GROUND IN BIOLOGY

University of Geneva, 19-20 June 2015

In metaphysics, two facts are said to stand in a relation of ground when the grounding fact is *ontologically prior* to the grounded fact, or the grounded obtains *in virtue of* its ground. How is the notion of ground to be interpreted in biology? For instance, what is the ground of an organ's function? Two standard answers are the organ's 'ætiology' and the organ's 'causal role'. In what sense can either one be a ground of the function? Functions are particular kinds of phenomena. What is the ground of phenomena? Here a popular answer is 'mechanisms'. What makes it the case that some mechanism is the ground of some phenomenon? Why do some parts and not others constitute the mechanism? In this workshop, the notion of ground will be discussed in relation to these and other hot issues in the philosophy of biology.

A workshop in the SNF project

Grounding – Metaphysics, Science, and Logic

$\exists M, g, w \in W_M : M, w, g \not\models \neg P_x \rightarrow \exists x \neg P_x$

$\exists M, g : M, w_n, g \not\models \Box(\neg P_x \rightarrow \exists x \neg P_x)$

https://groundingproject.wordpress.com

PROGRAMME

18 June 2015 University of Geneva, salle L208 (Landolt)

16:00–19:00 *pre-workshop reading session*

19 June 2015 University of Geneva, salle Simon Veil (Colladon)

14:00–14:10 *welcome and introduction*

14:10–15:10 Matteo Mossio (IHPST and CNRS Paris)
Organisation as a Biological Ground

15:10–15:30 *coffee break*

15:30–16:30 Lorenzo Casini (University of Geneva)
Functions and Grounds in Biology

16:30–16:50 *coffee break*

16:50–17:50 Matteo Colombo (TiLPS, University of Tilburg)
Dopamine and the Heuristic Identity Theory

17:50–18:10 *coffee break*

18:10–19:10 Jens Harbecke (Witten/Herdecke University)
Is Mechanistic Constitution a Version of Material Constitution?

20:30 *ground dinner*

20 June 2015 University of Geneva, salle Simon Veil (Colladon)

09:00–10:00 Marie Kaiser (University of Cologne)
The Metaphysics of Constitutive Mechanistic Phenomena

10:00–10:20 *coffee break*

10:20–11:20 Marcel Weber (University of Geneva)
How Objective Are Biological Functions?

11:20–11:40 *coffee break*

11:40–13:00 Stuart Glennan (Butler University)
Mechanism-dependence as the Ground of All Biological Phenomena

13:30 *ground lunch and farewell*

PRE-WORKSHOP SESSION

A pre-workshop reading session will take place on 18 June. Selected parts from Stuart Glennan's work-in-progress book will be discussed, with Stuart as a special guest. Anyone is welcome to attend this session and/or join us for a pre-workshop dinner afterwards. For more information on the readings or the dinner, please email lorenzo.casini@unige.ch.

ABSTRACTS

Organisation as a Biological Ground (Mossio, M.) In this presentation, I will argue that organisation constitutes the central ground of all biological phenomena. Biological systems are first and foremost organised systems, and their distinctive features inherently rely on their organisation. By providing a specific (although preliminary) characterisation of biological organisation, I will focus on how it grounds the teleological and normative dimensions of biological phenomena, as well as the notion of biological function. In the conclusion, I will discuss the relations between the organisational perspective and mechanistic accounts in biology.

Grounds and Functions in Biology (Casini, L. and Weber, M.) There is no consensus on what 'biological function' means. Instead, there are a variety of definitions, which may be broadly classified into an ætiological category (Wright, 1972) and a dispositional category (Cummins, 1975; Boorse, 1976). Each category is arguably more suitable to capture a different aspect of the concept. In this talk, we tackle the more general issue of how to best analyse the concept 'biological function' in ætiological and dipositional accounts. In particular, we motivate an interpretation of function based on *ground* (Fine, 2012), a relation of ontological priority that is meant to be particularly suitable to back explanatory dependencies. The advantages of our proposal are discussed.

Dopamine and the Heuristic Identity Theory (Colombo, M. and Wright, C.) An important class of arguments for the identity theory of mind/brain are inductive. This is especially the case for the so-called *Heuristic Identity Theory (HIT)*, which purports to be more sensitive to the history and practice of empirical science. This paper strengthens the inductive argument for *HIT* by offering a second major case study supporting it. In particular, the past century of dopamine research – especially the fifty year period from 1954–2003 – vindicates a non-traditional version of this identity theory, in which psycho-neural identity claims that imply a reduction of mental states to neural states are input or initial state to research and play a merely heuristic role in developing research in multiple fields and at multiple levels.

Is Mechanistic Constitution a Version of Material Constitution? (Harbecke, J.) The aim of this paper is to analyse the similarities and differences between the regularity account of mechanistic constitution and the standard accounts of material constitution. In a first step, the regularity theory of mechanistic constitution is presented, and the problems of material constitution and metaphysical grounding are reconstructed. A definition of material constitution is offered that is acceptable to both pluralist and monist solutions. It is then argued that the two relations are of a different logical order. Moreover, the criteria typically applied for an identification of the respective relata are characterized as fundamentally different. In a final step, it is shown that the ontology presupposed by the regularity approach to mechanistic constitution may offer an interesting radical eliminativist solution to the problem of mechanistic constitution and metaphysical grounding.

The Metaphysics of Constitutive Mechanistic Phenomena (Kaiser, M. and Krickel, B.) The central aim of this paper is to specify the ontological nature of constitutive mechanistic phenomena (i.e., of phenomena that

are explained in constitutive mechanistic explanations). After identifying three criteria of adequacy that any plausible approach to constitutive mechanistic phenomena must satisfy, we present four different suggestions, found in the mechanistic literature, of what mechanistic phenomena might be. We argue that none of these suggestions meets the criteria of adequacy. According to our analysis, constitutive mechanistic phenomena are best understood as what we will call 'object-involving occurrents'. Furthermore, on the basis of this notion, we will clarify what distinguishes constitutive mechanistic explanations from etiological ones.

How Objective Are Biological Functions? (Weber, M.) Biological functions, due to their teleological ring, have always been shady citizens of the objective world. In a somewhat recent attack, John Searle has argued that functions owe their existence to the value that we put into life and survival. In a first part of my talk, I will show that Searle's argument rests on a simple mistake, namely the failure to understand that functional predicates are (at least) three-place. These predicates relate not only a biological entity (e.g., the heart) and an activity that constitutes the function of this entity (e.g., pumping blood), they also contain a place for a goal state (e.g. survival or evolutionary fitness). A functional attribution without specification of such a goal state has no truth-value (of course, the goal state is often implicit in biological practice). But if completed with a goal state, functional attributions understood as three-place relations attain a truth-value, which is at least as objective as causal statements (provided that the latter are objective). Thus, Searle critique breaks down. What Searle ought to have said is that our valuing survival or other goal states is the reason why biology seeks functional knowledge, but this has nothing to do with ontology. In a second part of my talk, I will explore how the objectivity of functions could be challenged even if what I said above is understood. A potential threat comes from considerations about the nature of biological mechanisms.

Mechanism-dependence as the Ground of All Biological Phenomena (Glennan, S.) According to recent accounts of the nature of mechanisms, mechanisms are identified by the phenomena for which they are responsible. Put simply all mechanisms are mechanisms *for* some phenomenon. The relationship between mechanisms and their phenomena is naturally construed as a grounding relation, and when a phenomenon is so grounded I call it a mechanism-dependent phenomenon. My contention is that all biological phenomena are grounded in the activities of mechanisms, and that the mechanism-dependence is all the grounding that biological phenomena need. I will begin with an explication of the mechanism-dependence relation, comparing it with two other candidates for grounding relations – constitutive and causal relations. I will argue that mechanism-dependence is not in fact a single relation, or at least not a tightly bound one. Instead, I will suggest that there are many varieties of mechanism-dependence that arise from the many varieties of phenomena and the many ways in which mechanisms can be responsible for those phenomena. I shall conclude my talk by answering some challenges to my claims of mechanistic hegemony – for instance, that natural selection cannot be thought of as a mechanism, that systems biology offers distinctively non-mechanistic explanations, and most fundamentally that the "living causes" cannot be grounded in mechanisms.

ORGANIZATION

The workshop is organized by Lorenzo Casini (University of Geneva) and Marcel Weber (University of Geneva), with the generous support of the Swiss National Science Foundation (grant no. CRSII 1_147685/1).

ATTENDANCE

Attendance to the workshop is free of charge. Just come along. If you wish to join us for dinner, let us know at lorenzo.casini@unige.ch.

CONTACT

If you have any query on the workshop or the project, please send us an email at lorenzo.casini@unige.ch.