## SUMMARIES AND COMMENTS
*by Tomasz Komendziński*

TREES OF LIFE. ESSAYS IN PHILOSOPHY OF BIOLOGY, Ed. by Paul Gruffiths, Kluwer Academic Publishers, Dordrecht 1992, p. 278

This volume presents a selection of papers presented at the Philosophic Problems in Evolutionary Biology conference at University of Otago, New Zealand in August 1990. It is divided into three parts: ''Beyond Natural Selection", ''Central Concepts of Evolutionary Theory" and ''The Developmental System Approach".

The first part contains papers of E. Sober (''Models of Cultural Evolution"), K. Sterelny (''Punctuated Equilibrium and Macroevolution") and R. Craw (''Margins of Cladistics: Identity, Difference and Place in the Emergence of Phylogenetic Systematics 1864)1975"). Sober examines ''evolutionary" models of cultural change, and in detail that of Cavalli - Sforza and Feldman and that of Boyd and Richardson which considers cultural evolution as product of natural selection. Sober considers theories modelled on population genetics and suggest that the models are irrelevant to social scientists because they have uncovered the qualitative causes of social change.

Kim Steralny in his paper distinguishes three theses concerning macroevolution: 1. pattern hypothesis - ''species typically come into being in relatively short periods of evolutionary time, remain stable for a long period, and than go extinct again in a short period" (p. 3); 2. process hypothesis - ''unconventional evolutionary processes are needed to explain the pattern" (p. 3); 3. ''although evolution is driven by conventional Darwinian processes at the individual level, there are larger scale patterns in evolution that cannot be discerned at this level" (P- 3).

Robin Craw's ''Margins of Cladistics" is contribution to David Hull's programme ''evolutionary" sociology of science.

First in section two on ''Central Concepts of Evolutionary Theory" is paper ''Adaptative Explanation and the Concept of a Vestige", in which Paul Gruffiths

 describes the connections between adaptative explanation and the ascription of biological function, considers Gould and Vrba's distinctions adaptation -exap- tation and function - effect and discusses concept of vestige. Shanahan in ''Selection, Drift and the Aims of Evolutionary Theory" examines distinction between selection and drift, and argues that ''selection" and ''drift" ''are idealised cencepts which represent endpoints on a continuum of biological sampling processes" (p. 134).

Section third ''The Developmental Systems Approach" contains three papers: Gray's "Death of the Gene: Developmental Systems Strike Back", Oyama's ''Ontogeny and Phylogeny: Acase of Meterecapitulation?" and Morss' ''Against Ontogeny". Gray defenses developmental systems and constructionist approach to evolution. Morss, as

suggest title, concludes paper with objection to the whole idee of ontogeny on basis of Hull and Ghiselin's idea that species are not natural kinds, but rather historical individuals. Oyama discusses ontogeny - phylogeny relation on the different levels.

Griffiths' collection is not systematical but present interesting problems in contemporary researches related to evolutionary theory in philosophy and history of science domains.

THE FOUNDERS OF EVOLUTIONARY GENETICS. A CENTENARY REAPPRAISAL, Ed. by Sahotra Sarkar, Kluwer Academic Publishers, Dordrecht 1992, p. 300

This volume Boston Studies of the Philosophy of Science is related to researches of four scientists: R. Fischer, J.B. S. Haldane, H.J. Muller and S. Wright. It is presentation of the founders of evolutionary genetics, relations and comparisons between Fisher, Haldane, Muller and Wright.

Tedy Sidenfeld discusses Fisher's contribution to the theory of experimental design on basis theory of statistical estimation. Fisher - Wright controversy is presented by W. B. Provine and M. J. S. Hodge on basis of correspondence and in biological and philosophical contexts. Provine suggests that the controversy between Fisher and Wright had a great influence upon modern evolutionary biology.

Hodge in comparative and contrastive study discusses a few distinctions: between classical and romantic outlook, tenderminded and thoughminded philosophies, this-worldly and other-worldly thinkers, and conservative and rationalist attitude. On Wright is also paper of J. F. Crow related to his place in Twentieth-century biology and his influence in statistics animal breeding, physiological genetics, population genetics and evolution. "In any one of these areas Wright ranks among the important contributors to twentieth-century

biology. Considering them tohether he must be ranked among the greatest" (Crow, p. 194).

Scientific biography of J.B. Haldane is a subject of J.M. Smith and S. Sarkar's papers. Sarkar considers Haldane as biochemist, in the 1923-1932. W. C. Wimsatt compares Haldane and Muller approaches to problems of linkage and recombination. On Muller's role in evolutionary biology is second paper of Crow. Crow considers Muller's numerous contribution to theory of evolution and suggests that he is leader in the development of the neo-Darwinian view of evolution (p. 101). All of the papers are preceded by Sarkar's ''Introduction". The volumne contains materials to complete conception and roles of the founders of evolutionary genetics in contemporary theory of evolution. It is excellent supplement to Jonathan Harwood's "Styles of Scientific Thought. The German Genetics Community 1900-1933" (University of Chicago Press, 1993).

DAVID BLITZ: EMERGENT EVOLUTION, Kluwer Academic Publishers, Dordrecht 1992, 242 p.

David Blitz's book is impressive monograph on emergent evolution. It is synthesis examines the background, origin and debate over emergent evolution. This volume consists three parts.

In first Blitz examines the background to emergence in the 19th century discussion of the philosophy of evolution. Author considers the framework of evolutionary theory of Charles Darwin, philosophy of evolution of Herbert Spencer, Huxley's monism and epiphenomenalism, evolution and supernatural in conception of A. R. Wallace and G. J. Romanes' concept of the evolution of mind. Blitz examine ''the status of continuity and discontunuity in evolution, the role of qualitative and quantitative factors in change, the relation between the organic ant the inorganic, the relation between the natural and supernatural, the mind-body problem, and the scope of evolution, including its extension to ethics and morals" (p. 1). Spencer and Huxley, Romanes and Darwin are described as ontological monist. Only Wallace admitt a natural world.

Part two ''The Origin of Emergent Evolution" considers Lloyd Morgan's creative synthesis system of emergent evolution and influences on his thought (J.S. Mill, G.H. Lewes, H. Bergson, E. G. Spaulding, W.T. Morrin). In David Blitz's opinion was nine basic theses of Morgan's theory of emergent evolution: thesis of the co-occurence of emergences and resultans, thesis of quantitative continuity and qualitative novelty, thesis of the supervenience of emergents, thesis of unpredictability of emergents, thesis of progressive evolution, thesis of physical epigenesis, thesis of metaphysical preformationism, thesis of nisus towards deity and thesis of natural piety.

In the very interesting part three ''The Debate over Emergent Evolution" Blitz presents other systems of emergent evolution (Alexander, Broad, Wheeler, Sellars), systems related to emergent evolution (Conger, Reiser, Montague, Mead, Boodin, Smuts, Hartmann, Feibleman), critical reaction to emergent evolution (Pepper, Baylis, Me Dougall, Russell, Carnap) and further discussion of emergent evolution in conceptions of contemporary philosophers and biologists (as Needham, Novikoff, W. Sellars, Medawar, Dampbell, Sperry, Mayr, Salk, Salthe, Popper and Bunge). ''Emergent evolution during the period from the mid-1910s to the mid-1930s became a trend of thought, with both advocates and critics. Thought temporarily eclipsed by reductionism during the period from the mid-1930s to the early 1950s, emergentism maintained its influence in the philosophy of bioloby through the related concept of integrative levels. With the decade of the 1950s, philosophers of science reconsidered emergentism as a legitimate alternative to reductionism and holism. In the last decades philosophers such as Karl Popper and Mario Bunge have incorporated emergentism in their philosophical systems, as have a number of biologists, including Ernst Mayr and Stanley Salthe, with results that I traced in the last chapter (thirteen - T.K.)." (p. 176).

In conclusion, Blitz provides his opinion concerning three issues: the part - whole relation (analysis of the ontological and epistemological aspects of reductionism, mechanism, emergentism, organicism and holism), the analysis of emergence (Blitz requires the concept in logical and settheoretical terms), and the level-s of reality (''reality can be analyzed as a structure of irreducible levels: matter, life, society and mind" (p. 183)).

This volume of EPISTEME series presents clearly and syntheticaly history of emergentism in context of theory of evolution, his background, origin, critic and development.

THE PROBLEM OF REDUCTIONISM IN SCIENCE, Ed. by Evandro Agazzi Kluwer Academic Publishers, Dordrecht 1991, 216p.

The volume containes papers presented at Colloquium of the Swiss Society of Logic and Philosophy of Science ''The Problem of Reductionism in the Science" organized at the Federal Polytechnic of Zurich from May 18-19, 1990.

Evandro Agazzi's ''Reductionism as Negation of Scientific Spirit" and Mario Bunge's ''The Power and Limits of Reduction" are of a general philosophical character. Agazzi examines difference between reductionism and reduction. Reduction "is a legitimate methodological procedure of science (if applied with enough consciousness of its limits)", and reductionism (contrary to the spirit of science) "is a methaphysical absolutization of reduction" (p. XI). Bunge analyzes a concept of reduction on different levels of organization and say

that reduction must be supplemented by synthesis. Bunge concludes that ''moderate reductionism is a more realistic research strategy than radical reductionism, and either is more powerful than anti-reductionism" (p. 48).

Paul Hoyningen-Huene in ''Theory of Antireductionism: The Bohr Case Study" provides 1) explication of what a theory of antireductionist arguments is, 2) description of the Bohr case study, 3) explication of the connection between the theory of antireductionist arguments and the Bohr case study. He considers also classification of antireductionist arguments.

In next paper "A Short History of Emergence and Reductionism" Manfred Stockler analyzes theoretical and historical background of emergence and reductionism. Ervin Engeler (''The Technical Problem of''Full Abstractness" as a Model for an Issue in Reductionism") and Jules Vuillemin ("A Neutral Reduction: Analytical Method and Positivism") presents formal analysis of reduction and reductionism. Vuillemin considers connections between analytical reduction and positivistic phenomenalism (Comte, Mach, Duhem, Quine).

The last group of essays deals with reduction and reductionism in concrete scientific disciplines. Paul Weingartner discusses reduction and reductionism in theoretical and historical contexts. Renzo Morchio in ''Reductionism in Biology" egzamines formal, factual and methodological reductionism. He concludes that ''reductionism" is no longer necessary" (p. 159). Hans Primas ("Reductionism: Palaver without Precedent") discusses examples for a theory of reduction in the sense of Hempel, Oppenheim and Nagel, in physics and chemistry. He rejects reducibility of chemistry to physics. For a contemporary theoretician reductionism is dead because intertheoretical relations are of central interest to modern science and have nothing to do with the idea of reductionism. Natural science is necessarily pluralistic. Gilles-Gaston Granger (''Must a Science of Artificial Intelligence be Necessarily Reductionist") distinguishes two concepts of reductionism (ontological and epistemological) and examines the models of artificial intelligence. ''Artificial intelligence is unable to reduce natural intelligence to material, energetic and algorithmic procedures" (p. XVII). Patrick Suppes answers in the negative the question of the title (''Can Psychological Software be Reduced to Physiological Hardware?"). He concludes that are four strands to his argument. ''The first (...) analyzes the nature of computation. The second concerns the nature of goal-oriented behavior. The third uses an argument that the mind is computationally irreducible. The fourth asserts the irrelevancy of the standard attempts to provide a reduction via general ideas about determinism." (p. 183).

Discussion of epistemic concepts (knowledge, belief, doubt etc.) presents Elena Klevankina in paper "On the Problem of Reducting Value-Components". It is discussion of reduction in the sense in which ''reduction" means ''elimination". She considers eleminating qualitative features, degree, justifications, acceptability by replacing them through more neutral and objective criteria.

The volume is important supplement to ''Reduction in Science" edited by W. Balzer, D.A. Pearce and H.J. Schmidt (Kluwer Academic Publishers, 1984), and ''Reductionism and System Theory in the Life Sciences" edited by P. Hoyningen-Huene and P. Wuketits providing synthesis related to reduction and reductionism.

Pandit G.L.: Methofological Variance. Essays in Epistemological Ontology and the Methodology of Science, Kluwer Academic Publishers Dordrecht 1991, p. 422

''Methodological Variance" is second Pandit's book related to epistemology and methodology of science. His first book ''The Structure and Growth of Scientific Konwledge: A Study in the Methodology of Epistemic Appraisal" (Reidel 1983) contains general interaction theory. On the basis of general interaction theory he affirm that science is an enterprise comprising the negative **feedback controlled problem - solving (and problem - posing) systems** (NFCPS systems). A basic principle of the methodology says that "a sound methodological model of epistemic appraisal of objective knowledge systems, and states of scientific change they can undergo, must be embedded in a sound model of their epistemic-structural identity and growth" (p. XVI). Pandit says that the principle of embedded methodology serves to grund the methodology of science in the basic principles of epistemological ontology itself. This methodology is called by Pandit ''the methodology of theory - problem interactive systems as negative feedback controlled problem - solving (and problem - posing) systems". The concept of interactive systems Pandit considers in the first book (it is corrected now).

Pandit's book contains two parts and ten chapters. In first part he disusses the questions of theory of subjective knowledge, theory of objective knowledge and theory of human interaction and relationship between the three fields. He present a formalizing model distinguishing (subjective and objective) knowledge from (instructed and creative) human interactions (p. 53). From Pandit's point of view all knowledge is a form of interactions instructed by bodies of empirical evidence from perceptual experience. His fundamental distinctions is ''between organization, information and knowledge on the one hand and instructed and creative interaction on the other but all within the framework of a general interaction theory.

In two other chapters of first part Pandit discusses question of indeterminancy of translation and impossibility of any enterprise concerning self-knowledge within traditional epistemology. Pandit argues that ''The growth of scientific knowledge follows an interactive pattern in which theory-problem interactive systems can be seen moving from the pragmatically simpler frameworks of

subject-specific rules of problem-formulation and theory-construction to more complex ones, with the simpler ones being allways derivable from, and hence translatable into, the more complex ones as special cases" (p. 78).

In second part he considers, after introductory discussion of the methodological esentialism in science and in philosophy (Popper, Kuhn, Wit- tegenstein, Lakatos, Feyerabend), empirical science as an enterprise comprising NFCPS systems and in general the methodology of theory-problem interactive systems. Pandit also formulates three postulates of epistemic structuralism.

Interesting Pandit's ''methodological Variance" developes ideas from his first book ''The Structure and Growth of Scientific Knowledge" and provides some new ideas in the method ology of science. If we would like to agree in all with Pandit, life of traditional epistemology is not long. But I think that it is not such simply.

Alfred I. Tauber (ed.), Organism and the Origins of Self, Kluwer Academic Publishers, Dordrecht 1991, p. 384

The book contains three parts: ''Historical Perspectives", ''The Immune (Congnitive Self' and ''Evolution of the Self'. In Introduction Editor considers historical context of origins of the self. He analyses conception of Elie Metchnikoff and basic conceptual framework related to notion of immunity and phagocytosis theory. Tauber discusses also Kant and Schelling ''Naturphilosop- hie" and organism-mechanism debate into the 20th century. In next paper ''The immunological Construction of the Self' Lowy on basis Fleck's epistemological study from ''Genesis and Development of a Scientific Fact" analyses concept of organism in constructivist epistemology. In part two are three papers: Varela's "Organism: A Meshwork of Selfless Selves", Chernyak and Tauber's ''The Dialectical Self: Immunology's Contribution" and Root-Bernstein's ''Self, Nonself, and the Paradoxes of Autoimmunity". Varela presents a generalized view of the organism as a multi-level meshwork of processes. Varela says on two dialectics: dialectics of identity (bootstrapping of two terms - dinamical an global) and dialectics of knowledge (bootstapping of two terms - significance and coupling). Qestion of dialectical self is developed in Chernyak i Tauber's paper. They "attempt to re-formulate the question of immune self-definition within a combined philosophical and evolutionary argument" (p. 78).

Root-Bernstein in his paper considers problem of immunological discrimination between ''self' and ''nonself' and the paradoxes created for this discrimination by the phenomenon of autoimmunity (p. 159). He conclude that ''Science never progresses by basking in its all too limited sucesses. And so science itself is like the immune system: it is defined both by what it knows (self) and by what it does not (nonself): and the self part of science will be redefined

88 only by a dialectical interaction with the nonself. Philosophy, theory, and experiment will all have their roles in this redefining process" (p. 203).

In part three are five papers and Epilogue on evolution of the self. Patricia L. Foster (''Directed Mutation in Escherichia Coli: Theory and Mechanism") and Sahotra Sarkar (''Lamarck contrę Darwin, Reduction varsus Statistics: Conceptual Issues in the Controversy over Directed Mutagenesis in Bacteria") discusses the current argument related to question whether the environment indices genomic reponses in bacteria. Foster and Sarkar summarize and critically examines evidence for a Neo-Lamarkian mechanism for evolutionary change. Eliot Sober in ''Organismus, Individuals, and Units of Selection" says that organism are marvelously well-adopted entities, that are mode of parts, are themselves parts of larger wholes. Individuality is one of the major results of evolution. "A maj or project for evolutionary theory is to explains the variation in degree of individuality that we find within and between levels" (p. 295). In next paper Donald Williamson present his chimera theory and argues that sequential chimera theory is a step towards a better understanding of evolutionary processes. Scott F. Gilbert in ''The Role of Embryonic Induction in Creating Self' discusses the role of embryonic induction in the self-creation of the embryo (in general terms concerning the embryo as self). He considers induction, the origins of self and constraints on evolutionary novelty, question of correlative development, transfers of inductive competence and competence in the immune system.

The book edited by Tauber provide vision (in scheme) of self as a synthetic, dialectical construct, essentially generated from an evolutionary epistemology. It is't full synthesis in the area but only a commentary on the nature of organism.