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İÇİNDEKİLER

AL-JAHIZ AND THE RISE OF BIOLOGICAL EVOLUTION

by Dr. Mehmet BAYRAKDAR

Although al-Naẓẓām made the first steps in the field of biological evolutionary thought, in the history of science, the theory of biological evolution was presented for the first time in its complete form by a great early zoologist, al-Jaāhiẓ, in the ninth century; withim the theory as such was originated. Al-Jāḥiẓ's theory is an example of scientific revolution and innovation that has had reverberations into the farthest reaches of human thought. It is fair to say that many problems of the philocophy of Nature appeared in a new light after the revolution of al-Jāḥiẓ and his successors. Before decribing al-Jāḥiẓ's own views and his influence upon Muslim and European thinkers, especially upon Lamarck and Darwin, I want to give some biographical and bibliographical accounts.

A - Biographical and Bibliographical Notes:

Al-Jāḥiẓ's complete name is Abū ʿUthmān Amr bin Baḥr al-Fuḳaymī al-Baṣrī. He owes his sobriquet (al-Jāḥiẓ = the goggle-eyed) to a malformation of his eyes. He was born at Baṣra about 776. Little is known of his childhood, except that from an early age, an invincible desire for learning and a remarkably inquisitive mind urged him towards a life of independence and, much to his family's despair, idleness. Mixing with groups which gathered at different mosques to learn, attending as a spectator the philological enquiries conducted on the Mirbad and following lectures by the most learned men and scholars of his time on philology, lexiography and poetry, namely al-Asmaʿī, Abū ʿUbayda, Abū Zayd, he soon acquired real mastery of the Arabic language along with the usual and traditional culture[1].

And later his precious intelligence won him admittance to Muʿtazilī circles and bourgeois salons, where conversation, often light, was

1 Pellat (Ch.), "Al-Djahiz", in *EI.*, vol. II, p. 385.

also animated by philosophical, theological, scientific problems. His penetrating observation of the various elements in a mixed population increased his knowledge of human nature, whilst reading books of all kinds which were beginning to circulate in Baṣra gave him some outlook onto the outside world.

His early literary activity won him the compliments of al-Ma'mūn and thereby that consecration by the capital covetted by so many provincials eager to have their talent recognized and so reach the court and establish themselves. From then on, without completely abandoning Baṣra, al-Jāḥiẓ frequently stayed for long periods in Baghdād and later in Sāmarrā, devoting himself to literary and scientific works. For sometime he was the teacher of al-Mutawahkil's children. Although information about his private and public life is not readily forthcoming from either his biographer or himself, it appears from what knowledge we have that al-Jāḥiẓ held no official post and took on no regular employment. He admits, however, that he received considerable sums for the dedications of his books and we know that for a time at least, he was made an allowance by the diwan. In Baghdād, later on, he found a rich store of learning which enabled him to broaden his outlook and perfect his own philosophical and theological doctrine, which he had begun to elaborate under the supervision of the great mu tazalis of the day, of whom al-Naẓẓām and Thumānā b. Ashras, who seems to have had a strong influence on him, should be placed in the first rank.

Towards the end of his life, suffering from hemiplegia, he retired to his hometown, where he died in 869 (255)[2].

As in politics, so in theology al-Jāḥiẓ was a mu'tazilī. He was also a famous Muslim prose writer. His place in the development of Muslim thought is far from negligible. He was the founder of a sect named after him, al-Jāḥiẓiyya[3]. He was a genius in the science of zoology. And he knew how to obtain ammonia and salmiac from animal offals by dry distillation[4].

Being a polyhistor and man of letters, al-Jāḥiẓ had a very great output like many Muslim writers. A catalogue of his works lists nearly 200 titles of which only about a third have been preserved in their en-

2 Ibn 'Asakir, *MMIA*, IX, pp. 203–217.

3 *Khatib Bagdhadi*, XII, pp. 212–222.

4 Sarton (G.), *Introduction to the History of Science*, vol. I, Washington, 1927, p. 597.

tirety; about fifty others have been partially preserved, whilst the rest seem irremediably lost[5].

His most important book is *The Book of Animals (Kitāb al-Ḥayawān)*[6]. Jāḥiẓ's method was empirical and scientific, not only discursive, as Sarton believes[7]. That is why Asin Palacios says, "Como el mismo lo insinua en el prologo (I, 6), puso a contribucion para redactarlo los libros de los filosofos, los relatos y noticias de viajeros, marinos, etc. Y la observacion o experiencia directa."[8] The scientific value of this book is great; and it is, as Asin Palacios says, a real contribution to the history of science, namely to zoology.

The main source of al-Jāḥiẓ's *Book of Animals* is the book on zoology of his precursors and contemporary, ʿAbd al-Malik bin Qurayb al-Asmaʿī (739–831[9]. As far as I know, this book is the first zoological book in the history of Islamic thought. The *Kitāb al-Ḥayawān* was the object of many studies, and had great influence upon later Muslim scientists, and via them upon European thinkers as well. And it became the source for later books on zoology. Al-Jāḥiẓ's many sentences are quoted by Ikhwān al-Ṣafāʾ and Ibn Miskawayh, and many passages are quoted by Zakariyyāʾ al-Qazwīnī (1203–1282) in his *ʿAjāʾib al-Makhlūqāt*, and by Mustawfī al-Qazwīnī (1281–?) in yis *Nuzhat al-Qulūb;* and al-Damīrī in his *Ḥayāt al-Ḥayawān*[10].

5 Pellat (Ch.), "Gahiziana", in *Arabica*, 1956/2; cf. Brockelmann (C.), GAL, s. I, 241ff.

6 *The Book of Animals* was published in 7 volumes, in Cairo, 1323–1324.

7 Sarton says: "His most important work is *The Book of Animals*, a very discursive compilation, the purpose of which is theological and folkloric, rather than scientific...'," Sarton, *op. cit.*, p. 597. Sarton's judgement is not true; indeed, many of the knowledges given in the book are the result of his personal observation and his experiences, as al-Jahiz himself says in several chapters.

8 Asin Palacios (M.), "El 'Libro de los Animales' de Jahiz", in *ISIS*, vol. 14, 1930, p. 21.

9 Some parts of his book are published by R. Geyer in Wien, in 1887; and by A. Haffner in Wien, in 1895–1896; the book on the creation of man is still unpublished.

10 It is very interesting to notice that a summary of al-Damiri's and other Muslim scitists' books was translated into Latin by Abraham Echellensis (d. Italy 1664) and was pubüished under the title "De Proprietatibus et Virtutibus Medicis Animalium" in Paris, in 1617; So, that is to say, sometime before the appearance of Darwin's precursors, such as F. Redi (1626–1698), C. Linnaeus (1707–1778), Buffon (1707–1788), Lamarck (1744–1829), The idea of evolution of Muslims was penatrated in West. And this explains why the first evolutionists came from France. See Mieli (A.), *La Science Arabe et Son Role dans l'Evolution Scientifique Mondiale*, Leiden, Brill, 1938, pp. 263–264, n. 3; and extracts have been translated into French by A.J. Silvestre de Sacy, *Oppianos II*, Strasbourg, 1787; see Sarton (G.), Vol. III, Part II, p. 1641.

B - Al-Jāḥiẓ's View on Biological Evolution:

After a long study of animals, Al-Jāḥiẓ was the first to put forward his view of biological evolution in his *Book of Animals*, which contains the germs of many later evolutionary theories (animal embryology, evolution, adaptation, animal psychology and sociology)[11].

First of all, al-Jāḥiẓ's attempts were made in a truly scientific spirit to classify animals in a linear series, beginning with the simplest and continuing to the most complex; and at the same time, he arranged them into groups having marked similarities; and these groups were divided into sub-groups to trace the ultimate unit in the species[12].

An early exponent of the zoological and anthropological sciences, al-Jāḥiẓ discovered and recognized the effect of environmental factors on animal life; and he also obsrved the transformation of animal species under different factors. And in many remarable passages of his book, he also described for us the struggle of existences for survival, its aim and mechanisms and value in a scientific way, as well as in a folkloric way.

As to know the mechanisms of evolution, al-Jāḥiẓ described three mechanisms. These are Struggle for Existence, Transformation fo species into each other, and Environmental Factors.

Let us now see the mechanisms, as briefly as possible.

Struggle for Existence: al-Jāḥiẓ placed the greatest weight on evolution by the struggle for existence, or, in a larger sense, by natural selection. It operates in conjunction with the innate desire for conservation and permanence of the ego. Accoring to al-Jāḥiẓ, between every individual existence, there is a natural war for life. The existence are in struggle with each other. Al-Jāḥiẓ's theory of struggle for existence may accordingly be defined as a differential death rate between two variant class of existence, the lesser death rate characterizing the better adapted and stronger class. And for al-Jāḥiẓ, the struggle for existence is a divine law; God makes food for some bodies out of some other bodies' death. He says, "The rat goes out for collecting his food, and it searches and *j*seizes them. It eats some other inferior animals, like small animals and small birds. .. it hides its babies in disguised

11 Pella (Ch.), "Al-Djahiz", *op. cit.*, p. 386; cf. Sarton, *op. cit.*, p. 597.

12 Al-Jahiz, *Kitab al-Hayawan*, Vol. I, Cairo, 1909, p. 13, and see also different chapters of the volumes.

underground tunnels for protecting them and himself against the attack of the snakes and of the birds. Snakes like eating rats very much. As fot the snakes, they defend themselves from the danger of the beavers and hyenas; which are more powerful than themselves. The hyena can frighten the fox, and the latter frightens all the animals which are inferior to it .... This is the law that some existences are the food for others. .. All small animals eat smaller ones; and all big animals cannot eat bigger ones. Men with each other are like animals. .. God makes cause of some bodies life from some bodies' death and vice versa..."[13].

And according to al-Jāḥiẓ, the struggle does not exist only between the members of different species, but also between the members of the same species[14].

From what al-Jāḥiẓ has said, we can make an assertion that God has created Nature in a prodigal reproductive character and He has also established a law, which is the biological struggle for existence in order to keep it within a limited ratio. Otherwise, the disorder could appear in Nature and it could lose some of its riches and species. We can see the germs of Darwin's and neodarwinians' theory of Natural Selection in this remarkable passage which we have mentioned above.

Transformation of Species: Al-Jāḥiẓ, as later Lamarck and Darwin, for example, believes that the transformation of species andmutation is possible. The transformation operates in conjunction with the effect of environmental factors. And he asserted that the original forms branched out into new forms of species by gradually developing new characteristics which helped them to survive environmental conditions.

He says, "People said different things about the existence of al-miskh (= original form of quadrupeds)[15]. Some accepted its evolution and said that it gave existence to dog, wolf, fox and their similars. The members of this family came from this form (al-miskh)."[16]

And, he adds that God's will and power is the main causal factor in the transformation, and God can transform any species into another

13 *Idem.*, Vol. VI, pp. 133–134; and there are many passages in different volumes illustrating the struggle for existence. See VI, 139; VII, 47, 80.

14 *Idem.*, vol. VII, pp. 47–48.

15 According to some opinions, this original form of animal was lost because of earthquakes and floods. See al-Jahiz, *op. cit.*, vol. IV, p. 24; cf. vol. VII, p. 77.

16 *Idem.*, vol. IV, p. 23.

at any time He wants. So al-Jāḥiẓ defends the transformation of species and mutation, due to different factors, including God's will[17], as we have said above. Here al-Jāḥiẓ got some of his material from the sayings of different learned men.

As for the effect of environmental factors on species, al-Jāḥiẓ believes that the food, climate, shelter and other factors have some biological and psychological effects on species. And for him, these factors also lead the species to a hard struggle for survival. In a changed environment, there is also a change in some characters having survival value. The process of changing characters in succeeding generations makes the organisms better adapted to their environment. They thus survive and get a chance to breed and transmit their characteristics to their offspring. So, al-Jāḥiẓ based his theory upon the notion of the use and disuse of organs in the adaptation of animals to their environment.

Al-Jāḥiẓ says, "Without doubt, we have seen that some nabatheen navigators resembled the ape in some geographical environment, likely we have also seen some people from Morocco and have found them as like as al-maskh[18], except for a little difference. .. And it is possible that the polluted air and water, and dust made this change in the character of these Moroccans. .. If this effect goes on more and more in them, those changes in their bristles, ears, colours, and form (similar to the ape) increase more..."[19]

Such are the main mechanisms of al-Jāḥiẓ's biological evolution. Now, I will speak about al-Jāḥiẓ's great influence upon Muslim and European scientists. Al-Jāḥiẓ's zoology and theory of biological evolution have profoundly affected the development of zoology and biology. As we have said before, al-Jāḥiẓ's biological evolution had some direct influences upon Ikhwān al-Ṣafā', and other illustrious philosophers, such as Ibn Miskawayh, al-Birūnī, Ibn Tufayl, with whom al-Jāḥiẓ's theory acquired a new sense, in that they made of it two new doctrines: a cosmological one, because it was applied to the phenomena of the whole universe; and a sociological one, because it was applied to social phenomena. Moreover, Ibn Miskawayh and Ibn Khaldūn explain the

17 *Idem.*, vol. IV, pp. 24–25; cif. vol. VI, pp. 24–26.

18 I think al-Maskh is a kind of ape; see Vol. IV, p. 24. And do not confuse al-Maskh with al-Miskh.

19 *Idem.*, Vol. IV, p. 24; and cf. vol. IV, pp. 25–27.

true meaning of Prophecy and prove it by such a theory. Thus, Jāḥiẓ's pure biological evolution became the source of different doctrines in later Islamic thought, such as sociological, metaphysical and cosmological evolutionisms.

On the other hand, al-Jāḥiẓ's theory has been repeated by Muslim zoologists and naturalists, especially by al -Zakariyyā' al-Qazwīnī, in his *'Ajā'ib al-Makhlūqāt*, Mustawfī al-Qazwīnī in his *Nuzhat al-Qulūb*, and al-Damīrī in his *Ḥayāt al-Ḥayawān*, without mentioing other literary persons, such as al-Masūdī and Ibn Qutayba.

As for the influence of al-Jāḥiẓ on European thinkers, it has become the subject of two main studies: "Der Darwinismus im X und XIX Jahrhundert" of Fr. Dieterici (Leipzig, 1878) and "Darwinistisches bei Gahiz" of E. Wiedemann (sitzungsbericht der physikalisch-medizinischen Sozietaet in Erlangen, 47, 1915). Previous to me, they found a great similarity between al-Jāḥiẓ and Darwin. Indeed, Darwin and his precursors took up the theory of al-Jāḥiẓ as the base for the essentiality of their evolutionary theories, and they formulated it in a more scientific way in the context of eighteenth and nineteenth centuries development of science. Maybe the only main difference between al-Jāḥiẓ's theory is theologic and more transcendental in this sense that he accepts that the first cause of evolution in living organisms is God and that the other factors are secondary; while Lamarck, Darwin and others' evolution is more immanent and materialistic. Although the mechanistic explanations of the theories are more or less the same, Darwin and other modern scientists differ from al-Jāḥiẓ and other Muslim writers in ideological interpretation of the theory.

This is a very brief difference that we can mention here.

How has Jāḥiẓ's idea been transmitted to the Europeans? Al-Jāḥiẓ and other evolutionist Muslim thinkers influenced Darwin and his predessors in several ways. Before the flourishing of C. Linnaeus (1707–1778), Buffon (1707–1788), E. Darwin (1731–1802), J.B. Lamarck (1744–1829), and Ch. Darwin (1809–1882), and long before the rise of the school of Natural Philosophy in Germany, al-Jāḥiẓ and others were known to Europeans through the translation of their own works and studies on them by Europeans. For example, al-Damīrī's book *Ḥayāt al-Ḥayawān* was partially translated into Latin by a Jew, called Abraham Echellensis (d. Italy 1664) and published in Paris in 1617. This book contains many passages taken from al-Jāḥiẓ's *Kitāb al-Ḥayawān*.

Al-Nuwayrī's *Nihāya* was studied by D'Herbelot (1625–1695) in his *Bibliotheca Orientalis*, and later by J. Heyman (?–1737). Ibn Tufayl's *Ḥay Ibn Yaqẓān*, which contains the philosophy of evolution, was first published by Edward Pocockes, Sr. (1604–1690), together with a Latin translation published by Edward Pocockese, Jr. (1648–1727) in Oxford in 1671 (second edition, Oxford, 1700)[20]. Zakariyyā' al-Qazwīnī's cosmography, *ʿAjā'ib al-Makhlūqāt* was published by F. Wustenfeld in 2 volumes in Gottingen in 1884–49; and *Kitāb Talkhīṣ al-Athār* of Bākuwī, a summary of al-Qazwīnī's book was translated into French and published by De Guignes in Paris, in 1789[21]. In fact, his book also contains many ideas from al-Jāḥiẓ. And A.L. de Chezy translated al-Qazwīnī's *ʿAjā'ib*, and his translation was published in 1806 (first publication) by S. de Sacy, in his *Chrestomathie Arabe*. There is no doubt that the great evolutionist sufi, Mawlānā, had already influenced Goethe who is called "a Darwinian before Darwin"[22]; his theory of metamorphosis has profoundly affected the development of biology. In any case, Islamic zoology penetrated the West as early as the seventeenth century[23]. Some Europeans knew Arabic and they could read directly from the Muslim scientists' books; for example, Darwin himself initiated into Islamic culture in Cambridge under a jewish orientalist called Samuel Lee[24]. From what we have said it is clear that Muslim influence upon Europeans was far from negligible. Some further comparative study can be undertaken in this subject, in order to bring to light the influence of Muslim evolutionist thinkers upon the Europeans and the transmission of their ideas to the West.

Al-Jāḥiẓ's theory of evolution was something very new in the history of science, and there was nothing written previous to it. Although Greek philosophers like Empedocles and Aristotle spoke of the change in Nature, in plants and animals, they never made the first steps on the field of the future theory of evolution of the Muslims. Their concept of change was only a concept of simple change and motion, nothing

20 See Sarton (G.), *op. cit.*, vol. II, Part 2, pp. 354–355.

21 Mieli (A.), *op. cit.*, p. 152.

22 Cassirer (E.), *The Problem of Knowledge*, translated by W.H. Woglom and Ch. W. Hendel, Yale University Press, New Haven, 1950, p. 137.

23 Sarton (G), *op. cit.*, vol. III part 2, p. 1641.

24 See Darwin (Sir F.), The Life and Letters of Charles Darwin, vol. I, London, 1887, p. 289. Samuel Lee (1783–1852), of Queen's, was professor of Arabic and Hebrew. In 1821, he issued a "Sylloge Librorum Orientalium". In 1829, he translated "The Travel of Ibn Battuta", see The Dictionary of National Biography, vol. XI, London, 1917, pp. 819–820.

more than that. And by the concept of change, they never designed explicitly or implicitly a concept of evolution: "The World of Nature is thus for Aristotle, a world of self-moving thing, as it is for the Ionians and for Plato... Nature as such is process, growth, change. This process is a development, i.e., the changing takes successive forms, a,b,y, ... in which each is the potentiality of its successor, but it is not what we call 'evolution', because for Aristotle, the kinds of change and of structure exhibited in the world of nature from an eternal repertory, and the items in the repertory are related logically, not temporally, among themselves[25]".

25 Collingwood (R.C.), The Idea of Nature, Oxford, 1945, p. 82.