

EVOLUCIONISMO Y CULTURA

Darwinismo en Europa e Iberoamérica

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INTRODUCCIÓN

Hace cinco años se reunía por primera vez en Cancún (México) nuestro grupo de estudio sobre darwinismo, consecuencia de aquella reunión fue el libro *El darwinismo en España e Iberoamérica* (Madrid, Doce Calles-UNAM, 1999), también editado en inglés por Kluwer. Los trabajos que ahora presentamos identifican el segundo encuentro celebrado el pasado año 2001 en Jaraíz de la Vera (Cáceres, España). Si en el primer volumen nos congratulábamos por la ampliación temática y, sobre todo, geográfica de la investigación en historia del darwinismo y del evolucionismo, es ahora motivo de satisfacción una nueva apertura territorial y de objetivos. Era evidente que la historia comparada nos llevaría a nuevos espacios de análisis ampliando nuestro horizonte, y así ha sido. El contraste de la asimilación, recreación y reinención de la teoría darwinista, y de otras teorías basadas en la evolución, necesitaba otros espacios culturales.

Esta vez hemos elegido el territorio cultural de la Europa mediterránea contando con la participación de investigadores procedentes de España, Italia, Francia y Portugal, –José Luis Peset, Antonello La Vergata, Carlos Almaça, y Goulvent Laurent, dan ejemplo–, para abordar el estudio comparado con el espacio americano en un esfuerzo común por valorar el significado de la teoría evolutiva atendiendo a la diversidad cultural del conjunto. En América tratamos los casos de Bolivia y México, en los artículos de Rosaura Ruiz, Arturo Argueta y Eduardo Corona; el de Brasil, estudiado por Regina Cándida Ellero Gualtieri y Thomas F. Glick; y el de Cuba, por Miguel Ángel Puig-Samper.

Nos alejamos de las primitivas concepciones del difusionismo, muy esquemáticas en algunos de sus principios –como el de centro-periferia–, para acercarnos más a la nueva historia cultural comparada, aunque sin caer, en general, en el relativismo extremo de algunos de sus representantes, sin olvidar la propia diversidad intelectual de los autores que participan en este libro. Circunstancia que, a nuestro juicio, enriquece el conjunto al dar una visión más completa del fenómeno evolucionista desde puntos de vista muy variados. Así encontraremos novedosas contribuciones locales, como los trabajos de Xosé Fraga, Francisco Pelayo, Raquel Álvarez, Fernando T. Pérez, J. L. Maldonado y Susana Pinar, otras más generales, como el texto de Andrés Galera, y también críticas, como el de Olga Restrepo, que nos obligará a repensar algunos de los aspectos teóricos tratados en los últimos años.

Asimismo, el nuevo libro integra contribuciones especiales. Como la relación darwinismo-psiquiatría suscrita por Eduardo Balbo; el vínculo entre darwinismo y ética que Alvaro Girón analiza en la figura de Kropotkin; la iconografía sobre el darwinismo en España presentada por Alberto Gomis y Jaume Josa; y el grupo de artículos sobre literatura y darwinismo, donde participan Marcelo Montserrat, Alción Cheroni, Armando García, y Rafael Huertas, temática que, dado su interés, tendrá atención preferente en próximas reuniones.

Por último, queremos destacar y agradecer la ayuda prestada por la Dirección de publicaciones de la Junta de Extremadura y la Universidad Nacional Autónoma de México para la publicación de este libro, sin olvidar el constante apoyo de Pedro Sánchez, responsable de Ediciones Doce Calles, siempre atento a nuestros proyectos.

Miguel Ángel Puig-Samper
Rosaura Ruiz G.
Andrés Galera
Madrid, noviembre de 2002

CREATING EVOLUTION

Andrés Galera*

This paper analyzes the relation between creationism and evolutionism present in the biological models developed by naturalists like Linnaeus, Bonnet, Buffon and Darwin, in order to interpret nature. Evolution of living beings is a consequence of interactions that individuals of a particular species undergo in an ecosystem, even though those interactions don't have any evolutionary purpose. Evolution is just a possibility that emerges from these relations, a possibility which takes form when different factors, either endogenous or exogenous to the individuals and the group, meet in the community. The result is the formation of a new group different from the predecessor. Every organism establishes a primary nutritional relationship with its environment, necessary to survive. A consequence of this phenomenon is the development of trophic sequences that force the members of any ecosystem to have, at least, an elementary knowledge of their habitat in order to receive nourishment. This cognitive stimulus arises independently of the organism's level of structural complexity; it is an automatic process, necessary to restore the organism's metabolic expenditure. Both the degree and the means to obtain that information are dependant on the sensory mechanism of the species. The new species diversify and increase their sensory and motor capacities and, therefore, their possibilities of observing Nature are enlarged. In more complex evolutionary levels this process occurs intentionally. Getting acquainted with Nature was a determinant factor in the evolution of hominids, and in this sense, anatomic changes emerging since *Homo erectus* up to the appearance of *Homo sapiens sapiens*, gave rise to new cognitive options. Ever

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since that point, reading the book of Nature marked the future of human beings, making cultural development prevalent over morphological changes. Our present evolutionary scheme answers, primarily, to this sociological pattern, and is based on the inheritance of acquired knowledge.

For millions of years there have been a dialogue with Nature, and in order to interpret its messages we have employed a religious code. Up to the XX century, the Bible was the unquestionable material and spiritual guide for generations of Christian scientists. In relation with the history of living beings, there are two significant events in the sacred texts' cosmogony: an earthly paradise and a universal flood. Some naturalists identified these events as actual facts that took part within Earth's chronological time and space. We could settle the question in a radical way, as some intellectuals like Voltaire. This philosopher rejects any theology of natural phenomena or any consideration of them as miracles, therefore as events incomprehensible for reason and only understandable by means of an act of faith which constitutes in itself –as Voltaire ironically underlines– nothing else but another miracle¹. His conclusion: Any natural knowledge of nature excludes religion. This intransigent position adopted by Voltaire contrasts with other integrating proposals such as Linnaeus' (1707-1778)². His obstinate attempts to align science and religion develop an actualistic bio-geological scheme that unifies earthly and religious history as follows: the Swedish botanist located paradise in Ceylon, or present-day Sri Lanka (*Flora zeilanica*, Holmiae, 1747), and theorized an ingenious biological sedimentary process in order to explain the rise of ocean floors related to the formation of fossils. It's known as the Sargasso weeds theory (*Systema Naturae*, 1748, 6th ed., *Oeconomia naturae*, 1750). This model attributes a stabilizing function to this kind of sea weeds; the Sargasso colonies keep the ocean calm and favor mud and suspended particles to deposit and sediment. During the process of sea floor elevation, these muddy floors would form suitable sites for fossilization and therefore for the preservation of organic rests. From the moment that paradise reaches the status of an actual geographic region, it loses any supernatural value, and materializes as a chronological and spatial unit. It actually exists and can be visited in past and present, in body and soul. Creation is not an entelechy, it has geographic coordinates and tangible animal and plant members. On the other hand, the Sargasso's theory explains an undeniable fact: if the origin of fossil rests is proved to be organic, the mere existence of that kind of rests shows up that once upon a time, the Earth was covered by oceans and therefore that present-day continents had to emerge at a certain point from the sea floor. After this (these) Flood(s) –the Universal Flood, according to the Bible– the Earth emerged as a consequence of a slow and progressive sedimentary process. In addition, this process conditioned Creation, establishing two subsequent crucial periods: organic genesis and bio-geographic distribution. Accepting the hypothesis that the Earth's orographic conformation is the result of a geological process spread in time, brings us to the logical conclusion that species' distribution had to adjust to a parallel rhythm. In this sense, Creation was not a punctual fact but a chronological process,

¹ See «Inundación» in VOLTAIRE (1985), *Diccionario filosófico*, Madrid, Akal, pp. 329-331 (the original edition was published in 1764 under the title *Dictionnaire philosophique portatif*).

² About Linnaean scientific ideology see FRÄNGSMYR, F. (ed) (1994), *Linnaeus. The man and his work*, USA, Science History Publications. A summary of this book can be consulted in GALERA, A. (1996), «El príncipe de las flores», *Asclepio*, XLVIII, fasc. 2, pp. 219-223.

a «daughter of Time», so to speak –or *temporis filia*, according to Linnaean terminology. Linnaeus secularized Creation in order to rationalize its process, and this affected species' genesis and distribution. Once the aspect of time was set apart, the creationist models had to deal with the problem of quantitative variability of species, a problem that hadn't escaped from Linnaeus' intellect. The departure from a radical fixist interpretation into a new one more coherent with the observed intraspecific variability occurred in the sixth decade of the XVIII century¹. In this way, Linnaeus states that «it cannot be doubted that new species exist as a result of hybridization» (*Disquisitio de sexu plantarum*)². Since Linnaeus was conscious of the different typological variations, transmitted through reproduction to the new generations of organisms, he had to admit that not only the physical environment, but also the species inhabiting it, were «children of Time». Creation is a chronological process also in the genic scale. At the beginning, God created just one species of each genus, and the rest appeared subsequently by means of hybridization of the pre-existing forms³. There is a restriction imposed to the number of species, dependant on the gradual development of continental orography and to the geographical limits of paradise –unable to lodge our present– day diversity. This theory implies a significant rearrangement of the fixist ideology:

- 1.- The species is substituted by the Genus as the unvarying taxonomic level.
- 2.- Species are constant in time, but quantitatively variable.

God is still the program's artificer, and Creation follows «his» rules⁴; nevertheless, Creation is no more a supernatural fact, but an actualist phenomenon resulting from the same geological and biological mechanisms taking place at present time, mechanisms that cause bio-diversity to increase progressively in time by means of reproduction. And so Linnaeus constructs a variable model for creation by means of a basic evolutionary criterion: new species arise as a result of the hybridization of the pre-existing forms. This scheme implies to accept a genealogical relationship between living beings. (Curiously, one century after Linnaeus, Darwin believed that hybridism was an obstacle for the acceptance of his theory of Evolution⁵, but finally, Mendel solved the problem).⁶

Both creationists and transformists made use of the argument of organic design in order to justify their respective ideas about the origin of species. The argument had followers even in the XX century, now under the formula of Evolution's «do it yourself». François Jacob, for instance, explains that living beings evolve by modifying their organs during millions of years, in the same way as an expert craftsman

¹ About this ideological duality see GALERA, A. (1994), «Reflexiones sobre el modelo sistemático, el concepto de especie y el mecanismo de reproducción en el Siglo XVIII», *Nouveau monde et renouveau de l'histoire naturelle*, Paris, Presses de la Sorbonne Nouvelle III, 97-130; pp. 110-114.

² LINNAEUS, C. (1760), *Disquisitio de sexu plantarum*, Petropoli, Academia Scientiarum (reproduced in VERGATA, A. La (1979), *La evoluzione biologica: da Linneo a Darwin*, Torino, Loescher, p. 109). In addition see LINNAEUS, C. (1762), *Fundamenta fructificationis*.

³ *Ibidem*.

⁴ *Ibidem*.

⁵ DARWIN, Ch. (1877), *Des effets de la fécondation croisée et de la fécondation directe dans le règne végétal*, Paris, C. Reinwald, p. 28.

⁶ GALERA, A. (2000), «Los guisantes mágicos de Darwin y Mendel», *Asclepio*, LII, fasc. 2, pp. 213-222.

builds his implements by means of adjusting, retouching and adding new elements to the original model⁹, but with the difference that in this process there is no need for any craftsman at all.¹⁰

Less benevolently, other scientists point at defects in organic design to describe biological transformation as an evolutionary botch, and consequently to refuse the figure of a Creator that, had it ever existed, would have been much more careful manufacturing objects¹¹. And more recently, Michael J. Behe considered the biochemical complexity of living beings as an argument to reassert the idea that life is the product of an intelligent design¹². Anyway, calibrating a system's degree of perfection is subjective to a great extent, and this can explain that some scientists describe nature with help from God's hand –or any other intelligent entity– while others prefer to take communion from the devil of Chance.

As early as in the XIII century, the argument of an intelligent design was used by Saint Thomas Aquinas as one of the ways to reveal the existence of God in his *Summa teologica*. As another example, William Paley stated in his *Natural Theology* one of the most popular and successful metaphors among the many versions of the argument¹³: that of the watchmaker. We can summarize it as follows: if we were in the desert and find a clock there, we would undoubtedly attribute its presence there to a watchmaker who would have designed, manufactured, assembled and adjusted the different pieces in the precise mechanism. Therefore, instead of attributing their existence to the hazardous activity of nature. It is more likely to admit that animated objects exist thanks to a constructor who, in a similar way, provided them with apt mechanisms that allow their correct function.

On the other hand, David Hume's *Dialogues concerning Natural Religion* are an obligatory reference¹⁴. Refuting organic design as a proof of the existence of God is one of the main goals of Hume's literary debate. His was a methodological proposal: any analogy between two apparently similar processes is intrinsically limited by their different characteristics, and this circumstance makes it impossible to assign the same conclusion to both of them¹⁵. We can only use the same cause-effect relationship in identical processes; for the rest we need an empirical verification. The presence of a clock only determines its first cause, but we cannot infer the existence of a universal watchmaker based on analogies with animals and plants, because we are dealing with different phenomena. He assumes a mechanistic view of all living beings, considering them as aggregates of simple parts, pieces and organs; what he

⁹ JACOB, F. (1997), *El juego de lo posible*, Barcelona, Grijalbo-Mondadori; see. chapter 2 «El bricolaje de la Evolución», p. 74 (original ed., JACOB, F. (1981), *Le jeu des possibles*, Paris, Fayard).

¹⁰ See also «François Jacob et André Langaney dialoguent sur l'histoire de la vie», *La Recherche*, 296, march, 1997.

¹¹ See GOULD, S. J. (1980), *The panda's thumb. More reflections in Natural History*, New York. FUTUYMA, D. (1982), *Science on trial*, Pantheon books; MILLER, Kenneth R. (1994), «Life's grand design», *Technology review* (feb/march).

¹² BEHE, Michael, J. (1996), *Darwin's black box*, New York, The Free Press.

¹³ PALEY, W. (1802), *Natural Theology; or evidences of the existence and attributes of the Deity, collected from the appearances of Nature*.

¹⁴ HUME, D. (1779), *Dialogues concerning natural Religion*.

¹⁵ *Ibidem*, part II, p. 48.

questions is the analogy between human devices and the different quality of organisms. He doesn't deny the existence of God; he simply refuses to accept that living beings constitute a proof of it.

Apart from philosophy, Natural History has always used anatomical design in order to establish relationships between living beings. The hierarchy thus resulting was called *Scala naturae* or the chain of beings. It is a simple and innocent idea that represents the natural order in relation with the complexity of organisms, and explains the different function and form diversity in nature by means of the concepts of progress and perfection. The knowledge of nature is based upon the observation and description of its elements, and, relating them by their structural similarity, we can build a natural scala (ladder). The result is a straight typological series with an increasing morphological complexity in which the step from minerals to plants, and from these to animals, is marked by ambiguous intermediate forms. For instance, let's take the Swiss naturalist Charles Bonnet (1720-1793); according to him, metals and minerals are formed by water, air, fire and soil. Then the chain is continued through corals and madrepores and lay across moulds and lichens towards the plant kingdom, conformed by weeds, bushes and trees. The step before animals is conformed by the zoophytes or plantanimals, represented by species like hydras, jelly fish, anemones, sponges and star fish. The sequence continues with the numerous species of insects, mollusks, fishes, birds and quadrupeds, and finally reaches *Homo sapiens*¹⁶. The result is a gradual order of nature which spreads –as Voltaire critically affirmed– from simple atoms to god¹⁷. Aristotle and Plato were the promoters of this infinite assembly of things over the space. The basic principles of Plenitude and Continuity give shape to their successful formula. Plenitude means diversity, and represents the complexity of living forms inhabiting the Earth. The platonic concept states that everything that can exist actually does exist. On the other hand, Aristotle's continuity principle establishes a connection between natural objects and comprises the overlapping of similar species, differing just in some details. He orders them one after the other in a sequence of beings with increasing vitality and capacity of movement, that is, with increasing complexity. Therefore this chain represents a teleological model towards organic perfection, which, in the terrestrial (or sublunary) sphere, culminates with humans but, moreover, it permeates the different Heavens and spheres as a cosmogonic theory whose principle and whose goal is represented by God. This is an attractive scheme, a simple and likely hypothesis that doesn't need either complex physical or chemical laws or tortuous mathematical calculus in order to be proved; on the contrary, we can catch sight of it with our eyes, and it is sufficiently versatile so as to be adapted to the different historical theories about the origin of species: fixism, transformism and evolutionism. Nevertheless, some people refused it because of its artificiality. As an example, Antonio Genovesi (1713-1769) considered this gradual order as a result of human pride. According to him, we are misguided by our unlimited lust for knowledge, and thus we are lead to a misunderstanding between the specific place attributed to

¹⁶ BONNET, Ch. (1764), *Contemplation de la nature*, Amsterdam, Marc-Michel Rey, 2 vols.

¹⁷ See «La Cadena de los seres creados», in VOLTAIRE (1985), p. 107.

each organism during creation, and a non-existent morphological order¹⁸, which in itself disputes the Creator's infallibility. Each organism is perfect by definition and therefore any attempt to fit natural objects into this graded list is only admissible as an abstraction and as an imaginary intellectual resource, but it is inadequate for a fixist system where each element was given a specific place and a particular function by God. On the other hand, this chain of beings reproduces Creation with fidelity, according to other naturalists. We have already mentioned Charles Bonnet's natural series. But his is not just a systematic formula for the description of relationships between natural objects. To the contrary, it has a conceptual value of its own. This concept transforms the chain of beings into a variable sequence with changes in time, depending on the extinction or substitution of organisms. Not only animals and plants were created –pre-formed like germs– during creation, but also their substitutes in Nature. There is a predetermined replacement of organisms that gradually takes place with each complete revolution in the Earth. A new morphology is acquired by the species, somehow in a higher level of perfection than the predecessors. The principle of Continuity of the chain is thus kept constant by the correlative movement of its members¹⁹. The dynamic process of Creation is regulated by the phenomenon of pre-formation, and this guarantees a genestic unity for all living forms, past, present and future. Typological variability is not the result of a transformation, but of substitution of organisms by other pre-existing forms in a predetermined way, and thus the stability of the whole biological system is kept unchangeable.²⁰

With a different perspective, the Count of Buffon (1707-1788) saw a transformist value in the natural scala and considered it as an adequate argument to question the idea of creation. As a biological phenomenon, this chain represents a linear anatomic pattern that allows the correlation of different species with a common ancestor. All the different races would have been produced with the same mould, either as a degenerate or improved form of the model. But there had been just one vital plan for the conception of everything in Nature²¹. This transformist interpretation is close to the XIX century evolutionism, but it lacks the necessary cognitive dimension to justify variability from a non-determinist position. In the end, Buffon renounced this avant-garde vision of living beings in favor of the revealed Truth of individual creation²². Less scrupulously, Jean Baptiste de Lamarck (1744-1829), another French naturalist, pointed out in 1809 the radical evolutionary meaning of the *scala naturae*.²³

Even Darwin was a convinced fixist until 1836, when he came back from his voyage around the world. He used to accept Paley's argument about organic design

¹⁸ GENOVESI, A. (1786), *Elementi di fisica sperimentale ad uso de' giovani principianti*, Naples, Giuseppe Bisogno, 2 vols, II, p. 106.

¹⁹ BONNET, Ch. (1796), *Palingenesis philosophique*, Geneve. See a selection of texts included in Vergata (1979), pp. 83-85.

²⁰ GALERA, A. (1994), pp. 108-110.

²¹ See «L'âne», in BUFFON (1753), *Histoire naturelle, générale et particulière*, Paris, Imp. Royale, t. IV. Also in BUFFON (1984), *Histoire naturelle*, Paris, Gallimard, pp. 191-194. See also «Des pingouins et des manchots» and «Comparaison des animaux et des végétaux».

²² BUFFO (1984), «L'âne», p.194. See also GALERA, A. (1994), pp. 126-130.

²³ LAMARCK (1809), *Philosophie zoologique*, (see 1994 edition, Paris, Flammarion, «Avertissement», p. 55).

as a proof for Creation and determinism in Nature²⁴. He admits that it was not until 1839 that he was completely convinced of the existence of variability in natural species²⁵. In a letter addressed to Joseph Hooker during the year 1844²⁶, he confesses that his acceptance of variation and of a common origin for all organisms was contrary to his previous ideology, when in 1831, he set sail on board of the Beagle. In 1844, he had finished an essay with more than 200 pages about the origin of species, whose precedent was a rough draft of about 30 pages, written two years before²⁷. This document summarizes the basic structure of his theory of evolution. As a proof of the text's ideological value, let's point out that Darwin had ordered its diffusion and publication in case he died²⁸. But he was still going to live for many years and, therefore, he had time to correct and complete his ideas, publishing them in 1859 with the title *On the Origin of Species by means of Natural Selection*. The preceding manuscripts allow us to understand the cognitive process by means of which Darwin changed his mind, replacing the idea of Creation for that of Natural Selection in order to explain the observed animal and plant diversity on our planet. This change implies a new natural order. But darwinism doesn't deny the existence of God, it just modifies the history of the Earth. With the acceptance of evolution, Creation is just a process limited to the appearance of matter and of the laws governing it, and God's plan is not any more to generate all living beings²⁹. Now, the form of each organism is not a product of God's hand, but of probability and constant laws governing nature³⁰. The breach between Darwinism and Creationism is not as radical as it could seem if we just look at the final result. There are some contact points between both ideologies, and the Creator is an acceptable figure in the darwinian theory. The question is what role does God play in evolution? Darwin answers it with the help of the metaphor of «artificial selection», used by him as an empirical model developed in his theory in order to justify species variability. The origin of organisms is translated to the creation of some living form(s) with matter that would have been given a basic capability of sensitivity, of growth and of reproduction³¹. Ever since then, God acts in the same way as farmers do: combining and selecting the best individuals by means of reproduction³². But God makes this work indirectly, using a general mechanism derived from the material laws governing Nature. As a consequence, this divine bio-genesis is not a punctual and arbitrary

²⁴ See DARWIN, F. (ed) (1958), *The autobiography of Charles Darwin and selected letters*, Dover, New York, pp. 63, 66, 175, 184. Darwin had read Paley's works during his period at Cambridge, and he accepted his ideas, see p. 19.

²⁵ *Ibidem*, p. 175.

²⁶ January 11th, 1844. *Ibidem*, p. 184.

²⁷ *Ibidem* p. 43.

²⁸ See letter from Darwin to his Wife; July 5th, 1844. *Ibidem*, p. 180-1. His son Francis published both manuscripts in 1909, under the title *The Foundations of the Origin of Species*.

²⁹ See the 1842 and 1844 manuscripts quoted in DARWIN, Ch. (1979). *Introduzione all'evoluzionismo*, Roma, Newton Compton, pp. 98-99, 211, 273 (*On the origin of species by Means of Natural Selection*, London, John Murray, 1859, 1st ed. pp. 488-9).

³⁰ *Ibidem*. See also DARWIN, Ch. (1875), *Variation of Animals and Plants under domestication*, London, John Murray, 2nd. ed., vol. II, pp. 427-8.

³¹ See the 1842/1844 manuscripts, *ibidem*, pp. 69 and 273 (*On the origin of species*, 1st. ed. p. 490).

³² *Ibidem*, pp. 52-3 and 128-129.

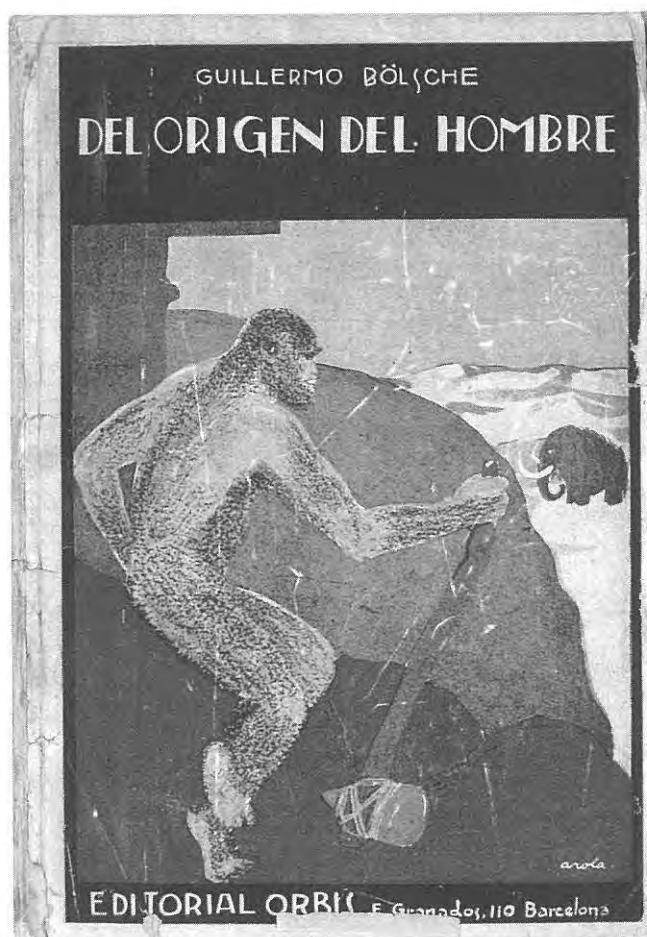
fact, but a progressive process spread in time, free from external interferences. On the other hand, the darwinian transformist model restricts and limits the actual variability because of the morphological perfection pattern it follows³³. Malthus' demographic ideas provide the key to this methodological problem³⁴. Struggle for life acts as a filter which causes the survival of the fittest and makes possible the extinction and substitution of a species for another. Natural selection plays the role of the «long hand of God» that rocks Nature's cradle, transforming it as a general law that determines every particular relation in Nature without his direct intervention. There are two basic rules in this combinatory game: reproduction as a source of variability, and the individual's survival, as a mechanism for population control. Both rules lead to the proliferation of living beings while the planet rotates and changes its orography—as Darwin suggests—by means of the alternating movements of soil and water on the Earth's surface³⁵. Therefore Creationism and Darwinism are not opposite theories. They differ in the same way as the theories of predestination and freedom do³⁶, and they complement each other in a degree that depends on the amount of freedom given by god to the fate of the Universe. The bigger that freedom, the bigger their compatibility.

³³ *Ibidem*, pp. 69 and 171.

³⁴ *Ibidem*, pp. 53-54 and 130.

³⁵ *Ibidem*, pp. 69 and 273, (*On the Origin of species*, 1st. ed. pp. 489-90).

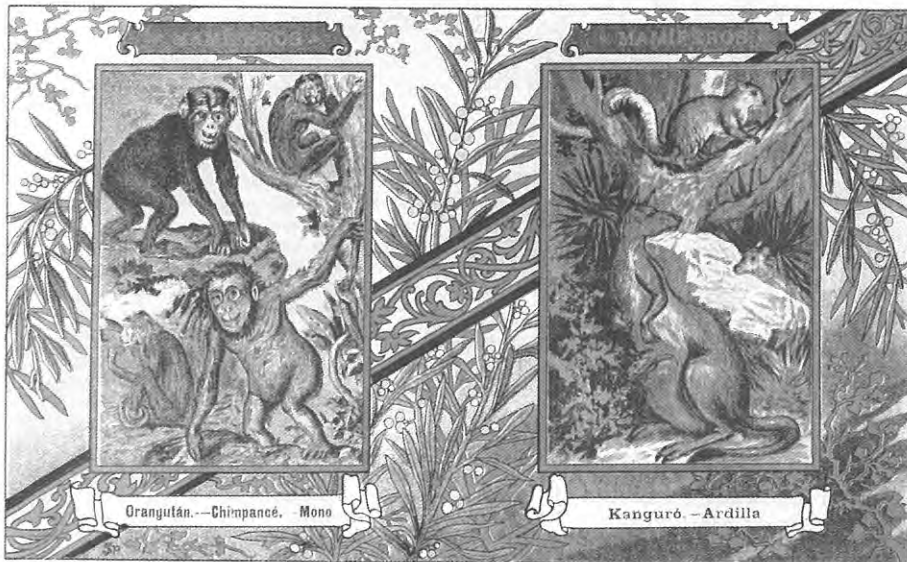
³⁶ DARWIN, Ch. (1875), II, pp. 427-8.



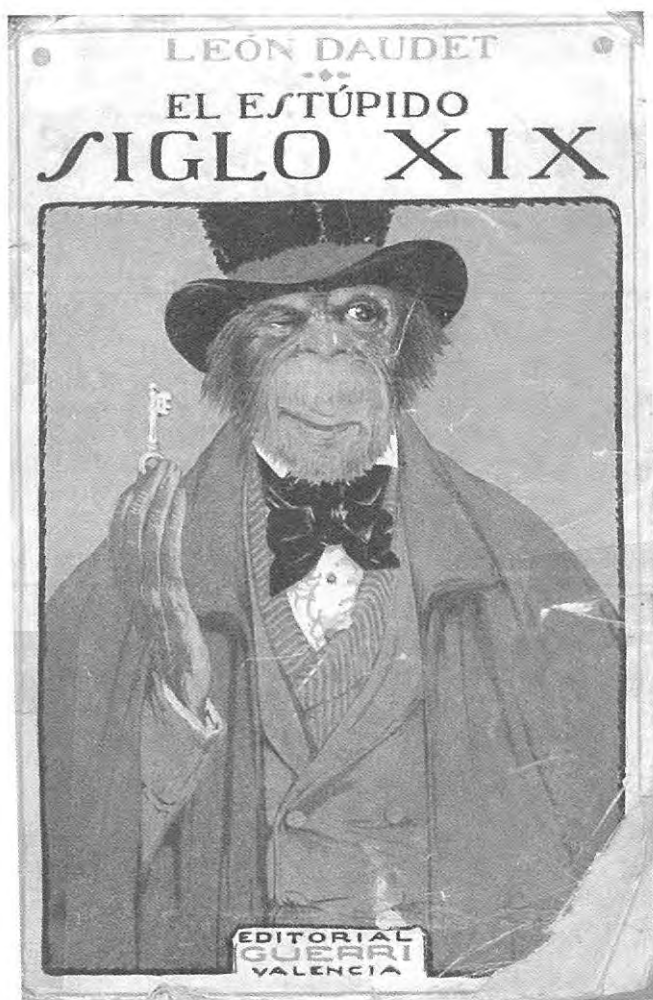
Del Origen del Hombre, por Guillermo Bölsche. Barcelona, 1928.



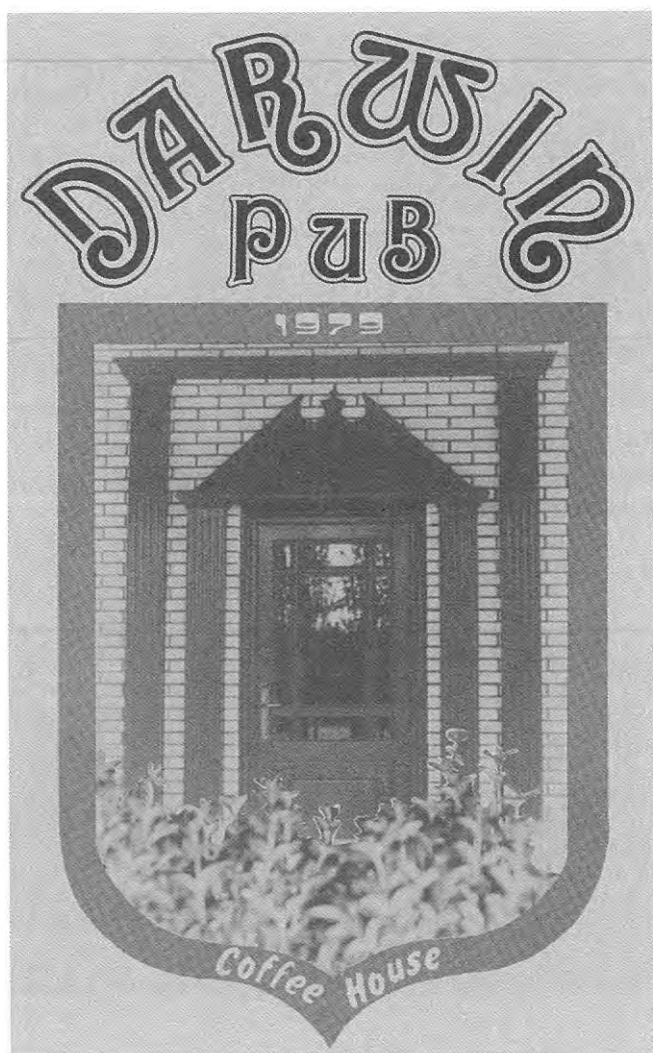
Exposición callejera (sic) de animales sabios (*La Carcajada*, 1, nº 24 [24 julio 1872]).



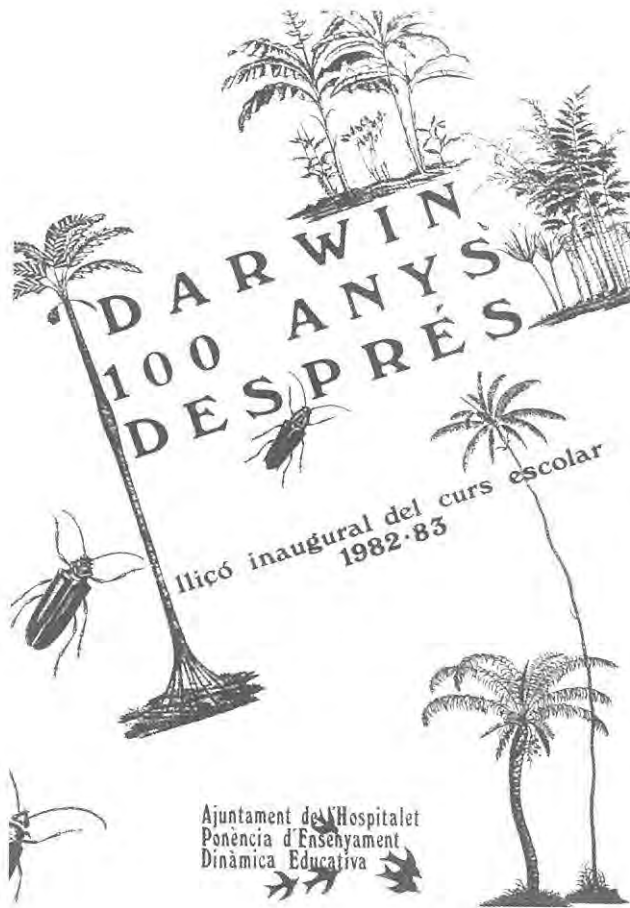
Album Zoológico para instrucción de los niños, por D. Ramón Pomés. Barcelona 1900.



León Dauder. *El estúpido siglo XIX* (1926).



Darwin Pub. Fundado en 1979.



Darwin 100 anys després (llicó inaugural del curs escolar 1982-83 por Jaume Josa). Ajuntament de Hospitalet, 1982.