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ON PALEY, *EPAGOGÉ*, TECHNICAL MIND AND A *FORTIORI* ARGUMENTATION

Introduction

It is our intention to re-investigate only a few of the innumerable epistemological problems concerning Paley's argumentation for the existence of God¹. Nowadays this argumentation is commonly considered as invalid. Modern philosophers believe that the Humean *Dialogs on Natural Religion* and the Darwinian theory of evolution

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¹ William Paley (1743-1805), anglican bishop. The most influential contribution to biological thought was his book *Natural Theology: or, Evidences of the Existence and Attributes of the Deity, Collected from the Appearances of Nature*, first published in 1802. Rodney (1974) wrote: "Paley's ... works were used at Cambridge for nearly half a century after his death." See also Hall (1969/232).

We have been working with the electronic text of Paley's book prepared in 1998 by the University of Michigan Humanities Text Initiative from the Twelfth Edition, J. Faulder, London, 1809. We refer to this edition as "[mNT page number]". We have also consulted a later edition of Paley's book, published in Edinburgh by W. & R. Chambers, 1849. This edition contains the additions and notes "executed by Mr Thomas Smibert, Licentiate of the Royal College of Surgeons, Edinburgh". We refer to this edition as "[sNT page number]".

deprived Paley's reasoning of any cognitive validity². This judgment seems to us unjustified. We shall try to demonstrate that the very meaning and the logical structure of Paley's argumentation are continuously misunderstood, and that critics have attacked rather a false image of Paley's cognitive pathway. Furthermore we will show that Paley actually argues for the existence of a *single agent* producing biological organs. Indeed Paley demonstrates, that a biological organ is a kind of objective whole³, and by necessity one produced by a single agent. However, Paley's form of argumentation is not sufficient to indicate whether this agent might be identified with a divine Creator, or Aristotelian "soul" building and commanding biological organs, or the recently discovered, described and deciphered deoxynucleotide polymer (DNA, molecular genome) present in the reproductive biological cell.

Demonstration of existence and demonstration of benevolence. We believe that it is necessary to distinguish two "parts" of Paley's argumentation. We want to decouple his argument for the existence of a transcendental "Watchmaker" (or the "Project argumentation" – mainly Chapter 1 – State of the argument) from his argument for the existence of a benevolent deity (Chapter 26 – The goodness of the Deity). We are aware of the fact that the failure of either of them reduces the plausibility of a living Absolute and Creator. However, we will concentrate on the analysis of the first argument alone.

² Cfr Blackburn (1994), item "Paley" and "Project"; Bogen J. (1995), item "Teleological explanation", Sprague (1967) and Vienne (1992).

Some ignore him completely as for instance: Boni (1981); Klaus & Buhr (1976); Krings *et al.* (1973); Schlüter D. (1974); Sordi (1977); Schmidt & Schischkoff (1961); Testore C. (1952); Urmson (1975); Volpi & Nida-Rümelin (1988). That seems strange, as Paley's teleological argument not only was universally accepted for almost a century but "*developments in the study of organic design, though not reestablishing the argument from the design of the watch to the existence of a watchmaker have revived an interest in Paley's laborious insistence upon the relation of form to function*" (Emmet 1968, see also Raven 1968).

Some reference texts concentrate on Paley's ethical and moral doctrine, completely ignoring his natural theology. See: Niedzielski (1913); Calogero (1935); Ziegenfuss & (1950); Denonn (1964); Cardin (1967); Brugger (1981); Kessler (1998).

Among critics some point out the instances of evil, death, pain, so as to reject the concept of the benevolent deity. Other critics extrapolate Paley's actual premises beyond the limits of rationality, e.g. from a watch to the astronomical cosmos. A third group of critics (Dawkins, 1986; Bogen, 1995) does not reject Paley's reasoning, but claim that chaotic, nonselective dynamics sufficiently explains the origin of biological organs.

³ "Recent [...] concept suggests a 'modular' framework, treating subsystems of complex molecular networks as functional units that perform identifiable tasks – perhaps even able to be characterized in familiar engineering terms". (Lauffenburger, 2000/5031; cf. also Hartwell *et al.*, 1999/C47-C48; Whitesides, 2001).

The project of a watch and the project of Cosmos. The “project argument” can be divided into two parts. The first part of it claims that every watch has its watchmaker. The other part claims – supposedly because of analogy or inductive reasoning – that every biological being and even the whole cosmos has its Watchmaker (transcendent, divine, creative ... etc.). In our entire analysis we will try to examine and identify the cognitive mechanism of the first part of the argument only. Is the observation of a watch a credible, reliable and reasonable way to conclude that a single agent has produced it? Is it reasonable to claim that the agent was necessarily capable of apprehending the properties of the mineral matter, freely manipulate this matter, and was endowed with the kind of skill that is sufficient to impose on the matter the arbitrary form he invented?

There is a practically unanimous and widespread opinion that Paley's argumentation for the existence of a divine “Watchmaker” is based on analogy and on Baconian or Humean induction. Even professional philosophers take this for granted.

Induction – extrapolation or epagogé. Arguments based upon Baconian or Humean induction or upon analogy are clearly defective and so are their conclusions. We consider this judgment as obvious and non-controversial. However we will argue that Paley's main argumentation for the existence of God is based on a *specific* method of interpretation of some *specific* data. This method is neither based on analogy or on an incomplete, enumerative induction understood as a kind of extrapolation⁴. It is rather a typical instance (and illustration) of the Aristotelian *epagogé* on the one hand and an *a fortiori* reasoning on the other. Later we shall turn back to the problem of inductive demonstration, but let us first consider the problem of analogy, supposedly fundamental in Paley's “project argument.”

Is Paley's argument based upon analogy?

Let us compare the allegedly analogical form of Paley's argumentation with the cognitive process manifest throughout Paley's writing. An analogy-based argument has three possible forms – cosmological, biolo-

⁴ Extrapolate = (*Statistics*) to estimate the value of a variable outside its observed range; to infer an unknown from something that is known; conjecture (The Random House College Dictionary, 1973).

gical and “organic”. The most general form of the argument involves the concept of Cosmos (mainly the astronomical Cosmos):

- (a) From the existence of a watch we can argue for the existence of a watchmaker,
- (b) Cosmos is similar (analogous) to a watch
- (c) So, from the existence of Cosmos we can argue for the existence of someone who is similar (analogous) to a “watchmaker”.

The cosmological type of argumentation is explicitly rejected by Paley because (1) our knowledge of the astronomical bodies is too superficial, (2) astronomical bodies lack a sufficient degree of complexity, (3) most of them seem to lack any true, correlated parts.

“My opinion of astronomy has always been, that it is *not* the best medium through which to prove the agency of an intelligent Creator; /.../ We are destitute of the means of examining the constitution of the heavenly bodies. We see nothing but bright points, luminous circles, or the phases of spheres reflecting the light which falls upon them. Now, we deduce design from relation, aptitude, and correspondence of *parts*. Some degree, therefore, of *complexity* is necessary to render a subject fit for this species of argument. But the heavenly bodies do not, except perhaps in the instance of Saturn’s ring, present themselves to our observation as compounded of parts at all.” [mNT 378].

“And what we say of their forms, is true of their motions. Their motions are carried on without any sensible intermediate apparatus; whereby we are cut off from one principal ground of argumentation and analogy. We have nothing wherewith to compare them; no invention, no discovery, no operation or resource of art, which, in this respect, resembles them.” [mNT 379].

“Even those things which are made to imitate and represent them, such as orreries, planetaria, celestial globes, &c. bear no affinity to them, in the cause and principle by which their motions are actuated. I can assign for this difference a reason of utility, viz. a reason why, though the action of terrestrial bodies upon each other is, in almost all cases, through the intervention of solid or fluid substances, yet central attraction does not operate in this manner. It was necessary that the intervals between the planetary orbs should be devoid of any inert matter either fluid or solid, because such an intervening substance would, by its resistance, destroy those very motions, which attraction is employed to preserve. This may be a final cause of the difference; *but still the difference destroys the analogy.*” [mNT 380, italicized by PL&JK].

The rejection of the “cosmological” version of Paley’s argumentation is of the utmost importance. Those who try to prove Paley was wrong, quite often reiterate this version of the argument. Those who defend Paley’s demonstration often forget that he himself rejected it.

For instance Smibert (1849) quotes an anonymous antipaleyan, who wrote in the Quarterly Review: “The leading argument of Paley involves a *petitio principii* /.../ he takes for granted that which he should prove. The atheist affirms that in the series of events which we observe in nature, there is neither design nor contrivance /.../ It is self-evident that there cannot be contrivance without a contriver; design without a designer. But the question at issue between the atheist and the theist is this – Is there contrivance, is there design?” [sNT 18].

The way Smibert answers this criticism shows he completely misunderstood Paley's method of argumentation. "Throughout the two first chapters [...] Paley never alludes to the phenomena of the universe [...]. The subject with which he there deals is the *watch* [...] to prove from its structure and mechanism the existence in it of design and contrivance [...]. He then devotes his whole work to the purpose of proving that design is apparent in the system of the universe, in a far greater degree than it is exhibited in the watch or any work of art: consequently, that a great Designing Intelligence exists." [sNT 18].

Now it seems evident that Paley neither "devoted his whole work to the purpose of proving that design is apparent in the system of the universe", nor would he ever claim that a design of a greater degree than that in the watch is manifest in the system of the universe.

The next possible but also inaccurate scheme of Paley's argumentation from analogy is restricted to biological entities alone:

- (a) From the existence of a watch we can argue for the existence of a watchmaker,
- (b) Biological entities are similar (analogous) to a watch,
- (c) So, from the existence of a biological entity we can argue for the existence of someone who is similar (analogous) to a watchmaker.

Paley admitted that *any* part of an animal or vegetable may serve as a hint to discover a "contriving mind". However, he explicitly preferred to reject the above scheme of argumentation as imperfect and too general.

"It is not that every part of an animal or vegetable has not proceeded from a contriving mind; or that every part is not constructed with a view to its proper end and purpose, according to the laws belonging to and governing the substance or the action made use of in that part; or that each part is not so constructed as to effectuate its purpose whilst it operates according to these laws; but it is because these laws themselves are not in all cases equally understood; or, what amounts to nearly the same thing, are not equally exemplified in more simple processes and more simple machines, that we lay down the distinction here proposed between the mechanical parts and other parts of animals and vegetables." [mNT 78].

In his argumentation Paley is evidently restricting the sphere of phenomena that he makes use of. His argument for the existence of God is not rooted in the idea of a "mystery", "holy ignorance" or "darkness", but on an almost perfect knowledge of *some animal organs*. His reasoning is not based on "gaps", a lack of information, but on perfect knowledge. The rudimentary state of contemporary chemistry restrained him to use it as the empirical basis for his argumentation.

He carefully distinguishes between the anatomy of muscles, joints, bones and tendons on the one hand, and the inner, unknown mechanism which underlies the contraction of the muscles on the other.

"... the disposition of the muscles for the use and application of the power, is mechanical, and is as intelligible as the adjustment of the wires and strings by which

a puppet is moved /.../ the nervous influence, by which the belly or middle of the muscle is swelled, is not mechanical. *The utility of the effect we perceive; the means, or the preparation of means, by which it is produced, we do not.*" [mNT 78, italicized by PL&JK].

The above distinction concerns the limits of our orientation in the intricate "contrivances" of a biological entity. Paley apparently believed that one can perfectly understand one aspect of the biological complexity without understanding some other aspects of it.

Paley also recognizes a clear distinction between the *description* of a phenomenon and the *understanding* of the laws or principles governing it. For instance, he enthusiastically describes some of the marvelous capacities of "gastric juice, or the liquor which digests the food in the stomachs of animals". "In a few hours it reduces to uniform pulp" /.../ "the flesh /.../ of animals /.../ the seeds and fruits, the roots, and stalks, and leaves" [mNT 83]. Paley is aware of the fact that the gastric juice being "stronger in its operation than a caustic alkali or mineral acid" is nevertheless inoffensive to the delicate tissues of the digestive system. All these phenomena seem amazing, but, as he writes:

"/.../ we are ignorant of the composition of this fluid, and of the mode of its action; by which is meant we are not capable, as we are in the mechanical part of our frame, of collating it with the operations of art." [mNT 84].

Paley's thinking is much different from the view of those who in the artificial synthesis of urea by Wohler saw an argument in favor of their monist, purely materialist view of the world. He was aware of the fact that a biological entity produces chemical compounds in a much more perfect way than a chemist in his laboratory. Therefore no artificial production of biological material would distract his mind from seeing the unsurpassed and obvious perfection of purely natural, biological dynamism.

"This I call the imperfection of our chemistry; for should the time ever arrive, which is not perhaps to be despaired of, when we can compound ingredients so as to form a solvent which will act in the manner in which the gastric juice acts, we may be able to ascertain the chemical principles upon which its efficacy depends. /.../ In the meantime, ought that which is in truth the defect of our chemistry, to hinder us from acquiescing in the inference, which a production of nature, by its place, its properties, its action, its surprising efficacy, its invaluable use, authorises us to draw in respect of a creative design?" [mNT 85].

The less perfect and the more perfect knowledge of principles. Paley, in other words, distinguishes between an argument based upon a perfect knowledge of principles (for instance, the mechanics of the muscles, bones, tendons and joints, of a vertebrate body) and the imperfect knowledge of principles (e.g. the activity of gastric juices). Although he

considers the latter as quite sufficient to recognize a “creative design”, he prefers to concentrate on those phenomena which are better understood (as for instance the optical system of the eye). We believe that Paley’s original thinking might justify the following version of the analogy-base argument:

- (a) From the existence of a watch we can argue for the existence of a watchmaker,
- (b) Some biological organs are similar (analogous) to a watch,
- (c) So, from the existence of some biological organs we can argue for the existence of someone who is similar (analogous) to a watchmaker.

However even this scheme does not give justice to the way Paley demonstrates the rational reliability of his way of reaching the cognition of the Divine Watchmaker. His method is based on a specific type of “induction”.

Is Paley’s argument based upon “induction”?

“Induction” – an ambiguous term. “Inductio” (Latin) means the “act of guiding in”, “tempting someone to enter in”, or “to see in”. *Aristotelian induction* means a process of transition from the more evident, but superficial sphere of being (phenomenal, accidental) towards a less visible, but more essential (substantial) sphere of it.⁵ In modern philosophy the meaning of the term “induction” has changed considerably. Nowadays “induction” is meant to indicate a process of generalization, a step from singular instances towards more general denotation. To put this change of meaning more clearly, let us use a simple parable.

Suppose we have observed a number of footprints in the snow. Aristotelian induction means *an attempt to discover the kind of being producing such prints*, while modern induction means an attempt to decide *whether the link between the prints and snow holds only in this particular case or whether it might be generalized beyond it*.

The modern logic of “induction” is almost exclusively conceived within the framework of a syllogistic pattern of reasoning. Premises and conclusions are the basic conceptual units, which shape its meaning. This in turn makes the concept of reasoning intrinsically dependent on linguistic structures – phrases, propositions, and their purely formal relations. Consequently the modern term “induction” symbolizes a weak and even deceptive form of cognitive procedure.

⁵ Cf. Dębowski (1984).

In the case of *Baconian induction* the frequency of a link observed between two relatively different traits of an entity is considered as a hint to recognize their more stable connection. The actual (causal?) reasons for this link have to be investigated by other, more reliable cognitive methods.

In the case of *Humean induction* the frequent link observed between two relatively different traits of an entity is believed to be a *psychological* or *metaphysical* hint mimicking their quasi-fundamental connection. "Psychological" – because of either inborn or acquired but rather unwarranted tendency to extrapolate the past experiences into future. "Metaphysical" – because of an arbitrary belief that the future is to be the same as the past (cf. Cohen, 1995).

Paley explicitly denies that his demonstration is founded on enumerative induction (either Baconian or Humean in type). His denial should not be ignored or arbitrarily disregarded.

".../ what I wish /.../ to observe is, that if other parts of nature were inaccessible to our inquiries, or even if other parts of nature presented nothing to our examination but disorder and confusion, the validity of this example would remain the same. If there were but one watch in the world, it would not be less certain that it had a maker. If we had never in our lives seen any but one single kind of hydraulic machine, yet, if of that one kind we understood the mechanism and use, we should be as perfectly assured that it proceeded from the hand, and thought, and skill of a workman, as if we visited a museum of the arts, and saw collected there twenty different kinds of machines for drawing water, or a thousand different kinds for other purposes. Of this point each machine is a proof, independently of all the rest." [mNT 53].

It is important to note, that in the quoted passage Paley does not defend the validity of the argument for the existence of God, but rather the validity of the demonstration that a single watch was necessarily produced by the combined activity of mind, hand and skills of a watch-maker. The demonstration is somehow founded on the "understanding of the mechanism and use". It evidently requires the unity of: (a) an observation (the primary act of cognition), (b) a manipulation and (c) a skill. It also indicates the intrinsic *unity* of the producer (agent). How then is one to understand the method Paley uses to validate his demonstration?

Communication, indication, demonstration

"*Verbal communication attempt*". In our opinion the text of Paley's book should be carefully analyzed in order to trace several irreducibly different stages of cognitive and communicative effort. This effort is performed on the one hand by Paley himself, and on the other by the reader. The graphic form of the text just provokes the reader to activate his memory. Single words *indicate* – because of an arbitrary linguistic

convention (the English language) – and *summon up* from the reader's totally personal archive some specific and past cognitive experiences. We shall call this stage a “verbal communication attempt”, because success here depends both on the precision of the words used to provoke memory, and the content of the archive itself.⁶ During the “verbal communication attempt” the author of the text pronounces the words he himself (supposedly) understands⁷, but there is no assurance that the reader does know their meaning. Take for instance the following phrase: “*the balance and escape mechanism control the rate of the flow of movement from the spring to the hands*”. The reader has to know the technical meaning of the words used in the above phrase. If this stage fails, one should not despair but try another process, which we shall call a “verbal demonstration attempt”.

“*Verbal demonstration attempt*”. This procedure consists of a kind of guidance (with the help of the most common words and their most common meaning) to turn the attention of the reader on to the right element of his past, memorized experience. This stage – if successful – results in the creation of a more precise linguistic tool between the author of the text and the reader. The meaning of some words becomes more constrained and ambiguities in their meaning are reduced. Some new verbal indicators may be introduced, so that the language becomes “more communicative”.

The cognitive and manipulative experience. It is evident that the success of the verbal demonstration and indication, described above, depends on the content of the memorized experience of the reader. It happens that the reader simply lacks the necessary experience of the nature of the entities indicated by the author's text. For instance an engineer has a perfect cognitive experience (knowledge) of the way mechanical energy can be converted into electrical energy, or vice versa. He can therefore construct an engine utilizing mechanical energy as a “fuel” and produce the desired electric potential. He can also construct an engine, which utilizes electric potential to produce mechanical energy. This knowledge cannot be gained by looking at a series of graphic symbols on paper. A “technical mind” is a necessary condition for the understanding of some texts.

⁶ We take it for granted the Paley's text is meaningful and that the author tries to communicate us something really important and objectively sound. This assumption cannot be, at the moment, verified.

⁷ The word “understanding” is ambiguous. It may indicate the knowledge of the arbitrary link between the linguistic symbol and its meaning, or a more profound knowledge of an extramental entity.

Technical mind. What is a “technical mind”? It is a mind, that knows the properties of materials (both static forms of structures and dynamic forms of energy), has a capacity to handle them and to impose on them the desired form. The development of a “technical mind” is different in different people. Some just know how to handle food in order to consume it. Others do not. They would die from hunger without a cook or a restaurant. Some people have enough experience to carry objects. Only a relatively few people have enough technical experience to construct a mousetrap or, perhaps, to understand how it works⁸.

Paley's demonstration of the necessity that a watch was produced by a single agent requires just such a “technical mind” that perfectly understands how a watch is constructed and how it works. Without this knowledge one cannot grasp the meaning of his demonstration. In our opinion the ease with which many philosophers, critics and defenders of Paley's text have applied it to the dynamism of the whole astronomical Cosmos may indicate a lack of a sufficiently developed “technical mind”. Paley's text, therefore, must remain to them a kind of mystery or a kind of false reasoning.

The actual cognitive processes indicated by Paley's treatise

The outline of Paley's cognitive procedure is displayed in the first chapter of his *Natural Theology*. The chapter consists of a sequence of sentences. However, in our opinion, the sequential order of these phrases does not reflect the sequential order of the cognitive processes that are necessary to see the evident truth of final conclusions. On the contrary, this order runs against the natural and necessary sequence of cognitive acts that lead to the discovery of the divine Agent.

The cognitive maturity of the audience. Why is this so? The reason seems to be as follows. Paley wrote his book for adult, literate people, who as a rule have a rich knowledge and experience of cognition and the recognition of common facts and dynamism. The “experience” means that this audience does not need to be treated as newborn babies, but can almost subconsciously understand the intellectual short cuts and

⁸ “The same laws of thought rule the philosopher's reasoning and the peasant's, but the latter's conclusion will only be fairly certain when its matter comes within his usual cognizance. A man can reason well about familiar matter; but, unless he has explicitly examined the illative process, he will hesitate and err when dealing with new subject-matter. /.../ we reason with unequal facility on different subjects.” (Rahilly, 1911).

verbal indicators of meaning without the necessity to reiterate all the primary cognitive acts. The process of communicating an argument to such an audience utilizes many general statements, and general concepts. Their meaning only rarely has to be made explicit, or analyzed, or traced back to their original source (sense evidence, *conversio ad phantasmata*).

The epistemological background of our analysis. Our interpretation of human cognitive capacities is this: Man has just one cognitive faculty. This faculty belongs to the immanently integrated and immanently active domain of man's substance. The process of cognition starts with cognition of the epiphenomenal, superficial appearances of external material beings (even our own body parts are known in the same way)⁹. This stage of cognition is achieved with the aid of the bodily organs called *senses*, or *sense organs*. Human substance produces the sense organs during man's embryogenesis.

Orientation in the epiphenomena is not a copy of the original, objective traits of the external entities, but a superficial though perfectly *cognitive contact* with these entities. This cognitive contact is the result of the immanent activity of man's intellectual faculty operating with the instrumental aid of the sense organs. The epiphenomenal character of our concepts is a natural consequence of this. Our concepts, formed by the intellectual insight into the material assembled through the aid of sense organs, reflected upon and abstracted by the same intellectual agency cannot have any causal potential. Intellectual agency is a cognitive, not a causal agency. The "material" (*qualia*) provided with the aid of the sense organs is also deprived of any physical causal capacity.

"*Conversio ad phantasmata*" (we would prefer "*ad epiphenomena*") is an ambiguous term. It can indicate a repetition of a previous, direct observation of a physical entity (I can go back to a gallery, to have another look at a painting). Usually, however, it refers to a recollection, from memory, of a "phantasm", i.e. a remembered epiphenomenal orientation in a once observed entity (I am trying to recall – in my imagination – the details of this painting).

⁹ In our opinion the term *epiphenomenon* only secondarily refers to the mental content of our consciousness. Primarily the *qualities* of material bodies like color, shape, sound, taste and smell (*qualia*) constitute – in our opinion – the most "actualized", but the most superficial and causally inactive sphere of these bodies (Lenartowicz, 1986/73-4; Lenartowicz & Koszteyn, 2000/164-5).

Technical knowledge – an essential condition of understanding. Paley, therefore, starts with a general (and cognitively secondary) scheme of concepts and only later tries to confirm these concepts by certain allusions to concrete illustrations, which might help to recall the evident, objective source of these concepts.

“/.../ when we come to inspect the watch, /.../ we perceive – what we could not discover in the stone – that its several parts are framed and put together for a purpose, e.g., that they are so formed and adjusted as to produce motion, and that motion so regulated as to point out the hour of the day.” [mNT 2]

The above statement, which might pretend to be the very beginning of his argumentation, is in fact a kind of conclusion or summary. It utilizes words such as “*framed*”, “*put together for a purpose*”, “*adjusted*”. Their meaning should not be considered as the original starting point of a cognitive process¹⁰. However, the linguistic structures, phrases and words Paley utilizes must not be mistaken for premises in the sense of a *ratiocinium*¹¹.

Why then does Paley make his conclusive statement at the very beginning of his discussion? We think he does this because many people capable of reading his treatise know well what a watch is, and do understand how it works. Such an audience immediately realizes that it was made for a purpose. In other words Paley presupposes a clear, *technical kind of knowledge* on this matter. However, he is aware of the possible misunderstanding, therefore later he tries to be more explicit:

“/.../ we perceive /.../ that if the different parts had been differently shaped from what they are, or placed after any other manner or in any other order than that in which they are placed, either no motion at all would have been carried on in the machine, or none which would have answered the use that is now served by it.” [mNT 2]

The above statement is not directed at professional watchmakers. It is aimed at a less technical audience, who may not be aware of the many physical, selective, skillful determinations which were absolutely

¹⁰ In the “premises” of a “ratiocinatio” the stress is put on the *link* between the meaning of the words. In Paley’s discourse the main strength of argumentation is hidden in the *meaning* of the words. A ratiocinatio is conclusive because of its form, the meaning of the words is irrelevant. We believe there are two main forms of concepts, *analytic concepts* and *synthetic concepts*. The former refer to the orientation in the more or less abstract traits (white, square, hard, heavy, homogenous ... etc.). The latter refer to *substantial beings* and consist in a kind of subconsciously formed data base, tied together in unity (dog, man, atom, water molecule ... etc.).

¹¹ “Ratiocinium est illa mentis operatio, per quam, instituta duarum idearum comparatione cum eadem tertia, illarum inter se identitatem vel diversitatem cognoscit.” (Frick, 1925/63).

necessary to make the “contrivance” work in a stable, reliable and precise manner.¹²

The “multilayer” structure of material beings. We have to describe how our mind gradually discovers the distinct entitative layers of a watch, or a stone.

- a) *Ens in actu*, e.g. a perfect, functional copy of the watch (be it H4), or a simple stone; the set of parts and properties of these objects.
- b) *Ens in fieri*, e.g. the set of those many different modifications which have changed the crude and chaotically distributed mineral matter into different types of purified material (bronze, steel, glass ... etc.), that have carved this material into different parts of a selected shape and dimension, and finally that have assembled them into a functional unit. In the case of a simple stone the *ens in fieri* would mean the geological history of this piece of rock. The distinction between the *ens in actu* and the *ens in fieri* is *mental, cum fundamento in re*. The actual shape and properties of the watch and the stone depend on the series of physical modifications, which of necessity had to happen in order to produce the *ens in actu*. The concept of the *ens in fieri* ignores the causal element of these modifications, concentrating on their results. For instance the concept of the melting of an ice cube (a dynamic concept) may ignore the process of heating, which physically caused the melting.
- c) *Ens in causis proximis, secundariis*. The series of physical modifications has been caused by a series of external influences, which have changed the properties of the *ens*. E.g. the actual shape of the stone was determined by certain thermal, chemical, mechanical influences. These influences constitute the *causis proximis* of the present shape of the stone. Similarly, the material, shapes, dimensions and spatial arrangement of the parts in a functional watch were determined by the heterogeneous manipulations of the watchmaker. These acts of cutting, melting, welding, assembling constitute the *causae immediatae, proximae* of the final, functional structure of the watch. The distinction between the *ens in fieri* and the *ens in causis proximis* is also *mental, cum fundamento in re*. It is impossible and unreasonable to separate the physical influence of a hammer from the physical effect in the hammered material. However, it would be equally unreasonable to claim that there is no objective difference between the hammer and its energy on the one hand, and the material together with its property of malleability on the other.
- d) *Ens in causa prima, ultima*. This concept refers to a specific case in which some different *causae immediatae* are evidently subordinated to a single agent. E.g. the Paleolithic painting of a bison in the Altamira cave was produced as a result of a complex set of manipulations. Here we can mention the illumination of the cave, the production of the scaffolding to reach the cave ceiling, the preparation of different pigments and colours and the many skillful movements of the brush. In the case of a simple stone the number of “*causae immediatae*” is also high, but there seems to be no objective unity, no objective correlation between them. They constitute a random set, lacking the perfect unity of the watchmaker.

¹² Paley knew the story of John Harrison and his famous watches (cf. mNT 28-29). In the winter of 1761/62, during a 62-day sea journey from London to Jamaica in the West Indies, Harrison's watch H4 lost just 5.1 seconds! (cf. Betts, 2001 and Sobel, 1996/120). This amounts to a navigational error of less than two nautical miles (about 3.7 km).

In the case of a true (Aristotelian) living substance, the destruction of the *in actu* layers (mutilation, disease), does not paralyze the more profound, inner trend for the regeneration of the damaged organs. All the four entitative “layers” constitute a single, integrative entity and their mutual dynamic relations are therefore immanent. Only the raw material and raw fuel is selectively absorbed from the outside.

In the case of a pseudo-substantial being, such as a watch, the unity, integration of its *in actu* layer comes from an *external* entity by the means of many different but coordinated *causae proximae*. The capacity to repair the damaged parts is possible by the intervention of the *external causa prima* (the watchmaker).

The main object of Paley's argumentation consists in demonstrating that the objective reality of a functional watch by necessity leads our cognition to the knowledge of a single *causa prima*, i.e. a single agent, a watchmaker. This cognitive process is an illustration of the epagogé, that is of *induction* in the Aristotelian sense of this word.

The Aristotelian concept of “induction”, of the “first principles”, of “epagoge” and the intellectual faculty called “nous” has to be – in our opinion – reinterpreted.

“Epagogé” vel “induction” – a case study

*Aristotelian induction*¹³ (from *inducere* = to tempt, to seduce) means a special influence, which some empirical details have upon our mind. In other words, some special properties of an entity hint at a kind of unity, a kind of objective link between the phenomena, which are otherwise different and apparently unrelated to each other. For instance, one who observes a watch may realize that its hands move around its dial exactly twice as fast as the Sun is moving round the Earth. Because of this curious coincidence one can realize that may be there is a real correlation between the astronomical rule and the mechanical rule of this watch. Then one can realize that the movement of the hand has a rather constant velocity, and that the constancy is determined by some easily traceable parts of its mechanism (the “escape” and the “balance”). One can also realize that almost all the potential energy of the spring is used in the movement of the hands. The amount of the energy “utilized” to heat the machinery or to produce

¹³ Cf. Wesoły, 1981; Dębowski, 1984; Freeman, 1998; Wilkinson, 2001.

sounds is negligible. One may also realize that the shape of the cogwheels is such as to reduce the generation of heat and noise. Furthermore one can realize that the inherent properties of the material from which the spring was made are extremely favorable to store the energy and to release it in a slow, stepwise manner.

All this thinking, of course, presupposes a considerable knowledge of the physical world, a previous cognition of the inner properties of mineral elements. It presupposes an experience with the transfer of energy and the understanding of its qualitative changes. It seems that several “laws of nature” have to be known before the nature of the integration necessary for the regular motion of the watch's intricate mechanism is understood. Once however, the exact role of the different parts of the watch is grasped by our mind, the indivisibility of its structure is obvious. This indivisibility does not mean a rigid physical bond between its parts. All to the contrary, the elements of the watch are free to move, although this freedom is strictly constrained. A wheel can turn around in its nest almost without any friction, but the axis of rotation is just one. A balance can move without friction, but the direction and the limits of its movements are narrowly determined. Each part of the watch is movable, but the limits and the directions of movements are determined by a unique selection of ties, shapes and other properties. One can see that the shapes, ties and other properties relevant to the movement of the watch are not the inner, natural properties of the mineral materials which constitute the entity of the watch. The shapes, ties and properties came from outside; a kind of external force was necessary to impose them onto the material.

No single, *homogenous* force can do this. Quite a number of different (both qualitative and quantitative) forces seem at work here. At the core of the argumentation is the following claim. If one can claim that the movements of the watch are determined by an indivisible set of different material conditions, then one might ask: is the set of separate, irreducible determinations which is necessary to produce these conditions *indivisible*, or not necessarily so.

The first “principles”. In our opinion the most elementary, and the primary meaning of the Aristotelian “first principle” is *substance*, i.e. the *nature* of a given, concrete entity. In this sense, the “first principles” can be found neither in the cognition of an ensemble, nor in the cognition of a part, but only in the cognition of an objective whole. The substance (nature) is not a mental entity, but an objective entity. It is not a general, “universal” concept but an intrinsically integrated and stable set of active dynamisms, which reveal themselves through the

observable changes within the epiphenomenal layer of a concrete entity. Therefore neither a study of a population as a population, nor a study of a bone as a bone can lead to the cognition of the *first principle* in the Aristotelian sense of the word. The possibility of recognizing the “first principle” is hidden in the dynamism of a concrete life cycle for a given biological form, in a concrete specimen (e.g. the series of developmental stages starting with that concrete egg, through the tadpole stage to that concrete adult frog)¹⁴.

The general concepts (universalialia) used to classify different forms of the truly Aristotelian “first principles” (substantial entities) are mental product of the abstractive processes, and they do not represent a primary knowledge of “principles”. Primary knowledge of a “principle” consists mainly in the observation and contemplation of a whole, not an assembly. The substances are not the assemblies of “logical principles”, but rather the source of the dynamic order we call “*the nature of this concrete entity*”.

The process of abstraction, performed by *nous* should not be understood as an independent faculty. Its efficiency is founded on the intellectual capacity to observe phenomena, perceived with the aid of senses.

“*Nous*” or the “*intellectus agens*”. This is a cognitive agency able to detect objective correlations existing between the apparently different phenomena observed within an entity. For instance, the active intellect, in contemplating rare osteological material, excavated in a paleontological site can “see” the inevitable dynamic consequences of certain fragmentary bony shapes as well as the general mechanical laws. In grasping these consequences, it can guide the process of the reconstruction of the whole skeleton, on the basis of the incomplete evidence.

This faculty cannot acquire an orientation in external objects without the aid of fully developed senses and without a capacity to manipulate both senses and their object. Nor can it acquire an immanent orientation without reflection on its own successful cognitive dynamism in the external sphere of beings. If cognition with the aids of the senses were to be paralyzed, no immanent cognition would be possible.

Nous therefore, contemplates (by a kind of intuition) the epiphenomenal data observed through the aid of the senses¹⁵. It perceives the

¹⁴ Cf. Lenartowicz, 1999.

¹⁵ “Observation, vision, and looking, were the key elements in the subject side of Aristotle’s epistemological equation, on the other object side the key element was undisturbed nature.” (Matthews, 1992)

correlations manifest in these data. These correlations induce it to improve or modify the process of inspecting the object under scrutiny. In this way the new levels of relations and correlations become increasingly evident to the *nous*. Finally a fundamental level may be reached. At this level the inner coherence, or “unity” of the being under investigation becomes obvious.

A watch as a model of substantial entity. In Paley's treatise the primary object of cognitive effort is a concrete watch. A watch, according to the Aristotelian doctrine is not a good example of a substantial being. However, it has some traits, which can illustrate the fundamental aspects of a true, substantial being. The dynamism of any watch depends upon an *indivisible* (integrated) set of properties. Its dynamism is therefore *stable*. Within certain limits, it is *independent* from external dynamisms (thermal, gravitational, mechanical influences).

The difference between a model and the original substantial dynamism. However, any truly substantial being has its own source of actual existence. For instance, the adult, functional appearance of a frog is rooted in *the same* entity, not in another. The gradual, stepwise, complex developmental changes, called the embryogenesis of a frog (*ens in fieri*), take place not in an external being, but have to be treated as an immanent activity. All the immediate causes (*ens in causis immediatis, secundariis*), instrumental in these developmental changes are *immanent*, coming from within, not from without. Their principal coordinating, integrative cause is single (*causa prima, primum principium*), and also immanent.

In the case of a watch, the *causae proximae* are from without, and the *causa prima* (watchmaker), which coordinates and integrates the dynamism of the *causae proximae*, is also from without.

The reconstruction of fieri. The epistemological problem of Paley's *Natural Theology* is as follows. Suppose one observes an *ens in actu* (be it a stone or a watch). Some details of its *fieri* can be reconstructed. If it is a stone, a geologist can claim that it is composed of the mineralized shells of marine organisms and that it was formed at the bottom of the sea. He can even claim that the stone in question comes from a rock in Scandinavia. If it is a watch, its *fieri* can also be reconstructed. An engineer can claim some parts of the watch were processed on a lathe, some others were hammered, bent and hardened. The metal parts were melted, the rubies or diamonds were formed by a natural process of crystallization, and later cut down to the proper dimension and shape.

Reconstruction of causal determinations (ens in causis proximis). Hammering, bending, hardening determined the shape and the proper-

ties of some parts of the watch. Likewise, some geological or atmospheric dynamisms have determined the shape and the properties of the concrete stone. In both cases we are dealing with a series, a set of heterogenous, non-identical *physical influences*. The next question is this: Is it possible to distinguish between a correlated and uncorrelated series of determinations?

The objective whole and its integration. In the case of a watch the set of these determinations is of a special kind. Its final result is unique – constituting a non-random, indivisible set of narrowly restricted heterogeneous properties. The conditions of reaching this final result are also very circumscribed. These (structural) conditions determine a highly selective transfer of energy and motion from the winded spring towards the passive “hands”. The transfer of energy is economical,

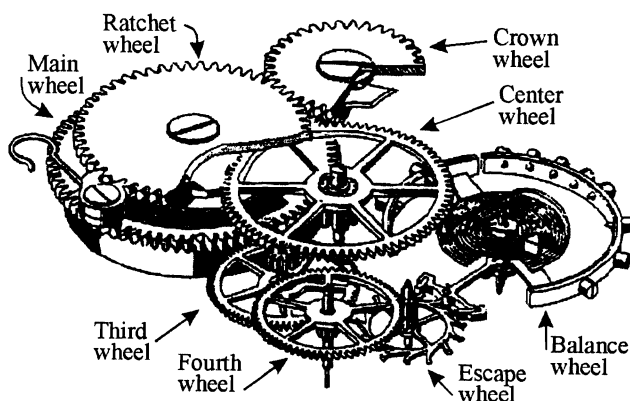


Figure 1. Some details of the watch “contrivance”. After Odets (2001).

unidirectional and at a constant speed. This kind of motion evidently depends on a perfect adjustment of parts, their dimensions, shapes, inner properties and their specific spatial orientation.¹⁶ “Perfect” here means of the kind which makes economy, unidirectionality and constancy natural (founded on the stable properties of the mineral elements) and inevitable.

We have to notice that the last statement is also a generalization. It is not the first step in the perception of the way the watch moves.

¹⁶ See also Lenartowicz, 1975/81-92, 1984/233-248.

Paley's narration going "backwards" leads us towards more primary perceptions which determine our understanding of the way the watch is functioning.

"To reckon up a few of the plainest of these parts and of their offices, all tending to one result: we see a cylindrical box containing a coiled elastic spring, which, by its endeavor to relax itself, turns round the box. We next observe a flexible chain – artificially wrought for the sake of flexure – communicating the action of the spring from the box to the fusee [OED: a conical wheel of a watch or clock upon which the chain is wound and by which the power of the mainspring is equalized.] We then find a series of wheels, the teeth of which catch in and apply to each other, conducting the motion from the fusee to the balance and from the balance to the pointer, and at the same time, by the size and shape of those wheels, so regulating that motion is to terminate in causing an index, by an equable and measured progression, to pass over a given space in a given time. We take notice that the wheels are made of brass, in order to keep them from rust; the springs of steel, no other metal being so elastic; that over the face of the watch there is placed a glass, a material employed in no other part of the work, but in the room of which, if there had been any other than a transparent substance, the hour could not be seen without opening the case." [mNT 2-3].

The passage we have just quoted tends to persuade us that the structure of the watch is *a kind of a whole*. What does this mean? It means that the proper movement of the watch depends on the indivisible set of structures, which in turn depend in their structure on the indivisible, selective set of previous determination. The movement of the watch is a typical "*all or none*" phenomenon. It doesn't matter what we change in the set of mechanical conditions of the watch – if we do so, the movement will change dramatically¹⁷.

The whole as revealed by a dynamic indivisibility. How can one visualize this dramatic change? Suppose we have eleven identical watches. All were wound up and all started moving at the same time. Suppose now that just one part in ten of the watches suddenly vanished. The ten watches would then go to a sudden stop and only the eleventh one would keep moving.

We can repeat this experiment in many different ways. Instead of the removing parts we may make them change their place, or orientation, or scale, or shape. The results will remain comparably dramatic. To be fair we have to admit that some relatively subtle changes may produce imperceptible changes in the movement of the watch, some can even improve the regularity and durability of this movement (better polished surfaces, a drop of oil here and there). But the limits of these advantageous changes remain relatively very, very narrow.

¹⁷ It is important to distinguish between a *correlation* and an *integration*. See Lenartowicz & Koszteyn, 2000.

The dynamism of the watch is, therefore, evidently dependent upon what we might call the “integration” of many different parts. This “integration” is multifaceted. It involves the scale (absolute dimension), shape, distance, spatial orientation, and inner qualities of the parts.

But – and this is crucial – one may ask: What is the relation between the mineral matter (elements, chemical compounds and their mineral forms, studied by geologists), and this “all or none” phenomenon of the moving parts within a watch? Is it necessary to postulate a single agent who selected the mineral forms, processed and shaped them from more or less homogenous and more or less random pieces of matter?

Occam's Razor and the multiplicity of causal influences

From a dynamic whole towards its origin. Let us realize that we haven't yet proved that a single agent is necessary to produce the watch we have just described. Is a watch a sufficient and reliable cognitive hint of the existence of a *single agent*? This question is related to Occam's Razor. How many agents are necessary to produce a watch? How Occam's Razor is involved in our search for the agents which are physically necessary to determine the shape, the dimensions, the material of all the parts of the watch, and to put them together in the way which determines its extraordinarily stable and economical movement?

Certainly it takes a truly technical mind to reconstruct all these multiple and diverse physical conditions. Different parts of the watch are formed from a relatively hard material so their shaping requires energy and a sufficiently hard tool. Almost each part has a different shape and dimension. Some aspects of these parts are evidently correlated. Is it rational to infer that these multiple and diverse conditions were accomplished by a single agent? We do believe – “instinctively” that it is rational, but is it enough to prove that single agent has necessarily existed?

On the one hand we might disregard the differences and claim that the same, homogeneous, repetitious, monotonous process produced these numerous and differently shaped parts. A Humean mind wouldn't shy away from such a suggestion. However, on the other hand we may also claim that a different but *unrelated* processes shaped each part. We may claim that the link appeared only after all of these parts were shaped and assembled by random, uncorrelated processes. To explain

the origin of the watch we invoke, therefore, not a single agent, but a multitude of separate, independent, uncorrelated agents.

The application of the Occam's Razor. The analysis may proceed a bit further. We see a number of identical watches and we believe (b1) they were made by the same factory, or the same artisan. Is this belief objectively warranted? The identity of a series of watches has nothing to do with the "integration" we have mentioned above. Let us state the same question in another way. Suppose we believe (b2) a different agent (or different set of agents) made every watch.

The source of our beliefs is identical in both cases. The conclusions differ. What about the link between the empirical data and the conclusions? What about Occam's Razor? Do the empirical data provide any hint for a suspicion that the agents were different? Suppose we are dealing with a set of identical footprints? What prevents us from believing that a different agent made each pair of footprints?

In our opinion Occam's Razor can help to resolve our doubts. "*Non sunt multiplicanda entia sine necessitate*". How many "causal agents" have to be invoked to explain the origin of a series of identical phenomena?

In the case of Paley's argumentation we are dealing with a substantially different form of explanation. Instead of a series of identical elements we are dealing with a set of differently shaped elements. Is Occam's razor of any use in this case? At this point therefore we must discuss the problem of correlations and their origin.

What does "intelligent" mean? It means several things at once. It means the agent is capable of manipulating certain mineral substances so as to change their inner properties (e. g. to change iron ore into various kinds of steel). The intelligent agent is capable of knowing these properties and of making the parts, structures of the watch from the material, which assures the most durable and stable movement of the watch. Generally we may conclude that the agent is capable of discovering the laws hidden in the mineral world and of manipulating them to produce the moveable wholes, we call watches. This description of "intelligence" sounds technical, technological. This is correct, because it *is* technical. There is no better example or illustration of intelligence than a complex dynamism rooted in a deep knowledge of the elements of the matter, a dynamism that tends to create an indivisible whole.

The historical and psychological problem of preformation. Some adults seem to ignore, or disregard the fundamental fact of their existence,

namely the fact that their body was shaped during the embryological stage of life. This ignorance and disrespect concerns the origin of many other creatures around them. It underestimates the developmental processes that are fundamental to the continuity and diversity of life. In modern times this kind of intellectual blindness has led to the origin and to the relatively lasting triumph of the otherwise ridiculous scientific theory, namely the *theory of preformation*.¹⁸ It claimed that every living body is fully shaped in its material structures from the very beginning of its existence. The changes we call “development” consist – according to this view – only in the spatial magnification of these “preformed” parts and in the increase of their opacity. The theory of preformation was based on rather superficial, fragmentary observations. For example, one of the most famous microanatomists John Swammerdam (1637-1680) opened up a late pupal stage of a butterfly, and believing it is an “egg”, found in it a totally formed butterfly's body. The theory of preformation led to several absurd consequences, such as the idea of „emboîtement”, and the ovulist/spermatist controversy. This strange scientific blindness was dominant during the Enlightenment period until the early 19th century. It was the official biological doctrine during Paley's time. Some philosophers therefore believed that God Himself had created all these complex bodies at the Beginning. Some others, to the contrary, were persuaded that no divine agent was necessary, because

1. the growth of small living bodies into the big ones resembles – in its mechanism – the growth of crystals from a solution,
2. this growth occurs by means of the random, blind dynamisms of crude matter.

Understandably, no Aristotelian soul, no divine agent, and no genetic program are needed to drive the growth of a living body to its mature form.

Why is the theory of preformation so important to our interpretation of Paley's treatise? It is important, because this theory has eliminated – for more than five generations – the awareness of the most evident illustrations of *entia in fieri*, i.e. the instances of the integrative epigenesis (ontogenesis, embryonic development). Such an important source of intellectual and scientific knowledge was rejected and forgotten as a fairy tale¹⁹. However, Paley, because of his well-

¹⁸ Cf. Needham, 1931/97-103; Gardner, 1972/241; Lenartowicz, 1980.

¹⁹ About half century later, because of progress in developmental biology, the theory of preformation was rejected and the intellectual question of coordinated embryonic

developed technical mind, closely observed the dramatic efforts of John Harrison to improve the complex structure of his chronometers²⁰. Harrison's achievements became for Paley a convenient model of an *ens integratum in actu*, of the *ens integratum in fieri*, of the *ens integratum in causis proximis*, and the *ens integratum in causa prima*.

This model was open to direct, intellectual observation and inspection. Paley's well-developed technical mind saw the evident correlations between the *functional perfection* (dynamic selectivity, stability, indivisibility, and economy) and the *structure* of the finished H-4²¹. His „nous" saw the evident and necessary correlations between the *processes of production* (*ens in causis proximis*) and its *final result* (*ens in actu*). He also saw, by an intellectual insight, the evident necessity of a single, unifying agent, able to coordinate all the different and physically independent processes that shaped raw matter into the perfect watch. In other words, Paley's contemplation of a technical achievement allowed him to understand the secret of entitative, objective unity and the nature of successful cognitive processes. He then used the argument *a fortiori* to prove that biological organs reveal the same objective unity and by necessity require a single *causa prima*. In the last part of our study we shall demonstrate that the argument *a fortiori* can also be used to prove that any functional watch has a single agent.

The essence of the *a fortiori* argumentation

We have decided to follow Avi Sion's version of the *a fortiori* argumentation (Hebr. *qal vachomer*)²². The formal structure of his version is complex. According to Avi Sion it involves two elements, the scheme of a *fortiori* "syllogism" and the Dayo (Sufficiency) Principle.

dynamism (*ens in fieri*) re-emerged again. August Weismann, the father of modern developmental genetics, immediately saw the necessity for a single, integrated program, an integrated guiding principle (*an ens in causa prima*). His theory of "idioplasm" was the first conceptual precursor of the molecular blueprint of biological ontogenesis, and a new, materialist attempt to replace the non-material aristotelian "soul" with a chemical entity. (Cf. Lenartowicz, 1980, 1999)

²⁰ John Harrison of Barrow on Humber (1642–1727) (Cf. Sobel, 1996; Betts, 2001)

²¹ The successive, gradually improved versions of Harrison's "contrivances" were named H-1, H-2, H-3 and H-4.

²² Sion, 1997.

The *a fortiori* "syllogism" is this:

P is more R than Q is R, and
 Q is R enough to be S; all the more
 P is R enough to be S.

It is not a typical syllogism. A typical syllogism has just three terms: P, Q (or a middle term) and S. Here we are dealing with four different concepts. The concept of R refers to a trait that decides whether something is S, or not.

In the first "premise" P is asserted to possess the trait R in a higher degree than Q.

In the second "premise" Q is asserted to possess the R trait in the sufficient degree to be S. In the conclusion P is asserted to possess the trait R in the sufficient degree to be S.

E.g.:

H-4 is more integrated than a swallow's nest.

A swallow's nest is integrated enough to be (by necessity) produced by a single *causa prima*. All the more

H-4 is integrated enough to be (by necessity) produced by a *single causa prima*.

The *Dayo (Sufficiency) Principle* requires that the conclusion of an *a fortiori* argumentation be kept within the limits of the minor premise²³.

Avi Sion's interpretation seems to reduce the classical *a fortiori* argument to the *a pari* argument. It changes the

P is more R than Q and
 Q is R enough to be S, all the more
 P is R enough to be S.
 into
 P is as R as Q and

²³ Indeed Avi Sion wrote: "Thus, we may acknowledge the dayo principle as correct, provided it is understood as being a minimal position. It does not insist on the quantitative equality of the subsidiary or middle term (as the case may be) in the conclusion and minor premise, nor does it interdict an inequality; it merely leaves the matter open for further research. A-fortiori argument per se does not answer the question; it is from a formal point of view as compatible with equality as with inequality. To answer the question, additional information and other arguments must be sought. This is a reasonable solution." (Sion, 1997/56)

Q is R enough to be S, therefore

P is R enough to be S.

So, in our opinion, the Dayo (sufficiency) Principle might be called an Overcaution Principle. It gives a firm assurance of the right conclusion, although cognitively it is a wasteful, costly instrument.

The true *a fortiori* argument therefore might be represented by the following scheme:

P is more evidently R as Q is R, and

Q is R evidently enough to be S, all the more

P is R evidently enough to be S.

In other words, if it is irrational and non-empirical to doubt that Q is S, then it is even more irrational and non-empirical to doubt that P is S.

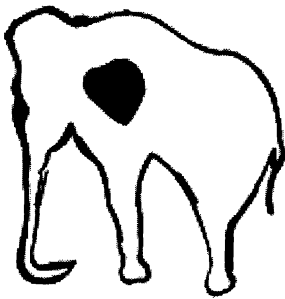
The application of the a fortiori argument to the chronometer and paleolithic paintings. Taking into account its necessarily macroscopic scale, the material used, and the sufficient mechanical resistance of this object, the Harrison's H-4 is close to the maximum level of integration. One might therefore wonder if it is possible to imagine an *a fortiori* argument in which a much less integrated entity were used as a minor premise. The analysis of such a case might help to prepare our mind for a further investigation of Paley's treatise, especially his claim regarding the necessity of a single agent working within the biological entity²⁴.

Fig. 2 represents three different prehistoric paintings. Each one of them comes from a different cave, and most probably from a different period of time. To what extent can one reconstruct the origin of these paintings?

First, one can ask whether the upper, middle and lower paintings represent single objects of observation. The affirmative answer seems evident. Next, one can ask, how many *causae proximae* were absolutely necessary to produce these paintings. The obvious answer is that each of these paintings required quite a number of separate strokes of the painting tool. Finally, one might ask, whether we see the evident coordination of these separate strokes. Is their shape, direction, scale, length and color independent or correlated?

These paintings indicate that their makers were able to observe living animals, to register their entitative unity and the essential

²⁴ We intend to follow up our investigation in a subsequent paper.



proportions of their body. They were also able to manipulate different colorful materials, to prepare them and to apply them selectively on the surface of the rock. It is a violation of Occam's Razor to postulate that more than one craftsman created a single painting. The only rational reconstruction simply requires a single maker for a single painted animal. If the craftsman was helped by others, they constituted an element of the *causae proximae*, not *causa prima*.

Figure 2 Paleolithic cave paintings. RHINOCEROS – The Font-de-Gaume Cave, Eyzies-de-Tayac, dept. Dordogne, France. ELEPHANT – The Pindal Cave, Pimiango, near Oviedo, Spain. BEAR – de la Mairie Cave, Teyjat, dept. Dordogne, France. After Brézillon (1969).

In this way, we have found an example of an entity, which certainly originated because of a multiplicity of distinct acts (a number of *causae proximae*) and still has a single primary cause. Now we can construct a new *a fortiori* argument:

- (a) Harrison's H-4 is more evidently unified than a painting of an animal body, and,
- b) a painting of an animal body is unified evidently enough to be a product of a single agent, all the more,
- (c) Harrison's H-4 is evidently a product of a single agent.

The importance of the a fortiori reasoning. The *a fortiori* argument is an important cognitive tool to defend the valuable achievements of common sense. It helps one to realize that common, everyday realities can considerably support many much more sophisticated elements in

our understanding of the world. The argument *a fortiori* can be used against many sceptical arguments, to show their arbitrariness and lack of consequence.

In summing up, we can say that Paley's *Natural Theology* is aimed at a reader who has a developed technical mind. The method of argumentation is based on *epagagé* and a *fortiori* argumentation. The empirical material which is observed by *epagagé* and processed in the *a fortiori* scheme of argumentation is provided by biological and technical realities. To ignore or disregard them is to never understand the value of Paley's work.

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Piotr LENARTOWICZ SJ & Jolanta KOSZTEYN

O PALEYU, *EPAGOGÉ*, ZMYŚLE TECHNICZNYM I ARGUMENTACJI A *FORTIORI*

Streszczenie

Dwieście lat temu anglikański biskup William Paley (1743-1805) napisał traktat pt. *Teologia Naturalna*, w którym zawarł, między innymi, dowód istnienia Stwórcy. Traktat ten został zlekceważony przez ogół filozofów nowożytnych a pominięty milczeniem przez filozofów i teologów katolickich. To milczenie jest trudne do wytłumaczenia. Natomiast lekceważenie dowodu Paleya wynikało z przekonania, że był to rodzaj nieprecyzyjnego wnioskowania z analogii, w dodatku oparty na zawodnej formie rozumowania indukcyjnego.

Lektura tekstu *Teologii naturalnej* ukazuje bezpodstawność takiej interpretacji wywodów Paleya. Świadomy niejasności ukrytych we wnioskowaniu z analogii, nie chciał on z tego typu rozumowania korzystać. W swoim procesie poznawczym, prowadzącym do Boga, nie korzystał też z indukcji niekompletnej, enumeracyjnej ani eliminacyjnej. Wyraźnie stwierdził, że do fundamentalnego zrozumienia konieczności, o których pisze, potrzebna jest analiza pojedynczego bytu, a nie porównywanie bytów pomiędzy sobą.

Jako podstawowy przedmiot analizy Paley wybiera zegarek. W tamtych czasach Anglia żyła sukcesem Johna Harrisona (1693-1776). Ten prosty rzemieślnik skonstruował mechanizm H-4, który swoją precyzją przewyższał – o kilka rzędów wielkości – wszystkie dotychczasowe zegary. Z tekstu wynika, że Paley nie tylko znał się na konstrukcji zegarów ale też doskonale rozumiał istotę wynalazków Harrisona (np. zastosowanie taśmy bimetalicznej), które przyczyniły się do sukcesu zegara H-4.

W tej pracy nie interesuje nas wprost sam dowód istnienia Stwórcy. Skoncentrowaliśmy się na badaniu, jaką metodą Paley dowodzi, że zegar musi mieć tylko jedną, inteligentną przyczynę (zegarmistrza). Ta przyczyna jest w stanie zorientować się we właściwościach materii

mineralnej oraz manipulować tymi właściwościami dla skonstruowania całości dynamicznej (zegara). W naszym przekonaniu tekst Paleya ilustruje dwie podstawowe, choć podświadomie stosowane metody zdrowego rozsądku: opisany przez Arystotelesa specjalny rodzaj indukcji (*epagogé*) oraz argument *a fortiori*.

Metoda epagogé. Paley dokładnie obserwuje właściwości licznych i różnorodnych części zegara. Dostrzega zależność jego dynamiki od właściwości użytych materiałów, od precyzyjnego wykonania części po precyzyjne ich rozmieszczenie. Dostrzega też, że te warunki tworzą pewną niepodzielną całość. W ten sposób Paley odkrywa istotę tego, co nazywamy jednością i niepodzielnością dynamiczną. Zgodnie z tradycją terminologii tomistycznej nazwalismy tego typu pojęcie *ens integratum in actu*. Integracja oznacza tu dokonaną, aktualną kompletność i optymalność (dynamiczną). Niczego tu nie brakuje i nic nie jest zbędne.

Zdobywanie tego typu orientacji nie dokonuje się na drodze spekulacji formalnych, np. rozumowania sylogistycznego, ale na drodze *obserwacji* przedmiotu. Jest to obserwacja intelektualna („percepcja rozumowa”, „intelekcja”) dokonywana przy pomocy organów zmysłowych. To, co intelekt widzi, nie jest formą podmiotową, ale formą samego przedmiotu. Nie jest to forma powierzchowna, akcydentalna, lecz forma głębsza, swojego rodzaju fundament, dostrzegalna w materiale powierzchownych zjawisk dostępnych dla czujników zmysłowych. Abstrakcyjne pojęcie całości jest tu czymś wtórnym, późniejszym. To, co intelekt widzi w pierwszej kolejności i na podstawie czego tworzy pojęcia abstrakcyjne, to konkret – w tym wypadku konkretna forma dynamiczna.

Arystotelesowska *epagogé*, czyli *indukcja intelektualna* oznacza mechanizm dwufazowy. Pierwsza faza to „indukcja”, czyli kuszenie, wabienie intelektu poprzez bardziej powierzchowne przejawy bytów substancjalnych. Druga faza, to dostrzeganie źródeł owych powierzchownych przejawów. Z tego zaś wynika, że precyzja poznania zmysłowego jest koniecznym warunkiem rozpoznania „istoty”, „natury” bytu. Jest to, oczywiście, poznawanie natury *konkretnego* bytu. Czym innym zatem jest abstrakcja *pomijająca* nieistotne elementy zmysłowej, powierzchownej obserwacji przedmiotu, a czym innym abstrakcja *generalizująca* wyniki rozpoznania *istoty* konkretnego bytu.

Tylko niektóre wyniki (dane) obserwacji zmysłowej są „pokusą” dla intelektu. Te właśnie elementy wykorzystuje np. malarz, rysując paroma kreskami łatwo rozpoznawalną sylwetkę bizona. Taki szkic niewiele ma wspólnego z abstrakcją generalizującą naturę (istotę) biologicznego bytu bizonów wykładaną na weterynarii.

Orientacja we właściwościach substancji mineralnych wiąże się z doświadczeniem w manipulowaniu tymi substancjami. Obie są warunkiem i źródłem „zmysłu technicznego” – charakterystycznej cechy intelektu człowieka. Ludzki intelekt – w oparciu o obserwację zmysłami – z całą oczywistością dostrzega, jakim przekształceniom musiała podlegać surowa materia mineralna, aby doszło do powstania materiałów o odpowiednich właściwościach, do powstania części o odpowiednim kształcie, oraz do zmontowania tych części w całość gotowego mechanizmu zegara. Ten zbiór modyfikacji i przekształceń – z którego Paley oczywiście zdaje sobie sprawę – nazwalibyśmy *ens integratum in fieri*. Umysł Paleya dostrzega też, jak bardzo różnorodny i jak bardzo selektywny musiał być zespół procesów i manipulacji (przyczyn sprawczych), które doprowadzają do takiego, zintegrowanego stanu materii. Ten zespół nazwalibyśmy *ens integratum in causis proximis*. Wreszcie Paley uznał, że owe *causae proximae* musiały być podporządkowane przyczynie decydującej o oczywiście selektywnej w czasie i przestrzeni jedności ich działania. Taką przyczynę nazwalibyśmy *ens integratum in causa ultima vel prima*, czyli przyczyną integrującą. Wszystkie te „warstwy” całościowości zegara są odkrywane dzięki „indukcji intelektualnej”.

U Harrisona indukcja intelektualna była *warunkiem zbudowania* zegara, a u Paleya ten proces był *warunkiem zrozumienia* doskonałości tego zegara.

Zegar Harrisona, jako ludzki wynalazek, nie ma, ściśle rzecz biorąc, „natury”. Jednak jest on pewnego rodzaju modelem substancji (w arystotelesowskim rozumieniu tego słowa). Cechuje go stałość i trwałość dynamiki. Jego ruch jest równomierny z jego „natury”, wynika bowiem z precyzji wykorzystanych mechanizmów eliminujących do minimum tarcie i dozujących przepływ energii pomiędzy sprężyną a wskazówkami. Cechuje go pewna odporność na wpływy zewnętrzne związane z temperaturą, wilgotnością, kołysaniem statku i wstrząsami, a ta odporność jest efektem specyficznej konstrukcji wewnętrznej. To wszystko jest prawdą oczywistą dla intelektu.

Epagoge jest więc procesem poznawania „natury” bytu, czyli samych fundamentów, źródeł jego właściwości. Z tego wynika, że byty substancjalne (a tylko pośrednio ich zbiory lub części) są właściwym przedmiotem poznania intelektualnego. Arystoteles – czego wielu komentatorów nie rozumie – pisząc o *arché* czyli o zasadach, *principiach* i ich poznawaniu, nie miał na myśli abstrakcji myślowych lecz obiektywną „naturę” konkretnych substancji. Traktat Paleya jest właśnie opisem procesu dochodzenia do samego źródła, do samej ostatecznej przyczyny całościowości zegara – czyli do zegarmistrza.

Paley dostrzegając zarówno integrację zegara, jak i oczywistą integrację organów istot żywych, dochodzi do przekonania, że te organy *a fortiori* muszą być rezultatem przyczyny integrującej, oczywiście doskonalszej od zegarmistrza. Argumentacja typu *a fortiori* (podobnie jak mechanizm *epagoge*), jest na gruncie filozofii i przyrodoznawstwa pomijana zazwyczaj milczeniem. Jednak jest to wartościowa i spontanicznie stosowana forma poznania intelektualnego.

Schemat tego rozumowania przedstawia się następująco:

- (a) **P** jest bardziej **R** niż **Q** (*jest R*), a
- (b) **Q** jest wystarczająco **R** aby być **S**, tym bardziej (*a fortiori*)
- (c) **P** jest wystarczająco **R** aby być **S**.

Stosując tę formę argumentacji możemy dowieść, że zegar musi być dziełem jednej przyczyny integrującej (posługującej się, ewentualnie, zespołem przyczyn podporządkowanych). Oto przykład takiego dowodzenia:

- (a) Zegar [P] jest **bardziej zintegrowany** [R] niż gniazdo jaskółki [Q] (*jest zintegrowane*).
- (b) **Gniazdo [Q] jaskółki jest dostatecznie zintegrowane [R],
aby być rezultatem przyczyny integrującej [S], tym bardziej (*a fortiori*)**
- (c) **Zegar [P] jest dostatecznie zintegrowany aby być rezultatem przyczyny integrującej [S].**

Jaki sens ma tego typu argumentacja? Otóż pozwala ona obronić pewne zdobycze intelektu przed atakiem, kwestionującym ich wiarygodność. Argument *a fortiori* opiera się bowiem na wiarygodności bardzo pospolitych, elementarnych i niekwestionowalnych zdobyczy umysłu.

W arystotelesowsko-tomistycznym nurcie filozofii czynnik integrujący (w procesie embriogenezy, czyli budowania struktur) organizm konkretnej istoty żywej nazywano *duszą* (*psyché*). Każda taka dusza była rozumiana jako niepodzielny, immanentny, aktywny czynnik zdolny do orientacji w otoczeniu i do podporządkowywania sobie nieskorelowanych dynamizmów mineralnych. Stąd podstawowym zjawiskiem empirycznym – leżącym u źródeł arystotelesowskiego pojęcia „duszy” – był *rozwój embrionalny*. Oczywisty fakt rozwoju embrionalnego wymusił, niejako, w świadomości Arystotelesa poznanie duszy, rozumianej jako niepodzielny, immanentnie aktywny czynnik, budujący zintegrowane narzędzia (organy) ciała. W czasach Paleya biolodzy już od ok. 150 lat byli pod wpływem powszechnie przyjętej – choć oczywiście błędnej – teorii „preformacji”, która ze świadomości biologów wymazała fakt embriogenezy. W ten sposób doszło – oczywiście – do okaleczenia pojęcia duszy,

która odtąd była rozumiana na sposób platoński, wyłącznie jako zasada intelektu, myślenia intelektualnego. Teoria preformacji ostatecznie upadła kilkadziesiąt lat po śmierci Paley'a. Jednak sam Paley, żyjąc w klimacie swej epoki, nie znał lub nie doceniał arystotelesowskiego pojęcia duszy kształtującej organy ciała. Doskonałość korelacji i integracji biologicznych przypisywał bezpośrednio działaniu Stwórcy, tak jak dzisiaj tę doskonałość przypisuje się – naszym zdaniem bezpodstawnie – chemicznym właściwościom pewnego szczególnego, zaszyfrowanego kodem molekularnym, polimeru DNA.

Przedstawiona analiza fragmentów *Teologii naturalnej* Paley'a stanowi wstępny etap ewentualnych dalszych badań nad jego dowodem istnienia Stwórcy.