination is, the better is the final classification. Sergi started his far-reaching and original scientific work in Anthropology around 1880, and continued almost until his death. Two aspects are of particular importance: the establishment of a classification system in craniology based on morphological characters of the skull, rather than on measuring lines and angles, or using index calculations; and the formulation of

new hypotheses concerning the origin and spread of European human races from Africa.

Sergi supported the establishment of an observatory for the anthropological and physio-psychological studies of children of school age (in which scholars such as Maria Montessori also worked), according to the ideal of physical, social and moral improvement which was typical of the *Belle époque*, called “hygienist utopy” (Pogliano, 1984a). At the mature age of 71, Sergi became interested in Eugenics together with a small group of compatriots who participated in the first International Conference of Eugenics held in London in 1912. He was one of the most fervent supporters of eugenics in our country, but the management of the Italian movement was controlled above all by scholars of statistics and demography (Pogliano, 1984b; Mantovani 2004; Cassata 2006). Sergi devoted his last works to the integration of anthropology, psychology and evolution (*In memoria di Giuseppe Sergi*, 1937; Mondella 1980; Guarnieri, 1985; Pogliano, 1986; Maiocchi, 1999), as in the book, *Psiche, genesi, evoluzione* (Sergi, 1930).

Two of the major topics of the Italian late Nineteenth century evolutionary debate regarded the relative importance of the environmental influence on heredity and the problem concerning the lack of transitional fossils. Both these aspects can be found in the work of Giuseppe Sergi; and this means that the “anthropologist” Sergi, when working, continued his research on an eminently evolutionary basis. In fact, he always declared he was a Darwinist. Furthermore, considering the general crisis of Darwinism in Italy and at International level (Huxley, 1942; Bowler, 1983, 2003; Larson, 2004; Quammen, 2006) in that period, the definition of “atypical” Darwinian is probably unsuitable for him. Rather, he, as a man of science, advocated a paradigm which was in apparent decline, and simply attempted to support it the best he could.

Italian scientists and soft inheritance

If we take certain general aspects of Darwinism today for granted, it seems strange that Giuseppe

Sergi, like many other scientists of the end of the Eighteenth century who considered themselves to be Darwinists, freely mentions the inheritance of acquired characters in his works and by doing so supports the concept of evolution by natural selection. From this point of view, he can be considered a typical author. Sergi, for example, believed that different environments produce distinct variations of organisms, and that external conditions of life have a certain influence on living beings. In a work of 1893, he writes:

“We ignore the state of the primitive human type, or the primitive types, considered in all their internal and external characters, [...] and the reason for this, which is easy to understand, depends on factors such as the production of distinct variations in different environments, the influence of the external conditions, the mixture of different human types and the hybrid forms that derived from their crosses” (translated from Sergi, 1893, p. 20).

In 1904, he refers to clearly the influence of the external environment and the principle of use and disuse, when writing that

“[In living beings] there is a continuous accumulation of acquired characters which are induced from the outside, which constantly pushed back the oldest characters, making them inactive. These latter, therefore, tend to disappear from view due to lack of activity. However, this is never fully complete, and hence the regression, these ancestral characters reappearing, mixed with the new and recent” (translated from Sergi, 1904, p. 155).

In 1912, despite the newborn Mendelian genetics, he maintained that it was not possible to make a definitive statement about the inheritance of acquired characters:

“Inevitable difficulties in the study of variations regard the causes of their production. Do external energies affect living beings in their variations, or do the internal conditions of organisms determine their own variability? [...] Any naturalist knows, from Lamarck to

Darwin, from Galton to Weismann, what has been written and discussed concerning acquired characters; and he also knows how many authors are working on that problem today. At present, it is not possible to draw any definitive conclusions on the subject; and we can only take note of this" (translated from Sergi, 1912a, p. 9).

Sergi's belief in soft inheritance represents a constant characteristic of his scientific work; and it is evident that he maintained this view, albeit with occasional doubts, even after the birth of genetics. Yet, before making historical comments on such matters, we must probably first consider that the idea we have today of Darwin's own theory is similar to the deforming mirror theory of Alfred R. Wallace or August Weismann, and filtered through the interpretation of the Twentieth century geneticists. The resulting picture is, therefore, – quoting the words of Stephen J. Gould and Richard C. Lewontin – that of a "radical selectionist". However, this was not always the case.

*Darwin – as Gould and Lewontin wrote – has often been depicted as a radical selectionist at heart who invoked other mechanisms only in retreat, and only as a result of his age's own lamented ignorance about the mechanisms of heredity. This view is false. Although Darwin regarded selection as the most important of evolutionary mechanisms (as do we), no argument from opponents angered him more than the common attempt to caricature and trivialize his theory by stating that it relied exclusively upon natural selection. In the last edition of *The Origin*, he wrote: «As my conclusions have lately been much misrepresented, and it has been stated that I attribute the modification of species exclusively to natural selection, I may be permitted to remark that in the first edition of this work, and subsequently, I placed in a most conspicuous position—namely at the close of the introduction—the following words: "I am convinced that natural selection has been the main, but not the exclusive means of modification." This has been of no avail. Great is the power of steady misinterpretation» (Darwin, 1872, p. 395). [George J.] Romanes, whose once famous essay on*

Darwin's pluralism versus the panselctionism of Wallace and Weismann deserves a resurrection, noted of this passage (Romanes, 1900, p. 5): «In the whole range of Darwin's writings there cannot be found a passage so strongly worded as this: it presents the only note of bitterness in all the thousands of pages which he has published» (Gould & Lewontin, 1979, p. 589).

Gould, in particular, returned to the same argument in *The Structure of the Evolutionary Theory*, pointing out that much of the Lamarckian system "contains nothing that should have offended Darwin" (Gould, 2002, p. 179). Gould continues: "Darwin did not grant such crucial emphasis to soft inheritance, although he accepted the principles of use and disuse and inheritance of acquired characters, and he awarded them a subsidiary role in his own theory. [...] The mechanisms of change differ to be sure – altered habits establish new selection pressures for Darwin, but induce heritable modifications more directly for Lamarck – but both thinkers share a functionalist commitment" (Gould, 2002, p. 179). Furthermore, "Neo-Darwinism referred to the panselctionism of Weismann and Wallace, an attitude explicitly and pointedly rejected by Darwin, who gave selection pride of place (hence the association), but granted other forces (including "Lamarckism") important, if lesser, roles in evolutionary change" (Gould, 2002, p. 198).

In the late nineteenth century, in Italy, in the texts of the evolutionists, Darwin's name is not mentioned except in conjunction with that of Lamarck. A typical expression in field literature is "Lamarck and Darwin's evolutionary theory" – or simply "Lamarck and Darwin" or "Darwin and Lamarck" (e.g., Cattaneo, 1885). In Germany, Ernst Haeckel even wrote about a "diverse and integrated" theory of "Darwin, Goethe and Lamarck" in a weighty book translated into Italian (and published in the form of both handouts and a single volume) by Daniele Rosa (Haeckel, 1868, 1892). Immediately after, writers generally stressed that, through the work of Darwin, there was a conceptual overrun, which is an "improvement" of the theory of evolution of living beings. Darwin maintained the idea that "natural selection" represents

the chief evolutionary force, but he did not deny – no one was able to do this at that time – the existence of soft inheritance, or inheritance of acquired characters, and mechanisms such as use and disuse or the direct influence of the environment on reproductive organs. Stephen J. Gould, again, tries to justify this apparent paradox observing that,

“As functionalist theories, both Lamarckian soft inheritance and Darwinian natural selection share a defining premise that environmental information about adaptive design somehow passes to organisms, and that organisms then respond by fashioning traits to enhance their competitive ability within these environments. (Above all, functionalist theories require explicit interaction of organism and environment in the service of improving local adaptation. The pure imposition of one side upon the yielding properties of the other side does not qualify)” (Gould, 2002, p. 1179).

It is a curious fact that, between the late Nineteenth and early Twentieth century, all the Italian followers of Darwin discuss questions that the present-day reader would not hesitate to link to both “strong” and “soft” inheritance. In other words, it is inconceivable that entire generations of scholars – many of who were pen-friends or contemporaries of the English naturalist, with a mentality which was closer to Darwin than the commentator today – had misunderstood, misinterpreted or distorted the Darwinian theory. This idea is probably a presumption, as well as a historical mystification.

One example will be suffice to illustrate this aspect. Giovanni Canestrini (1835-1900) is traditionally considered to be “the most Darwinian of the Italian Darwinists” (Mantegazza, in Canestrini, 1894; Montalenti, 1983; Landucci, 1996). He translated most of Darwin’s books into Italian, investigated several connected subjects and tried to disseminate the fundamental principles of Darwinism all over Italy (Minelli & Casellato, 2001). He, without doubt, knew the theory of Darwin very well. Hence, it is a paradox that the present-day zoologist Baccio Baccetti, in the *Dizionario biografico degli italiani*, observes that,

“Canestrini was certainly one of the first in Italy to defend, from the chair, evolutionism. [...] In his scientific works there is yet a singular confusion, because the author tries more than once to prove the inheritance of acquired characters, then presenting it in support of the evolution by natural selection” (translated from Baccetti, 1975, p. 24.).

The fact is that history should be taken for what it is, with no attempt to alter it, or, at least, trying to deform it as little as possible. However, we are not always willing to give up our beliefs. There is no “singular confusion” in Canestrini, because, from his point of view, Darwin’s theory of natural selection did not work without an untroubled faith in soft inheritance. As had been previously emphasized by Gould and Lewontin, Darwin himself shared the same idea, which directly derived from the previous scientific tradition. A common belief of that time, in fact, was that the *variation* on which natural selection acts was generated in most cases by processes of soft inheritance (use and disuse, influence of the external environment or food, direct effect on reproductive organs, etc.). Similar remarks can also be found in the works of Giuseppe Sergi and other authors (like, for instance, the above mentioned Enrico Morselli, one of Sergi’s masters). In a work of Canestrini, for example, we find:

“In the battle of Solferino in 1859, Mr. Ottone Grueber had a wound from a bayonet (with three cuts) under the left shoulder blade, from which he recovered after some time. The scar, of a characteristic shape, was retained for long. [...] In 1864, Mr. Grueber took a wife, and nine months and three days after the marriage he had a son, “who – in the words of his father – brought the same point of the wound an identical scar. In 1880, this young man was about fifteen years old, and to say the mother and another relative, that sign was still evident” (translated from Canestrini, 1881, p. 84).

Analogously, Sergi criticized the “invulnerability of the germinal plasma” even after the birth of genetics. In 1914, for example, he still considered alcoholism and syphilis as a possible

cause of exogenous alteration of the germ-plasma of the race. He observed that,

"Overcoming the difficulty of the theories about the invulnerability of the germ-plasma [...] We must point out that alcohol can have an influence not only on the overall organic system, but, in the course of time, can also cause an interaction between somatic cells and germ, resulting altered in this way. [...] Of the other causes of degeneration in the race I only mention syphilis, having not allowed to prolong this exposition over a suitable time, because the effects of it are too well known here for having to show the importance and damage"

(translated from Sergi, 1914a, pp. 373-374).

With reference to Canestrini, Giuliano Pancaldi has remarked that,

"Canestrini's acceptance of some pre-Darwinian concepts adopted by Darwin was not the result of a dogmatic obedience to the ideas of the English scientist. On the contrary, the persuasive strength of those concepts was for the most part connected to the same previous scientific tradition which imposed them even to Darwin himself. In fact, when there was no support of that tradition, Canestrini appeared to be capable of a certain severe criticism towards Darwin's ideas, as in the case of the theories of sexual selection and that of pangenesis"

(translated from Pancaldi, 1983, p. 192).

The same observation certainly also applies to Giuseppe Sergi. His belief in the transmission of acquired characters is based on the same "previous" scientific tradition mentioned by Pancaldi, while he shows he is capable of self-criticism when considering, for example, the ideas to be attributed for the most part to Darwin, such as that of the transitional fossils or the phyletic gradualism.

Like Darwin and Canestrini, Sergi showed an enduring faith in soft inheritance; and, similarly to them, he used that principle to "support evolution by natural selection". But the same observation was also made by Michele Lessona (1823-1894), Paolo

Mantegazza, Cesare Lombroso and other members of the heterogeneous first Italian generation of Darwinists. Canestrini, Lessona, Mantegazza and Lombroso died before – or too early after – the genetic revolution, in 1900, while Sergi's faith in soft inheritance was lost just after the birth and partial consolidation of genetics. Initially, Sergi criticizes Mendelism, and it is possible to distinguish four phases in Sergi's rejection of Mendel's laws. (Volpone, 2008, pp. 183-187). In a first phase, for Sergi, Mendel's theory applies only (1) for peas, mice and few other organisms. (Sergi, 1914a). In a second phase, he considered that it applied (2) for plants and animals (Sergi, 1916), and then (3) for man too, but only in the case of normal rather than pathological heredity (Sergi, 1921). The final phase concerns (4) his silence regarding the subject: after the 1st World War, in Sergi's works, there is no other mention of such *querelle*.

It seems clear that Sergi finally abandons the soft inheritance theory only when he accepts genetics. But this acceptance is not without reserve. In fact, regarding the ideological conflict between Mendel and Darwin, Sergi progressively recognizes the validity of Mendelism as a mere genetic theory, but does not consider it in evolutionary terms (Sergi, 1914a, 1916, 1921, 1923, 1929, etc.). In this way, he continues to defend Darwinism, because, according to Sergi, Mendel's laws can, at most, refute the hypothesis of pangenesis, which deals with inheritance, but cannot deny the basic principles of the theory of evolution by natural selection, concerning instead with the origin of species. (Sergi, 1922).

The uselessness of searching for transitional fossils

At the end of the Nineteenth century, any discussion concerning the descent of man based on orthodox Darwinism maintained the concept of a fundamental derivation from inferior forms and the community of descent. But Louis Agassiz (1807-1873) in the United States of America, Theodor Poesche (1824-1899) in Germany and other authors all over the world

defended polygeny and the idea that the human races were not varieties of the same species (see Poliakov, 1972; Tullio-Altan, 1990; Orsucci, 1998; Eriksen & Nielsen, 2001). In addition, many of them claimed to be more Darwinian than their antagonists, because, from their point of view, searching for transitional fossils was rather useless in order to demonstrate Darwin's theory of evolution.

Exactly the same applies for Giuseppe Sergi in Italy. He was both a supporter of polygeny and one who considers himself as a real Darwinist. The point here is that also several of his contemporaries shared the same opinion about his proper theoretical position. In the early decades of the Twentieth century, for example, the zoologist Gustavo Brunelli (1881-1960), who was a serious, authoritative and reliable scientist, is a perfect example (see Remotti, 1962; Alippi Cappelletti, 1972). He particularly focuses on the polyphyletic character of evolution claimed by Sergi, defining the idea as a "Darwinian position".

In the third volume of the *Rivista di Biologia*, under the heading "Biologia generale, Genetica", Brunelli, co-director of the journal (along with Osvaldo Polimanti), reviews a book of Sergi entitled "L'origine e l'evoluzione della vita", published in 1921, making the following comment:

In the crisis of contemporary evolutionism, we have two categories of people: the skeptics, who abandon Darwin's thought, and the critics, who attempt a reconstruction in the light of modern science. Sergi is to be placed in the latter. On the basis of his documented exposition of paleontological facts, on which the work was fundamentally based, he does not draw, while noting the concerns and deficiencies, any conclusion which is contrary to the principle of evolution. However, before the already complex fauna of the Cambrian, before the missed connecting links, before the gradual shift allowed by Haeckelian phylogeny, he opts for a polyphyletic evolution with no passage between the phyla. In the problem of evolution, Sergi sees something that goes beyond the simple transformation of the species, in the sense of Darwin, and here – because

*I completely agree with Sergi on this point – I allow to myself to quote what I wrote in a comment of mine about *The Origin of the Species*, published in 1913 (together with a translation reprinted by the Istituto Editoriale Italiano of Milan): «Evolutionism has progressed by purging some wrong views that have been forwarded amidst the different types. It is not improbable that we should become convinced that the problem of the evolution of species is quite different from that of the genesis of a phylum, and, the same may apply for other major taxonomical groups»*

(translated from Brunelli, 1921, pp. 85-86).

In the decades between the Nineteenth and Twentieth century, the state of the evolutionary debate in Italy was confused and extremely delicate. The doctrine of Georges Cuvier was reconsidered, while Karl Ernst von Baer's ideas, based on the existence of a finite and irreducible number of basic types, emerged stronger than ever (Landucci, 2001). Brunelli did not hesitate to place Sergi among the interpreters of Darwinism who were constructively "critical", as opposed to the "sceptical" ones, or defeatists. This is somewhat surprising, given that Sergi was advocating a form of "polyphyletic evolution with no passage between the phyla." However, for holding similar opinions, some scholars claimed to be anti-Darwinists, or, at least, were accused of being so.

In that period, for example, Giovanni Virginio Schiaparelli (1835-1910), the Italian astronomer and man of culture, also proposed a solution for the problem regarding the lack of transitional fossils (Schiaparelli, 1898), but this, for the most part, appeared as an alternative to Darwin's theory. He supported an analogy between the mathematical curves belonging to the same family (e.g., conical) and increasingly complex biological systems, such as individuals, races, species, genera, etc. These classes of entities, given they share common characters, are grouped in the same group. And similarly to the curves that come from their generating functions, living beings descend from common ancestors. The transformations that generate the various curves represented by the same fundamental equation can

take on certain values and not others, depending on the field of existence of the parameters contained within. Analogously, perhaps, the transition from an organic form to another could happen only through non-arbitrary intermediate forms. Hence, this leads to the idea that evolution can consist of only "fixed" types, placed on a scale with discrete elements, which are not continuous.

Schiaparelli believed that a "unique fundamental formula" might be useful to account for the entire phylogeny of living beings. The constraints on its parameters determine the characteristics that discriminate between the various organisms which originated during the course of evolution. By considering the common characteristics and differences between different groups makes it possible to classify them hierarchically into varieties, species, genera, families, orders and so on.

Sergi is well-known for his idea regarding a multiple and distinct origin of both the higher *taxa* of living beings and different human races, by means of a polygenic principle. He, as previously pointed out by Brunelli, referred to a "polyphyletic evolution without passage between the *phyla*", but these latter were not properly "fixed" in the way Schiaparelli had suggested. In fact, Sergi criticized continuity as well as the radical discontinuity in the views concerning the evolution of living beings, because the polygenesis he advocated is based on the initial differentiation of evolutionary lineages into a certain number of different forms of the same kind, which are allied but distinct (*initial typical forms*). He, for example, criticized Henry F. Osborn (1857-1935), accusing him of being monogenist and trasformist, and underlining that,

"During the geological succession from Permian to Early Cretaceous many different kinds of reptiles appeared, but those who look carefully, will find the contemporaneous presence of various families as well as the short duration of some of them. From this fact, it is possible to deduce their independent origin [...]. The trouble is that the hypothetical ancestor from which they might be derived does not appear, because it does not exist: this distribution clearly supports the idea of a primitive polygenesis" (translated from Sergi, 1922, p. 42).

According to one of the mature versions of his theory of a polygenic origin of living beings, Sergi postulated the existence of

"a primordial variation, to be admitted in order to explain the natural polygenism which can be universally observed; any other explanation is impossible" (translated from Sergi, 1922, p. 43).

Each group of living beings does not derive from individuals of just one kind, but from series of different and variegated individuals which can be called "stirpi", *i.e.*, births or descents. The various individuals of a descent are not perfectly identical to each other, and this justifies the natural polygenism in their lineage. This analysis applies to all living beings, and therefore, naturally also to humans. (Sergi, 1912b, 1914b, 1916-1917, 1922). Regarding man, Sergi, in particular, wrote:

"I sustained that the origin of animal forms takes place in series or descents, that is to say it is a multiple process, because it is not rational to suppose an origin resulting from one single type of individual only. Since the components of a descent are not equal to each other, different lineages are immediately formed within it. I sustained this also for the Primates, distinguishing in Homo three families as follows:

Primates (only for Catarrine)

Descent: Cercopithecidae

Descent: Simiidae

Descent: Hominidae

Those descents are separate and distinct from each other, having their roots in a primary stock, which, of polygenic origin, probably gave rise to the three groups that I call "descents". The easiest way to formulate the concept is that three independent parallel branches have led, by means of subdivision, to Cercopithecidae, Simiidae and Hominidae" (translated from Sergi, 1922, p. 57).

Any apparent transitional form between man and monkey claimed to represent an intermediate

passage of the process of “transformation” of one descent into the other, for Sergi, simply represented a step of the evolution of man.

“I think that the absence of intermediate forms of progression is something that must be accepted. [...] Any intermediate form could be discovered between man and monkey, it is always possible to consider it as one of the pieces that make up the evolution of Homo, and not the transformation of an anthropomorphic monkey from Simiae to Homo, as was admitted in the past and now it is accepted so far. This phenomenon and this idea would be corroborated by what is known about the evolution of some animals, like horse, camel, elephant and others: they originated in ancient Tertiary through initial typical forms that elevated to full well-known types, passing through the intermediate forms without changing the basic type, but improving it: that is the true legitimate evolution. On the contrary of what was intended in error by Ernst Haeckel and other evolutionists, evolution does not transform living beings”
(translated from Sergi, 1922, p. 58).

Analogously, Sergi considered the different human races as evolving through different branches deriving from the aboriginal “stirpe” of man. In Italy’s case, in particular, he argues in favour of a settlement and development of an autonomous African race that originated in Abyssinia, which, having passed onto this side of the Mediterranean, has since expanded throughout Europe, bringing civilization with them (Sergi, 1893, 1895, 1900, 1903, 1911, 1912, 1916-1917).

In the first decades of the twentieth century, despite the fact that the general consensus given to the theory of Darwin had reached an all time low in Italy (Landucci, 2001; Volpone, 2008), Sergi continued to claim he was a Darwinian. In fact, he reconsidered Darwin’s ideas – in the words of Brunelli – “in the light of modern science” and “attempts a reconstruction”. His polygenic doctrine is nothing but an escamotage to bypass the problem regarding the lack of transitional forms in the fossils foreseen by Darwin. This, of course, was not intended to subvert the theory, but rather to

sustain it. Brunelli on this point is very clear and, in addition, emphasizes that he too is of the same opinion. In other words, the polyphyletic origin of the major taxonomical groups supported by Sergi, Brunelli and other authors of the period, in Kuhnian terms, is a real ad hoc hypothesis, which is useful when trying to preserve the validity of a scientific “paradigm”, such as the Darwinian one.

Conclusions

Giuseppe Sergi was never a (neo)Lamarckian; or better, he could be accused of showing the same presumed traces of Lamarckism which can be found in other contemporary Darwinian authors, such as Giovanni Canestrini, Enrico Morselli and so on; or, alternatively, in Darwin himself. Nor could he be said to follow, for instance, Cuvier or von Baer, simply because he sustained a polyphyletic origin of the main *taxa* of living beings, in order to avoid the problem regarding the non-existence or deficiency of transitional fossils. Sergi was simply a man of his time. Considering the serious crisis of the theory of evolution by natural selection at the turn of the Twentieth century, and taking into account his passion in sustaining it at all costs, it is almost inevitable that, in such a complicated historical context, he has come to be considered a real “champion” of Darwinism.

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Editor, Giovanni Destro Bisol

