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Metaphysics in Historical, Social, and Scientific Context: The Case of Superorganism Theory

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My research during the year I was a resident at the Wissenschaftskolleg addressed general philosophical questions concerning the structure and presuppositions of scientific theories and explanations. Especially in the face of apparently competing alternatives, understanding what is at stake for the various claims put forward can help to resolve or dissolve the conflict. Scientific theories make at least two sorts of ontological commitments in explaining observations — what basic entities exist and what forces act upon those entities. I have focused my philosophical investigations of these matters on explanations of the complex behaviors of social insects. Recently, there has been a "revival" of superorganism theory, which purports to defend a new entity as real, and thus to challenge what is taken to be an ontologically meager reductionist perspective in biology. Invoking a "superorganism" suggests that the features of prototypical individual organisms (like human beings) can be usefully applied in identi-

fying other entities, including associations of individual organisms into societies. One aspect of my study involved the comparison of the multiple contexts in which superorganism theories were promoted in the United States in the early 20th century with that of the current revival. While at the Kolleg I completed a manuscript, *Superorganism: Then and Now*, which suggests that the assumptions of modern defenses of the superorganism differ substantially from earlier ones, although the role these views play as challenges to neo-Darwinism is similar. This paper will be published in 1995 in the *Yearbook in the Sociology of Science.*

My work then turned to more general metaphysics and more contemporary biology. Lurking behind particular efforts to explain a specific phenomenon are more fundamental commitments to the unity or disunity of science itself. What are the relationships between the various disciplines that make up the current practices of science and how are they involved in explanation? Do they compete, are they compatible, or even in the end reducible? Even within the sub-disciplines of biology these questions can be raised. I had previously developed a model of self-organization with Robert E. Page, to explain some aspects of the division of labor in honey bee colonies. We presumed the presence of genetic diversity among individual bees, and argued that some division of labor would emerge from interaction among the individuals, and without invoking adaptation at the colony level. I took the problem of explaining this complex feature of insect colonies as a location for questioning the relationship between allegedly competing accounts. Here I benefited from discussions with members of the "Schwerpunkt" *Social Intelligence.* In developing a manuscript on *Complexity and Pluralism,* Nigel Franks and Jean Louis Deneubourg were especially helpful for refining my arguments detailing when and where conflicts occur. I compared the structure and application of three different self-organization explanations of division of labor — the genetic account proposed by Page and myself, an architectural one by Franks, and a learning algorithm by Deneubourg. I tried out versions of this manuscript in lectures at the Kolleg, the *Fors chungsschwerpunkt Wissenschaftsgeschichte und -theorie,* the *Einstein Forum,* Hamburg University, and the Universities of Oslo and Trondheim in Norway. The response from those audiences along with discussions with fellows of the Kolleg have had an important influence on my thinking. The interaction I had with the social insect biologists was no accident, as the Kolleg recognized our shared interests in designing the constituency of our year. However, in addition there were unanticipated discussions and collaborations which have moved my research in ways I could not have predicted beforehand. This, I think, is a unique and the most valuable opportunity provided by the Wissenschaftskolleg. I was exceptionally lucky in that two new and

quite different projects emerged from discussions with members of the Biodiversity"-Schwerpunkt" and with Wolfgang Streeck.

After their Tuesday colloquium and many individual discussions, I found myself more and more intrigued by the issues addressed by the focal group working on "Biodiversity Reserve Selection Methods". Debates between Paul Williams and Dan Faith on alternative phylogenetic measures for diversity highlighted deep questions about what we know about the natural world, and the policy implications of this >pure< science suggested by Dick Vane-Wright and Chris Humphries fueled my already burning interests in interdisciplinary interactions. I was graciously invited to participate in a series of seminars with their group, other fellows of the Kolleg, and outside visitors. Gustav Ranis continued to raise the question of the value of biodiversity itself, and argued that it must be addressed prior to any defense of a particular strategy for conservation. I believe it was, in part, in response to his persistence that at the end of the year the Biodiversity group asked me to contribute to the first chapter of their book. My task is to explicate how the various economic, aesthetic, and moral values people have and can assign to biological diversity influence the ways in which diversity is measured. I have been working on this since returning to California and will present my results in a workshop I have organized at the London School of Economics in March, 1995. Dick Vane-Wright will present the work of their group at this occasion, and a social scientist from the L. S. E. will also make a presentation. While I think of my work as both preliminary and provisional, I am planning to continue to do research in this area. I have the Kolleg and the Biodiversity group to thank for opening up a new and vital arena for this philosopher of biology.

The second new direction was again spawned by the Tuesday colloquium. Wolfgang Streeck presented a critical account of the recent history of the European Community, detailing the predicament of maintaining authority at the super-national level in the face of the autonomy of the constituent nations. He outlined new ways to think about these political structures. In my colloquium I discussed the notions of the unity and disunity of science that are plausible given the fact of the pluralism exhibited by scientific disciplines and sub-disciplines. Fellows in the audience pointed to the similarities in the types of questions we were addressing, even though the contexts are so different. While in Berlin, Streeck and I met on several occasions to explore the similarities further and are now collaborating on a project entitled *Global Order and Pluralism in Science and Politics.* This project is a >pilot< comparative study whose goal is to contrast theories of global governance and models of scientific structure in order to better understand each of these domains. Developments in each

field are being considered. On the side of political theory, in building an international order, hopes for universalistic world government have been widely abandoned, and new forms of order are being sought that recognize the apparently irrevocable diversity of national systems or cultures. In the European Community, for example, the quest for "harmonization" of rules and regulations, pertaining to products, health and safety regulations, etc., has given way to a search for new, "softer" regimes that leave national sovereignty intact while at the same time allowing integration to proceed. The tools that have been developed for this purpose are new, untested, and poorly understood instruments of international law, including mutual recognition of national standards, standardization of interfaces of systems rather than systems themselves, limitation of regulation to common minima, regulation of outcomes rather than methods to achieve them, harmonization of measurement procedures rather than substantive goals, etc. What these have in common is that they try to respect the different logics of national systems, thus endorsing "pluralism". This entails avoiding subsumption under universal, general principles, while at the same time trying to assure mutual compatibility and respect. On the side of natural science, the last decade has witnessed an increase in the defense of the "disunity" of science, from both philosophical and sociological perspectives. The fact of multiple research strategies and languages both across divergent disciplines, e.g., psychology and neurobiology, and within a given discipline between, for example, theoreticians and experimentalists or developmental and evolutionary biologists, suggests the need for something more complex than a naive "unity of science" doctrine. We expect that close scrutiny of pluralism in the sciences may shed light on the logic and the possibilities and limitations of a non-statist, non-universalist, pluralist form of international governance in a world of sovereign nation-states. In addition, the theoretical and practical advances already developed in the study of political structures may allow a more thorough understanding of the type of pluralism existing in the scientific domain.

These two new projects owe their inspiration and initial formulation to the Wissenschaftskolleg, to the institution of the Tuesday colloquium, to the lunches that forced us out of our offices and out of our individual pursuits to discussions across tables and disciplines. The intellectual inspirations born there will undoubtedly grow and develop in the coming years.

But while the professional side of life at the Kolleg was more than rewarding enough in itself, it was combined with the opportunity for real friendships to emerge. As one-half of the *Herr and Frau Sprecher* couple, I worked with Robert Darnton on supporting the `lighter' side of life, including the dances, the movies, and the "Abschiedsfest". The community of fellows, their families, and Kolleg staff is what I shall miss most.

Berlin's music and theater and life will draw me back, I am sure, but the city will not be the same organism without the heart of the people who made up the 1993-1994 year of the Wissenschaftskolleg.