

THE LOGICAL FORM OF BIOLOGICAL OBJECTS

“The Philosopher must twist and turn about so as to pass by the mathematical problems, and not run up against one,—which would have to be solved before he could go further . . .

Even 500 years ago a philosophy of mathematics was possible, a philosophy of what mathematics was then.”

L. Wittgenstein 1956, IV, §52.

1. OPENING

The task of this essay is to investigate the possibility of describing biological individuals with logical means. This approach is not interested in matters of time (for example, in evolution); but rather in the logical shape of biological objects. So it is radically different from natural science. In his later years, Wittgenstein made similar investigations in psychology and mathematics.¹ Unfortunately, he found no time to specifically develop a philosophy (logic) of biology. This is what we are going to advance here.

The approach followed in this essay opposes, above all, the intensionalism in philosophy of biology. A typical case of biologically motivated intensionalism is the theory of “organic wholes” accepted, among others, by the founding father of analytic philosophy, G. E. Moore. The most radical form of intensionalism, however, is vitalism. Vitalism, which is as old as biology, contends that compared to the elements of matter, biological individuals contain elements which are of a fundamentally different kind. This understanding was already accepted by Aristotle who introduced the concept of formal cause which is to be kept apart from the material cause.

The most radical form of vitalism, however, was developed in German Philosophy, first, in the eighteenth century by Leibniz and his followers. In the nineteenth century, Nietzsche was insistent that life is much stronger than knowledge (see Nietzsche 1874, § 44). At the beginning of the twentieth century, Hans Driesch still explained the life of biological individuals with the help of the Aristotelian term of *entelechy*. This is a substantial entity, controlling all biological processes (see Driesch 1905).

Our objective in this essay shall be to tentatively estimate the possibilities of applying the logical approach in biology, not to develop an explicit—

strict—logic of biology. For this purpose, in what follows we shall briefly discuss five different approaches in logical biology.

2. THE LOGICAL-ATOMIST APPROACH

As a first example of logical biology some ideas or, more precisely, hints of Bertrand Russell and Ludwig Wittgenstein can be suggested. In “The Philosophy of Logical Atomism” (1917/18) Russell compared philosophical logic with zoology. According to him, logic investigates the “‘zoo’ containing all the different forms that facts may have” (Russell 1956, p. 216). Now, we contend that this apprehension of Russell has also its back side: Zoology can be seen as logic. The task of the logic of zoology—and further of biology—is to describe zoological/biological individua in formal terms—in terms of their forms.

The implicit comprehension of logical forms as biological individua was developed further, despite in a rudimentary form, by Russell’s pupil Wittgenstein. Thus in *Remarks on the Foundations of Mathematics*, the latter asked:

But could one not study transformations of (e.g.) the forms of animals? . . . I mean: might it not be useful to pass transformations of animal shapes in review? And yet this would not be a branch of zoology.

It would then be a mathematical proposition (e.g.), that this shape is derived from this one by way of this transformation. (Wittgenstein 1956, III, § 13)

According to this project, such objects as geometrical figures, numbers, biological individuals, etc., can be seen as shapes (forms) which can be studied by the respective formal disciplines which describe their transformations. Wittgenstein is reluctant to call these formal disciplines *logic* only because he is indignant at the all-embracing strivings of this discipline. Otherwise, however, they have all the traits of what traditionally was conceived as logic: they are formal, strict, a priori, etc.

Formal biology, in particular, describes the qualitative forms (*Gestalten*) of biological objects. This is a type of morphology indeed—not a morphology of Goethe’s type, however, which only compares different individuals. Instead, Wittgenstein’s philosophical morphology tries to find the forms—the indefinable *atoms*—of these individuals with the only aim of analyzing them. In contrast, Goethe’s morphology is not analytical but complementary. It is a type of natural science—a suggested alternative to the science of Newton—not logic.

Here is a brief description of this approach:

Wittgenstein sees the task of elucidating here, above all, as putting the data together [*zusammenstellen*]; the data are to be so put together as to suggest an understanding. . . . In this way he suggests a “general picture” of the data, which presents them perspicuously, without paying attention to their temporal order. (Schulte 1990, p. 32)

Now, it is exactly this seeking of new formal orders of biological individuals which suggests the new *patterns* of individuals that are the proper subject of this type of logical biology.

This approach is based on the understanding that biological individuals are mosaics of atomic forms (and in this sense it is a kind of logic), so that at every moment we see the object in only one of its many forms; its other forms remain implicit.² The task of logical biology is to find out these forms; to find out its *new* forms. The method of logical biology is the comparison of the different forms of the different biological individuals which it collects in formal patterns of the most variegated order (including those of folk biology). In contrast, conventional biology is only interested in the spatio-temporal order.

This point explains why this type of logical biology is so rich. In contrast, the conventional taxonomies in biology, introduced into it by Carl von Linnaeus, are linear and quite monotonous. To be sure, logical taxonomies in biology are usually built on an inclusive relation of genus to an art. The ideal here is the *arbor Porphyriana*, by which every new classification relates a genus to an art. It is not surprising at all that Wittgenstein was critical of it. In “Conversations With M. O’Drury,” he noted:

I have always thought that Darwin was wrong: his theory doesn’t account for all this variety of species. It hasn’t the necessary multiplicity. Nowadays some people are fond of saying that at last evolution has produced a species that is able to understand the whole process of which gave it birth. Now that you can’t say. (Wittgenstein 1981, p. 174)

In opposition, Wittgenstein’s logic of biological objects looks for qualitative differences of all possible order. It compares forms (shapes) of objects in order to pick out new logical patterns in which new logical forms for them are presented. An instructive example of this procedure is supplied by Wittgenstein:

But might it not be that plants had been described in full detail, and then for the first time someone realized the analogies in their structure, analogies which had never been seen before? And so, that he establishes a new order among the descriptions. He says, e.g., “compare this part, not with this one, but rather with that” . . . and in so doing he is not necessarily speaking of *derivation*; nonetheless the new arrangement *might* also give a new direction to scientific investigation. (Wittgenstein 1980, § 950)

Despite the fact that Wittgenstein did not elucidate what this discipline exactly is, he gave hints at how to develop parts of it when he introduced the concept of “forms of life” (*Lebensformen*). At that, he used this expression in an idiosyncratic way. Indeed, in ordinary German, this concept means social, or spiritual *ways* of life, not *forms* of life. It is accepted, for example, that different social classes in nineteenth-century Britain had different *Lebensformen* (ways of life). This was also the sense the concept *Lebensformen* had for the man who first introduced it in the humanities—Eduard Spranger (see Spranger 1914). In contrast, for Wittgenstein this term is a biological, not a social category. He literally understood the forms of life as *forms*, accepting that there is a man’s form of life, lion’s form of life, etc. Every biological species has its own form of life.

Now, comparing different forms of life is only one type of pattern in the logic of biology. As already noticed, however, biological individuals have data of different order. So we can investigate different orders of biological forms (shapes). For example:

- (i) The outer form of the animals. “Are tomatoes fruits or vegetables?” “Is a zebra without stripes a zebra?”—All Wittgenstein’s questions;
- (ii) The behavior (*habitus*) of animals understood as a form; and
- (iii) The “ethics” of animals: what animals strive for, etc.

These different kinds of investigations give rise to different kinds of atomistic logical biology. At the end we have descriptions of different patterns of biological forms, which can be ordered in different chapters.

In truth, these investigations are similar to the one Wittgenstein made of colors in *Remarks on Colour*. Historically, it followed the approach of “pattern analysis,” introduced into the humanities by Oswald Spengler, which compares the archetypes of different cultures (see Haller 1988, pp. 74–89). These are analyses of atomic data, of indefinables, of objects (faces, shapes) which cannot be analyzed further. In *Philosophical Investigations*, Wittgenstein analyzed in this way the forms of: the fly (§§ 284, 309), goose (p. 221), hare (§§ 520, 521, 524, 542), dog (§§ 250, 357, 650, pp. 174, 229), beetle (§ 293), cat (§ 647), cow (§§ 120, 449, p. 220), lion (p. 223), mouse (§ 52), parrot (§ 344, 346), cat (§ 647).

Summing-up. To this point we have been interested in the atomic forms of biological objects. In the next four sections we shall turn our attention towards biological complexes, more precisely, towards the logical form of these complexes: towards the logic (the complex form) of their construction.

3. FORMAL ONTOLOGY OF BIOLOGICAL OBJECTS

This type of logic of biological individuals follows Nicolai Hartmann who accepts that the world: i) is a united system, which nevertheless, ii) have many *strata*. The strata are ordered one onto another so that any one of them “is not isolated in itself, but rather sets out the conditions and regularities for the next strata” (Hartmann 1940, p. 182). Every stratum of a higher order is a superstructure on the grounding stratum. Perhaps we can better understand this dependence in the light of John Searle’s understanding that strata are not causally dependent. The higher strata is only a trait of the deeper one (see Searle 1983, pp. 20–1).

This position was embraced, for example, by both Marx and Wittgenstein (the position of the latter we are going to discuss in § 6), according to whom the subject is parasitic upon the world. It does not have anything else to do but to imitate reality.³ The subject makes this into an attempt to grasp the world, to *assimilate* it, becoming in this way identical with it.⁴ As Marx put it—following Aristotle (via Hegel)—the subject makes this into an act effecting the “appropriating of alienated, objectivated essence” (Marx 1974, p. 242).

As for their uniformity, we shall accept that biological individuals are different developments of one and the same basic form. In this acceptance we shall follow a long tradition in searching for a uniform ontology in biology and philosophy of mind. Three examples:

(i) Nietzsche assumed that thinking has its primitive stages in the preorganic world. “‘Thinking’ takes shape in primitive states (preorganic) as it does with crystals.” (Nietzsche 1901, § 499);

(ii) Daniel Dennett assumed that different zoological species have different forms of one and the same consciousness (see Dennett 1996); and

(iii) According to Wittgenstein, all persons have one Spirit: “There really is only one world soul (Weltseele), which I for preference call my soul and as which alone I conceive the souls of others.” (Wittgenstein 1979, p. 49)

The acceptance of the uniformity of the nature of biological individuals paves the way for elaborating a powerful formal ontology of biology. More precisely, we can see different ontological individuals as constructed out of simple forms, through some formal modifications.

According to this apprehension of biological individuals, the different ontological strata—organisms, plants, animals, *homo sapiens* and his thinking—are results of different *ways* of composing complexes which can be described by logical means. In order to demonstrate this, we are going to