Worlds Apart? Aristotelian and Contemporary Engagement in Metaphysics and the Philosophy of Biology

April 14-15, 2016

University of Utah Department of Philosophy
Tanner Philosophy Library (Carolyn Tanner Irish Humanities Building 459)
215 S. Central Campus Dr., 4th floor, Salt Lake City, Utah 84112

Thursday, April 14

Aristotelian Themes and Contemporary Biology

9:00-10:15: *Denis Walsh,* University of Toronto
"Hylomorphism, Foundationalist Materialism, and Emergence"

10:15-11:15: *Melinda Bonnie Fagan* and *Matt Haber,* University of Utah
"From Stem Cells to Species: Potentiality, Transformation, and Individuality in Contemporary Philosophy of Biology" (Roundtable Discussion)

11:15-11:30: Coffee Break (Philosophy Department Lounge)

11:30-12:30: *Anne Siebels Peterson,* University of Utah
"Organismal Generation Then and Now: The Persistence and Development of Aristotelian Matter"

Aristotelian Biology Through the Ages

1:30-2:45: *James G. Lennox,* University of Pittsburgh
"Taking Development Seriously: Aristotelian Echoes in the History and Philosophy of Biology"

2:45-3:45: *Diana Quarantotto,* Sapienza Università di Roma
"Structures and Processes in Aristotle's Genetics and Embryology"

3:45-4:00: Coffee Break (Philosophy Department Lounge)

4:00-5:00: *Laura Nuño de la Rosa,* IAS-Research Center for Life, Mind, and Society, University of the Basque Country
"The Return of Types in Evolutionary Biology: Back to Aristotle?"

5:00-6:00: *Andrea Falcon,* Concordia University, Montreal
"Biology and Metaphysics in Aristotle's Philosophy"

Friday, April 15

Aristotelian Themes and Metaphysics

9:00-10:15: ***Michael Loux,*** University of Notre Dame
"Second Thoughts on Aristotle's Metaphysics"

10:15-11:15: ***William Jaworski,*** Fordham University
"The Hylomorphic Worldview: A Twenty-First Century Rebirth"

11:15-11:30: Coffee Break (Philosophy Department Lounge)

11:30-12:30: ***Michael Peramatzis,*** University of Oxford
"What is a Form in Aristotle's Hylomorphism?"

Aristotle, Biologist and Metaphysician

1:30-2:45: ***Sabine Föllinger,*** Philipps-Universität Marburg
"The Differentiation of the Sexes in Aristotle's Biology"

2:45-3:00: Coffee Break (Philosophy Department Lounge)

3:00-4:00: ***Klaus Corcilius,*** University of California, Berkeley
"Universal Goodness and Zoological Explanation: The Case of Animal Locomotion"

Organized by: Anne Siebels Peterson, University of Utah
Sponsored by: University of Utah Department of Philosophy
University of Utah Tanner Humanities Center
Conference Website Available At: http://annesiebels.wix.com/peterson

Abstracts

Klaus Corcilius (University of California, Berkeley)

Universal Goodness and Zoological Explanation: The Case of Animal Locomotion

Aristotle has a rather demanding conception of scientific explanation, which crucially involves reference to a thing's essence as 'the' because of which a given scientific fact about that thing obtains. In my paper I try to show how these demands shape Aristotle's theory of animal locomotion in a way that makes this theory—from a modern perspective—metaphysical all the way down.

Melinda Bonnie Fagan (University of Utah) and Matt Haber (University of Utah)

From Stem Cells to Species: Potentiality, Transformation, and Individuality in Contemporary Philosophy of Biology

Roundtable discussion on biological individuality in ontogeny and phylogeny (being and becoming, unity and diversity)

Andrea Falcon (Concordia University, Montreal)

Biology and Metaphysics in Aristotle's Philosophy

For Aristotle, what we call biology and metaphysics are not only separate projects; they are also autonomous theoretical sciences. While this does not mean that the boundaries between the two sciences are impermeable, it creates an obvious problem for the view that there can be direct infusion of biology into metaphysics or metaphysics into biology. Therefore, the question I am interested in is how exactly we should negotiate the boundaries between metaphysics and biology. In the first part of my talk, I will try to show that biology is part of the larger project that Aristotle calls physics. In the second part, I will look at how this integration is to be understood by focusing on Aristotle's theory of animal generation. This theory is an ideal place to explore how we should approach the question of the existence of boundaries between Aristotle's biology and Aristotle's metaphysics.

Sabine Föllinger (Philipps-Universität Marburg)

The Differentiation of the Sexes in Aristotle's Biology

In his biology, Aristotle offers a systematic and detailed explanation of reproduction. In this, as is well known, he maintains an 'asymmetric' theory of generation: he takes his Doctrine of Four Causes as basis and regards the contribution of the male partner in generation as the form-giving source of movement, which, although it is tied to matter, is itself immaterial in nature. The female contribution to generation provides the matter (*hyle*). There is thus an opposition of active and passive contributions. The genesis of a female offspring occurs as a deviation from the paternal *eidos*. Individual studies[1] have established that this concept is not due simply to a misogynistic general outlook, but to Aristotle's attempt to develop a comprehensive scientific theory. While the basic lines of this theory have been clarified, various problems remain, which will be pursued in the paper. Thus we need to ask whether the fact that active functions are assigned to the female contribution, both in the origin of the sexes and in the inheriting of individual characteristics, amounts to an inconsistency within Aristotle's theory of generation; here we need to investigate what the function of *hyle*

[1] Sabine Föllinger, Differenz und Gleichheit. Das Geschlechterverhältnis in der Sicht griechischer Philosophen, Stuttgart 1996,118-179; Robert Mayhew, The Female in Aristotle's Biology. Reason or Rationalization, Chicago/ London 2004.

is. Some problems are also posed by the meaning of *eidos*. For a formulation such as that in *De generatione animalium* I 20. 729a24f. – that the two sexes differ in *eidos* – stands opposed to the discussion in *Metaphysics* I 9, according to which man and woman have the same *eidos*. Special attention will be given to *kinesis* as impulse to movement and bearer of the 'inherited information'.

If we consider the Aristotelian theory of generation, differentiation between the sexes and heredity, as it appears in different works and contexts, it conveys a dynamic character. For Aristotle, in his grand attempt not only to describe but also to explain the differentiation of the sexes, continually integrates new elements in the attempt to bring theoretical premises and empirical observation into agreement. In this he does not limit himself to the sphere of human biology, but makes productive for his argument also observations from zoology, such as the phenomenon of 'wind eggs', and observations on parthenogenesis. These gain a particular interest from comparisons with modern discoveries (e.g. the activation of embryo development by stimulation of the cortical reaction). A final section of the paper is devoted to this comparison.

William Jaworski (Fordham University)

The Hylomorphic Worldview: A Twenty-First Century Rebirth

Since the Scientific Revolution of the sixteenth and seventeenth centuries the dominant philosophical worldviews have taken the physical universe to be a vast undifferentiated sea of matter and energy that can be described exhaustively by our best physics. These worldviews have given rise to seemingly insoluble philosophical problems such as mind-body problems. What place can there be in the universe for thought, feeling, and perception if at a fundamental level the universe lacks any such characteristics? I outline an Aristotelian hylomorphic framework (one committed to properties being powers) that dovetails with current work in metaphysics, philosophy of mind, and scientific disciplines such as biology and neuroscience, and explain how that framework enables us to situate mental phenomena within the natural world.

James G. Lennox (Department of History and Philosophy of Science, University of Pittsburgh)

Taking Development Seriously: Aristotelian Echoes in the History and Philosophy of Biology

What is the connection between thinking of organisms as naturally organized unities, giving them explanatory priority over their constituent parts and processes, and thinking of generation as a special kind of change distinctive of such natural unities, requiring different sorts of concepts and categories with which to describe and explain it? That is the philosophical question that motivates this paper.

One of Aristotle's most distinctive, important and—as I will argue—enduring contributions to philosophical thought was his insistence on the irreducibility of substantial generation, the unqualified coming to be of substantial beings (οὐσίαι), to changes that take place in other categories of being. This issue was important enough to Aristotle that he devoted an entire treatise, *On coming to be and passing away*, to it; and a much longer treatise, *On the generation of animals*, to a sustained study generation across the entire animal kingdom. This is what I mean by "taking development seriously". Defending the uniqueness of generation required that he mobilize virtually every other aspect of his distinctive metaphysical point of view: the priority of substance to the other categories; the special meanings of potentiality and

actuality as applied to items in that category; and the idea that the form of being at the end of generation is that for the sake of which it is taking place, i.e. the idea that development is goal-directed. In this paper I explore the relationship between Aristotle's concept of the organism as a hylomorphic unity and his concept of generation as a unique form of change; and I trace its impact on two other students of the subject: William Harvey (who coined the term *epigenesis*) in the 17th century and E. S. Russell (chief spokesman for organismal biology) in the 20th. If time permits, I will close with some questions about whether the current revival of interest in developmental biology (which takes a number of different forms) might be understood in light of these previous historical moments.

Michael Loux (University of Notre Dame)

Second Thoughts on Aristotle's Metaphysics

From the 1980's onwards there developed a huge body of literature on the middle books of Aristotle's *Metaphysics*. In this paper, I try to assess my own contributions to that literature. I argue that my approach, in emphasizing purely formal or structural features of the ontological framework Aristotle develops in the middle books, overlooked important teleological themes implicit in Z and H and their role in Aristotle's argument.

Laura Nuño de la Rosa (IAS-Research Center for Life, Mind, and Society, UPV/EHU
University of the Basque Country, Donostia - San Sebastian, Spain)

The Return of Types in Evolutionary Biology: Back to Aristotle?

Although organismal form played a privileged role in biology until the end of the 19th century, Morphology was excluded from the Modern Evolutionary Synthesis. From a philosophical perspective, the absence of Form in the Modern Synthesis was justified on the basis of its association with typological thinking, and more generally with essentialism, i.e. the definition of each species according to intrinsic, necessary, and sufficient properties. Typological thinking was claimed to be at odds with the population thinking introduced by Darwin, whose emphasis in individual variation became the theoretical pillar of the synthetic view of evolution. However, in the last decades morphology has experienced a renaissance in evolutionary biology which has entailed the return of typological concepts such as 'type', 'Bauplan', or 'homology'. This renaissance of morphology has challenged the received view on typological thinking in both the historical and the philosophical fronts. The progress in the historiography of pre-Darwinist biology has led to the revision of the "history of essentialism". In philosophy of biology, evo-devo's mechanistic interpretation of types has led to a vindication of essentialism where biological entities are seen as homeostatic properties clusters. In this presentation, I will argue that many of the synthetic historical and philosophical misunderstandings regarding typological thinking, derive from the conflation of the type concepts used in the two biological disciplines in charge of organizing organismal diversity, namely taxonomy and morphology. In particular, I will focus on the historical origin of this conflation, which I trace back to different interpretations of Aristotle and particularly of his work on the *History of the animals*. Firstly, I will show how the Scholastic interpretation of the method of division led to see Aristotle as the founder of "taxonomical essentialism". Secondly, I will argue that the Aristotelian study of biological diversity can be considered as a morphological (not taxonomical) project. As shown by the contemporary studies of Aristotle's biology, the epistemological goal of the *History of the animals* is not to classify but to define animals, and the method used to achieve this goal is not the Scholastic 'dichotomous division' of taxa, but the 'definitional division' of animal parts. I will contend

that this first attempt to understanding the logics of animal form is akin to the concepts of type developed by rational morphology, and, in this sense, can be seen as the founder of the type concepts of contemporary theoretical morphology. Furthermore, I will argue that, the explanation of form that Aristotle develops in the *Generation of animals*, foresees the approach to form of developmental morphology and explains the regained interest in Aristotle experienced by the philosophers of biology working on the new approach to evolution endorsed by evo-devo.

Michael Peramatzis (University of Oxford)

What is a Form in Aristotle's Hylomorphism?

I shall focus on the following question in Aristotle's hylomorphism: what does a natural form's essence involve? The main contenders for an answer to this central question run as follows:

(1) [PURISM] A form is pure; it is essentially nonmatter-involving; its definition makes no reference to any material items.

(2) [COMPOUND FIRST] Form and matter are abstractions in thought derived from the compound itself. The compound is a material (type of) object and is metaphysically basic.

(3) [TRUE GRIT] A form is essentially matter-involving; its own definition refers to some appropriate sorts of material item. These last are in some sense genuinely "material."

Setting to the side the exegetically implausible [COMPOUND FIRST] view, I shall compare [PURISM] with [TRUE GRIT] and argue in favor of the latter.

Anne Siebels Peterson (University of Utah)

Organismal Generation Then and Now: The Persistence and Development of Aristotelian Matter

What, for Aristotle, is the role of matter in the process of organismal generation? Does this role include persistence, and if so, persistence in what sense? Material persistence is commonly understood in terms of persistence both numerically and under the same type; alternately, it is sometimes understood in terms of persistence merely at the type level. After arguing that Aristotle's understanding of organismal generation undermines both of these ways of understanding the material persistence claim, the former because it conflicts with the sense in which organismal generation develops matter and the latter because it conflicts with organismal generation as a process extended over time, I will motivate a new way of understanding material persistence in Aristotle. According to the view I will develop, matter persists numerically but not necessarily under its original type—avoiding the problems facing the other two views and better according with the process of organismal generation. I will support my understanding of Aristotelian matter by arguing that for Aristotle, matter's numerical identity is not tied to any single type of being; rather, it is tied to the series of types of being needed for the generation of an organism of the relevant kind. As long as matter undergoes shifts in its form consonant with this process of generation, it should be seen as persisting in its numerical identity. Finally, I will argue that this understanding of the role of Aristotelian matter in organismal generation connects more deeply than its alternatives with certain features of organismal development on the scene in contemporary philosophy of biology.

Diana Quarantotto (Sapienza Università di Roma)

Structures and Processes in Aristotle's Genetics and Embryology

In Aristotle's view, embryogenesis is a single and continuous process whereby a single entity undergoes various different stages of development corresponding to different biological structures. So far, scholars have focused on one aspect of this theory: the fact that the various stages of embryogenesis, albeit different from each other, do not correspond to different entities but rather to one and the same entity at different points in its ontogenetic history. The explanation provided for this fact is broadly the following: the entire process is generated by a single source of motion, which works as a programme (i.e. a set of instructions) for building the organism and which determines and regulates the ordered sequence of the various stages. I shall argue that there is another aspect of Aristotle's Embryology, which is just as pivotal as the one just mentioned and which has been neglected: the fact that, in each stage of its development, the embryo is alive and that, although it is alive in different ways or degrees, it is so not simply in the sense that it proceeds towards the realization of the living process. From this point of view, Aristotle's theory is aimed at explaining how the living process continues as the embryo transforms from one structure to another. This fact cannot be accounted for adequately by means of the notion of 'programme'–at least insofar as the programme is conceived of as a set of instructions–since a programme is not a process. I shall suggest that the way in which Aristotle frames and resolves this problem finds interesting parallels in L. von Bertalanffy's general system theory and in J. Piaget's theory of the organizing organization.

Denis Walsh (University of Toronto)

Hylomorphism, Foundationalist Materialism, and Emergence

I contrast two approaches to the individuating, and explaining the properties of primary substances—hylomorphism and foundationalist materialism. The principal difference lies in the relation that each posits between a substance and its material constitution. According to hylomorphism, a primary substance is a complex of matter and form. According to foundationalist materialism a primary substance is constituted exclusively of its matter. The theoretically significant properties of a complex entity are fixed by the intrinsic, context insensitive properties of its matter. Foundationalist materialism has notorious difficulties accommodating the emergent properties of complex dynamic systems. This has become a genuine impediment to the proper understanding of the nature and function of biological systems, in which the function of the system confers certain causal properties upon its parts. I trace the problems back to the putative relation between a substance and its matter. These difficulties do not apply to hylomorphism. I conclude that hylomorphism provides a more appropriate model for the individuation and explanation of biological systems.