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THE EXISTENCE OF PURPOSE AND END IN ARISTOTELIAN BIOLOGY

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As we know Aristotle's scientific speculation covers a wide field. He was a competent mathematician, astrologist, physicist and chemist. But in history of science he was the first systematic biologist. For this reason he established a big zoological garden in Greece which was a great collection of animals and plants in those times. And for the systematic study of biological nature he scattered nearly one thousand people in Greece and Asia to collect different samples of animals and plants according to their region. For Greeks, and Aristotle in particular, there was not a clear distinction between scientific and philosophical discussion. So it is an important point to discuss the relation of his scientific work with his philosophical ideas and the philosophical ideas are generated through observations. Thus his achievements were indebted of observation rather than only to experiments. It is notable that Aristotle's biological discoveries make a great impact on his philosophical ideas, the things which are taken out from his biological works in the doctrine of teleology and the concept of material cause in composition of different parts of animal body. According to the doctrine of teleology the structure and the functions of nature and the natural objects are to be explained in terms of the purpose which they serve. For Aristotle purpose and end is inherent and immanent in all natural processes and present in arts and nature. All the natural objects mainly living organisms have their specific structure and specific functions. Systematic and scientific knowledge of the function of

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a living organism is completed by the knowledge of its soul's different parts, *i.e.* nutritive, sensitive and intellective. All the organisms having different parts of soul as their specific function are divided into higher and lower classes, *e.g.* the plants share the nutritive part while the animals with plants share the nutritive and one more, *i.e.* sensitive part in virtue of which they are superior to the plants. The man shares the vegetative parts with plants, the sensitive with animals and alone has the intellective part and only through this part he is superior to the other classes.[1] In this paper I intended to examine the existence of purpose and end in the structure and function of all living organisms. Our discussion of purpose and end will be divided into two parts: (*i*) the existence of end or purpose in arts and nature and (*ii*) purposiveness, end and intelligent agency.

I. THE EXISTENCE OF PURPOSE AND END IN ARTS AND NATURE

As we see in the fourfold scheme of causality the material cause or matter of thing, formal cause or the shape of thing, efficient cause or the mover for the completion of this shape, final cause or end, Aristotle regards the last one to be the most important one.[2] He generally defines it "that for the sake of which something comes out or the change takes place." The same final cause is defined as an end or the completion of a thing in nature and in arts for which the process of change is accruing, *e.g.* the artisan's movement for the completion or to end the statute. According to Aristotle the things come into being through two ways, by nature, *e.g.* animals and plants[3] and by arts, *e.g.* house of ship, but the end or purpose is apparent in both, in works of arts and in works of nature. In the same way the purpose or end in the things of arts is known through two ways as works and as tools. As in his *Physics*, he states that:

(*i*) Through works cause as the end is for the sake of something, *e.g.* as health might be what a walk is for. On account of what does he walk? The answer is to keep fit and we think that in saying that we have given the cause.

(*ii*) Through tools cause as the end means anything which, the change being effected by something else comes to be on the way to the end as slimness, purging drugs from the body and the surgical instruments come to be as mean to the health.

Thus, the two ways to explain the end or purpose in arts are different from each other.[4] All these examples from arts show the end which appears because of an agent when the agent acts upon a certain thing to get a certain end. Except these examples which he gives in the case of arts to define the final cause as an end "for the sake of which" Aristotle finds his models in nature, especially in generation of animals. The examples, which he gives from the generation of animals and the organic body, remove the doubts that his doctrine was developed in connection with the popular terminology of the arts. Because he observed that natural organic body is a well-organized body. Even if we take the simplest organisms such as plants we see that they have a well-organized system of organs that functions in a systematic way, *e.g.* the different parts of the plants exist to fulfil different purposes; the leaves serve to shelter the pericarp, the pericarp to shelter the fruit, while the roots of the plants are analogous to the mouth of animals that serves for the absorption of the food.[5] If we take his biological writings we find that the final cause or the end plays the most important part. In *De partibus animalium*, he holds the view that in generation of the animal body the agent cause and the material plan and the function of the body play a decisive part. In these writings it is clearly seen that the lapse of time is not very important for the final cause or end. Here he is only interested in observing the structures and the functions of animal bodies rather than concerning with the process of a certain and coming into sight and its gradual materializing. Like a modern scientist he tries to discover the way in which certain materials are the components of more highly organized structures. To prove this let's see the way in which he uses the term end or final cause. In *De partibus animalium*, he calls the organs of animals the matter of animal body. All these organs are built up with matter having different stages. That suggests that in

the growth of animals there is no stage at which the matter is separated from the teleological movement.[6] The first stage of animal matter is elementary composition, the second stage is composition of the homogeneous parts of animals such as blood, brain, sperm, bile, milk, flesh, these parts are soft and moist. And the third stage is the composition of heterogeneous parts such as face, hand and foot.[7] According to Aristotle the relation between the orders of the parts of animals is necessary and it is determined by a final cause.[8] Here Aristotle tries to show the relation of the two orders, the order of actual development and the order of logical existence. Both the orders are inverse of each other. It is like that which is posterior in the order of actual development is antecedent in the order of nature and which is genetically last that is first in nature.

The logical form of order follows through the method of induction, for instance, a house does not exist for the sake of bricks and stones but the material exists for the sake of the house, the same example will be applicable in the case of materials of other bodies. The animal does not exist for the sake of part but the parts exist for the sake of animal body. There is no need to use such kind of inductive method in the case of generation. It is evident from the conception of generation according to which the two causes are interrelated the final and the material, but the final cause is the first that is some definite form or similar to form, *e.g.* man generates man, plant generates plant out of underlying material in each case. The material and the generative process must be anterior to the generated being in the order of time, but in logical order the definitive character and form of generated being precedes the material.[9] This is evident if some one tries to define the process of formation. For the definition of house building includes and presupposes that of the house, but the definition of the house does not include nor presuppose that of house building. And the same is true for all other productions.[10] The elementary material must necessarily be existing for the sake of homogeneous parts. Because they are genetically posterior to it like the heterogeneous parts are genetically posterior to the homogeneous parts. For these heterogeneous parts have reached the end and goal having the

third degree of composition. In this degree generation or development often attains its final term.[11]

It is evident that the homogeneous parts of animal body exist for the sake of heterogeneous parts, while the heterogeneous parts exist for the sake of active functions and operations of the body such as the eye, the nostril, the whole arm.[12] Through these causes, material and final remarkably he succeeded in explaining the function and structure of animal body. As we observed that in every instance of the arts and the animal bodies he tries to show that one exists for the sake of the other and proves an explicit teleology in the works of nature, therefore, the whole nature and the generation is for one end. The existence of this end one can observe in the structure and function of the parts of body. If we were to consider the eyelid, we would see that it has come into being not at random but to aid the eyes, to give them rest and toward off things that are falling into them. Therefore, that for the sake of which something has come into being is the same as that for which it ought to have come into being.[13]

In the same way all the parts of animal body, especially the bones, the skin, the sinews and the blood vessels, the hair and various kinds of nails exist for the sake of flesh, further the bones are a contrivance to give security to the soft parts to which purpose they are adopted by their hardness.[14] And in those animals that have no bones the same purpose is fulfilled by some analogous substance, *e.g.* fish spine. In some fishes nature uses different types of bones, adjoining bones, single bones and some are without bones according to their needs. It is comprehensive in the example of insect where there is no distinction into soft and hard parts, but its whole body is hard. However, the hardness is such a character as to more flesh like than bone and more earthy and bony than flesh. Here the purpose of this hardness is to make the body of insect less liable to get broken into pieces.[15] Vessels exist for the sake of blood because every fluid requires a receptacle.[16] The liver and spleen is for the sake of digestion of the food, while the kidneys, on the other hand, take part in the separation of the excretion which flows into the bladder.[17] From our discussion, we find that by presenting such kind of examples

from the structure and the function of the parts of animal body, Aristotle proves that the purpose and end can be clearly seen in the works of nature, especially in the constitution of organic bodies. He shows that a certain end must necessarily exist for the sake of which they exist, *e.g.* the eye of an animal is live body; its sight or the power of seeing is its certain end or purpose for which it functions. An eye which is not functioning is an eye by name like the eye of a statute or of a painted figure. The same example is extended to the whole parts of the living body that they function for the sake of life. The life functions in animated beings such as sleeping. Waking, nourishing, thinking correspond to the power of seeing in an eye which is the essence and real form of this living organism.18 Simultaneously the parts of the body presuppose the existence of material cause which is for their sake. This proves the fact that matter and teleology cannot be separated in Aristotelian biology.

II. PURPOSIVENESS, END AND INTELLIGENT AGENCY

It is evident from our discussion above that the matter and form and the teleological movement are interrelated. The animated beings have the principle of change in themselves. Their motion is according to their nature. According to Aristotle the animated beings act teleologically and purposefully due to different stages of consciousness, *i.e.* the nutritive sensitive and intellective powers of their souls. The end or purpose implies intelligence, implies a mind to see and desire it the appearance of ends in nature in a proof of design in operation of nature.[19] Aristotle observes that, like the arts, the works in nature starts by reason or intelligent agency. As far as the arts are concerned the intelligent agency can more obviously seen, *e.g.* the physician or builder sets about their work before starting. He starts by forming for himself a definite picture and the picture has two sides; the one is perceptible to mind and the other is to senses. Having this picture the physician of the health or the builder of the house proceeds towards his ends. The physician of course has the object of desire the health and it is only perceptible through mind. While the object of the desire of the builder of a house can

perceptible through senses. Here the difference is clear in the way of perception, the only fact that necessitates them to hold the design of their end is the reason and explanation of each subsequent step that every one takes and of their acting in this or that way as the case may be.[20] Thus, we observe that for Aristotle the intelligent agency in the case of builder and the physician proceeds towards an end.

Generally in observation and according to Aristotle the actions in nature and in arts are similar to one another and imply an end or purpose towards which they are directed. For example we state that if a house were one of the things which come to be due to nature, it would come to be just as it now does by the agency of art, and if things which are due to nature come to be not only due to nature but also due to art, they would come to be just as they are by nature.

Thus, the art imitates the nature and tries to present the things that nature cannot complete.[21] It completes the imperfections of nature. But in his *De partibus animalium* he holds that in the work of nature the good end and the final cause is still more dominant than in the works of art.[22] Because nature makes everything for the sake of something.[23] And the finality corresponding to the intelligent actions that Aristotle proves, is more obviously seen in the natural objects, especially in the lower stage animals than the human beings who have the ability of deliberating or inquiring in its higher stage than the animals. Aristotle provides very beautiful example from biology that shows the natural objects of lower stage without having the ability of reason like human beings set for an end. And their end is apparent from their actions. For example, when the spiders, ants and animals like them make homes for their protection lead the human beings to the question that if they have mind that directs them towards an end. Further if we take little more lower stage objects than the animals such as plants we will find that in the same way the plants are conduce towards an end. For instance, in plants the leaves exist for the protection of the fruit.

It is evident that all these beings are acting upon due to their nature towards a specific end or function. The concept stated

above explains the existence of purpose and end in natural objects. The examples that Aristotle gives and analyses exist everywhere in nature. The swallow acts to make its nest is both due to its nature and for the purpose to live. The spider makes a web around it to protect itself. The plants that have leaves on them are producing them for the sake of fruit and their roots are not going up but down for the nourishment.[24] That is necessary for the protection of their life. The Aristotelian term "Nature" is multiply used by Aristotle and it is difficult to determine only one sense of the term "nature".[25] Generally "nature" is defined in two ways; nature as matter and nature as form and the term "nature" as form is an end. The specific formal element of the agent is identified by the end or form. For example, man is generated by a man, here the father is an agent and the moving cause, that except the moving principle, possesses a certain kind of form of child. The specific formal element given by nature art by chance and by spontaneity never goes against the principle that like comes from like. For this reason Aristotle holds in *De partibus animalium* that the matter is the means to an end and a cause in the sense of form. And the form or end much more constitutes the nature of animals than their matter.[26] Sometimes the unconscious teleology of nature is produced by chance and from natural spontaneity.[27] For example, when the mistake happens in the course of nature as in the case of arts, *e.g.* a man who possesses the art of writing writes incorrectly. In the same way in natural process such miscarriages happen, for instance, when man headed calves come into existence due to defective seed.[28] In other words, we can say that the matter fails in taking a certain form or end. Here the form is the purpose or end. So when the form does not fulfil the certain end or limit it is called the frustrated attempt in the attainment of end.[29]

In the end of our discussion, we conclude that Aristotle very successfully conjoins the formal and the final elements in the natural objects and proves the existence of purpose and end in his biological illustrations. And the teleological movement never ends in the process of generation of the natural objects.

REFERENCES

1 *Metaphysics*, 1043, 6-15.

2 *De Partibus Animalium*, 639 b, 14-15. Aristotle states, "plainly however that cause is first which we call the final one. For the reason, and the reason forms the starting point alike in works of arts and in works of nature."

3 *Selected Fragments*. Proire, 11.

4 *Physics*, 194 b, 32-195a, 3. Cf. *Metaphysics*, 1013a, 32-101 3b3.

5 *De Anima*, 412, 2gb5.

6 D. M. Balm, Aristotle's *De Partibus Animalium* (with passages from 11.3) tr. with notes. Oxford, 1972. *De generation et corruption*, p. 95.

7 *De Partibus Animalium*, 646a, 18-24.

8 *Ibid*, 646b, 27.

9 *Ibid*, 646a, 25-35.

10 *Ibid*, 646b, 1-5.

11 *Ibid*, 646b, 8-10.

12 *Ibid*, 646b, 11-15.

13 *Selected Fragments*, Proire 11, p. 44.

14 *De Partibus Animalium*, 653b, 30-35.

15 *Ibid*, 654a, 27-30.

16 *Ibid*, 667b, 17-20.

17 *Ibid*, 670a, 20-20.

18 *De Anima*, 412a, 20-413 b34.

19 Wolfgans, Kullmann, "Different concepts of final cause in Aristotle," p. 170, states that, "for Aristotle the previous stages as prior are indispensable requirements for the realization of an end, this end being a sufficient reason for the preliminary stages."

20 *De Partibus Animalium*, I-I 639b, 16-20.

21 *Physics*, 199a, 8-12. Cf. W. D. Ross, *Commentary of Physics*, p. 357.

22 *De Partibus Animalium*, 639b, 20-21.

23 *Ibid*, 641b 11.

24 *Physics*, 199a, 23-30.

25 *Metaphysics*, 1014b, 16-1015a1.

26 *De Partibus Animalium*, 642a, 16.

27 *Metaphysics*, 1069a, 35-63, Cf. Bonitz Index Aristotelicus, pp. 335-339.

28 *Physics*, 199b, 4-13.

29 H. Cherniss, *Aristotle's Criticism on Presocratic Philosophy*. Octagon Books, New York, 1971, p. 253.