

# Kinds, individuals, organisms

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### 1. Kinds, Individuals, organisms

The living world has been classified according to logical, genealogical or ecological systems. The first, centred in the notion of class, characterises entities intensionally as an essence or essential properties. Historically it is related to the pre-evolutionary stage based on the description and classification of organic types. The second rejects the notion of class and is attached to the mereological notion of individual. Organisms, as well as species (and other categories in the hierarchy), are characterised as individual spatiotemporal segments. In the post-genomic stage the confidence is lost that the genealogical relations can be drawn because of the massive evidence of lateral transfer occurrences, so networks seem to be the preferred model; this is compatible with the systems biology approach in which entities are studied as arising from interactions of parts.

The metaphysical concerns and discussions of evolutionary biology turned around the distinction between classes and individuals. Organisms, however, have been out of these discussions, and their theoretical role in evolutionary or molecular biology has been very limited. Thus, the usage of the term in the 20th century biology has been close to the one of everyday life. But this seems to be changing in the last times when concern is growing for the nature of the organism level cohesion (Pradeu, 2010; Strassman & Queller 2010).

The aim of this paper is to reflect on the meaning and relevance of the concept of organism in current biology, and to explore the implications these new understandings of 'organism' have for the ontology of biological entities. The discussion on the nature of biological units, as Darwinian entities defined by reproductive relations or as organisms displaying living phenomenology, is related to the debates on natural kinds, specifically on homeostatic property cluster (HPC) kinds.

### 2. Organisms

Intuitively the term 'organism' refers to individual entities like the most familiar and similar to us, animals. Yet, it was introduced in 1707 (Stahl) to oppose the mechanist view on living entities; thus, it incorporated an interpretation or a theory of living beings as organised systems.

The notion of organism is becoming prominent again in biology and in the philosophy of biology after some decades in which it has been nearly neglected and considered to be of little theoretical relevance. Although organicist positions about the principles of living organization have persisted at the shadow of other discussions considered to be more important, and mostly in adjacent fields like artificial life, origins of life or in medicine, they were somehow detached of the mainstream of discussions in biology.

The difference between a biology concerned by life at large (evolution and replication) or by organisms or living beings (autonomy and self maintenance) has been highlighted by many different authors, like Jacob (*The logic of life*), Maturana and Varela (*Autopoiesis and cognition*) and recently by Godfrey Smith (2011), who uses a "quite traditional view of organisms, and one not tied to evolutionary theory. This is a metabolic view: organisms are systems comprised of diverse parts which work together to maintain the system's structure,

despite turnover of material, by making use of sources of energy and other resources from their environment. Organisms in this sense can have any history. Even reproduction is optional. An organism might persist, on and on, without making more individuals. Organisms are essentially persisters, systems that use energy to resist the forces of decay, and only contingently things that reproduce". Like in Buss's (1987) pioneering work, Godfrey Smtih's analysis of biological entities distinguishes two strategies, reproduction and growth. The organism cannot be conceived of as a mere contingent crossover point between the genealogical and the interactive hierarchies (after Hull's replicator/interactor distinction), as it denotes a particular way of organisation that remains irreducible to mechanistic approaches (Ruiz-Mirazo et al 2000).

### 3. Living entities and HPC Kinds

In the metaphysics of science the discussion is whether science needs to classify biological entities as natural kinds or as individuals. On the one hand, similarities between members can be studied by induction and generalisation; on the other hand, the entity can be named classified in genealogical trees, it is considered to be unique, composed of parts and may be part of a group. Yet, merelogically defined individuals do not necessarily reflect the variety of biological organization present in biological individuals conceived as organisms.

Boyd's homeostatic property cluster kinds (HPC kinds) are a conceptual device to legitimise scientific categories without having to appeal to essences. Instead, they are conceived as a disjunctive cluster of properties plus a homeostatic mechanism that glues them together. According to their proponents, HPC kinds are tools that can generically characterise all scientific ontologies, there is no need of different kinds of kinds.

I will explore whether a monism on kinds (based on HPC kinds) can be assumed in biology to understand organisms (like Wilson 2006 proposes), or if an ontological pluralism of kinds, individuals and organisms as categories recruited for different explanatory purposes is required.

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