PREUSCHE, Andrea: **Geometrische Form als semioti-sches Phänomen** (Geometric shape as a semiotic phenomenon; Prolegomena on creative diagram formation using geometric shapes (connotography)). Tübingen: G.Narr Verlag 1987. 273p. = Kodikas Code: Supplement; 17. ISBN 3-87808-479-X

The title strikes up an age-old theme which is at the same time a highly topical fundamental subject: in what way are configurations that are describable in terms of formal logic connected with significative patterns, e.g. in what way are algorithms carriers of contents conveying meaning? Pythagoras was able to have recourse to far older traditions of thinking from Mesopotamia. At the present time the subject, although severely circumscribed by the subtitle, conjures up connections to linguistics (prelingual images and number concepts), to overlapping pattern recognition through the entire width of scientific and anthropological research (evolution, phase transitions, AI) all the way to the advancement of topological approaches. The mathematization of the world is followed by its geometrization.

Although the preface (O.S.) defines the book's objective as "describing the mode of operation of geometric form as a universal semiotic phenomenon independent of time", the investigative basis and range of validity are disproportionately narrow. True, in a most readable overview the introductory Chapter I "On the anthropological constancy of geometric form" manifests preferences for geometric form as an archetype and a semiotic phenomenon. But: "The following argumentation will above all be guided by Husserl's phenomenology, Cassierer's symbol theory, Perice's phenomenological semiotics and Eco's code and significance theory. Use will also be made of mnemonic psychology and design (Gestalt) theory as reference sciences" (p.52).

The ensuing discussion: II. "Of advance knowledge of things (recollection, recognition, retention; eidos and typus)", III. "Iconicity and symbol formation (iconicity; symbolic transformation; understanding of meaning) thus concentrate on a technical philosophical aspect which is only occasionally and sporadically expanded on. It is only in Chapter IV: "Geometric discourse", that the limits observed so far are exceeded, mainly by venturing into the creative-artistic realm of pictorial and plastic form-giving (diagrams, geometric code, configuration, ambiguity). Pictorial examples (by Kandinsky et al.) illustrate the train of thought and make it more readily understandable.

The investigation (p.51) professes two objectives: " (1) sign-phenomenological description and sign-theoretical analysis of geometric shape as a universal phenomenon and cognitive form, and - resulting thereform - (2) the design of a specific semiotic model on the basis of geometric shapes (connotography)". Regrettably, the chapter devoted to this second objective, i.e. Chapter V, "Creative diagram formation using geometric shapes: connotography" comprising only 23 pages, or one tenth of the overall text, is a very brief one. Although pictorial examples are included, the chapter - particularly since possible applications and the results thereof are merely hinted at - remains too vague and too unillustrative for this reviewer to care to comment on it. This is all the more deplorable since in interdisciplinary discourse - see above -historically grown as well as artificially concocted pictorial languages are gaining in importance as a field of research.

To sum up: with the exception of this final chapter, is the book a clean-cut piece of work within its self-imposed, predominantly technical-philosophical framework, one which especially those will find most readable who are interested in these specific partial aspects. However, it gives rise to an increasingly urgent wish for a more comprehensive, interdisciplinary investigation, be it only in the form of cross-connections and cross-references. Even if the self-imposed limitation is on the whole accepted, it is difficult to understand why even the footnotes and bibliography contain only cursory references, if any, to, say, the circumvention of language (e.g. E.Holenstein), to the interrelationships of space, number and time (as e.g. M.L.von Franz), to the physics and geometry of phase transitions (fluctuations, catastrophe theory) or to the reflections - not only of interest in the immediate front area - of system biology (Maturana, Varela), of (radical) constructivism as arising from it, or of evolutionary epistemology as proceeding from behavior research in the broadest sense (e.g.Riedl, Vollmer).

The Kodikas/Code series - an explanatory reference to which is lacking -probably addresses itself to a readership with specific pertinent interest. Nevertheless, the special terminology employed - which even this reviewer, although classically educated, had some trouble in understanding - should be complemented by a glossary, lacking here, or at least by an index, likewise lacking. Provision by the publisher of a more appealing set-up of the book, better tailored to the reader's needs and in keeping with the usual standards, would be desirable. And last not least: the work should provide an impulse for critically calling into question, in the light of current research, the philosophical bases expounded, e.g. in connection with what is known as Artificial Intelligence (e.g. Winograd/Flores). Helmut Löckenhoff

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SARTORI, Giovanni (Ed.): **Social Science Concepts: A Systematic Analysis.** Beverly Hills - London - New Delhi: Sage Publ.1984. 455p. ISBN 0-8039-2177-2

The present book came out of many years activities of the Committee on Conceptual and Terminological Analysis (COCTA). It is devoted to the problem of a critical stock-taking of concepts used in the social sciences. It is subdivided into a methodical and a practical part. In the methodical part, the editor gives guidelines for concept analysis; he concludes with a cross-disciplinary glossary of the most important concepts in this field. In the practical part, these guidelines are applied to an analysis of some selected concepts, namely *Consensus* (George J.GRAHAM, Jr.), *Development* (Fred W.RIGGS), *Ethnicity* (Robert H.JACKSON), *Integration* (Henry TEUNE), *Political Culture* (Glenda M. PATRICK), *Power* (Jan-Erik LANE, Hans STEN-LUND), and *Revolution* (Christoph M. KOTOWSKY). This review is restricted to the methical aspects of the book.

Ambiguities and inconsistencies impede intelligible communications and constructive discussions in social

science, and, as it seems, obstruct the development of a theory. Although single authors have always engaged in concept analysis, no method has yet been devised. With his guidelines, Sartori intends to set a basis for a systematic inquiry - where 'systematic' implies that a given procedure of analysis is replicated from concept to concept, thus allowing for a consistent and collective improvement of the state of the social sciences (p.10). On the premise that it is the concept that structures the sentence, Sartori subdivides his guidelines into three successive steps: *anatomy, reconstruction, and concept formation* (p.11). In the first step, the editor recommends critical scrutiny of a given concept with respect to its *anatomy*. He gives some characteristics of typical defects to which the analyst should pay attention. Above all, any empirical concept should be checked separately, (1) whether it is ambiguous, that is, how the meaning relates to the term; and (2) whether it is vague, that is, how the meaning relates to the referent (p.28). If the anatomical results are unsatisfactory, concept *reconstruction* should be performed. It requires, at a minimum, three steps: (1) the canvassing and listing of existing, authoritative definitions, (2) the clustering and transformation of these definitions into a set of extracted characteristics, and (3) a matrix (or matrices) that organizes these characteristics on the basis of meaningful criteria (p.41). The reconstruction results give the basis for the concluding *concept formation*, i.e., the redefinition of the concept. The guidelines are summarized in ten rules. Furthermore, different kinds of definition are introduced, and linguistic and philosophical concepts are clarified such as extension/intension, denotion/connotation, referent/meaning, ambiguity/vagueness, etc.

The editor makes a genuine effort to establish a methodical basis for concept analysis in the social sciences. However, in stating rules for concept analysis, in defining the concepts occurring in the rules, and in judging his definitions and his method, he serves too many masters at the same time. Consequently, the headings and the rules could not be structured systematically in accordance with the three steps of concept analysis mentioned above. This makes it hard not to loose the thread of exposition. The understanding is impeded additionally by the linguistic oriented philosophical background, which is controversial in the philosophy of science. Statements like "in the beginning is the word", "concepts are the units of thinking" (p.17), "words condition our reasoning" (p.19), or, "our knowing is, intrinsically and inextricably, onomatology - logos about (mediated by) names" (p.21) illustrate Sartori's bias in stressing the role of natural language in social science: Its theoretical framework is considered as a linguistic system with the word as its simplest unit of analysis (p.21f). Of course, each science uses the syntax of the natural language and many of its non-specific words, but from this it must not be concluded that scientific knowledge is expressed in a natural language. The theorem of Pythagoras, e.g., translated into an ordinary sentence remains nevertheless a technical expression. Natural language elements are employed only as a tool; the specific concepts and their relationships cause each science to create its own technical language. In an analogy, we may say that Sartori gives guidelines to a mechanic on how to keep his tools in

order. Of course, it is certainly an important matter to have useful tools, but the main interest of a mechanic is the car, its defects, and how to cure them; hints for maintaining the tools are not very helpful. In a word: the guidelines are missing the concrete reference to the research subjects of social science. This will be discussed with some characteristic points.

The rigid linguistic term/meaning/referent scheme does not fulfil the requirements of social science. A society with its different political and economic groups acting with or against each other has to be regarded as a complex system. A system is charaterized by its objects and the interaction processes between them. A process in turn can best be described by its working mechanism. But because a process will have, in general, many outcomes, it can also be characterized by the latter, but possibly with a loss of uniqueness. The outcomes of a process are changes in the relationships between objects described by state transitions, or objects like laws. They react, in general, upon the process of which they come from. Systems, processes and their products belong to different levels of reality. The levels are interlaced with each other, and there is no hierarchy. As a consequence, in representing the interrelations conceptually, there cannot be something like a hierarchy of concepts, or a 'ladder of abstraction' (Sartori, p.44-46). This fact makes it hard to understand what the meaning of a process or system really is and which referents should be assigned to it. This point remains unclear in all contributions of the volume. Furthermore, it has to be doubted that the knowing and the known can be broken down into the three basic elements: words, meanings, and referents (Sartori, p.22).

'Semantic field' is identified with *'system of concepts'*. A theory is based on specific concepts interrelated to each other. Since it is impossible to define all concepts without running into an infinite regress (a problem ignored by Sartori), some of them are left undefined like 'energy' in physics; they get their meaning only within the context of the theory. This is contrary to Sartori's assertion that concepts are more fundamental than theories (p.9). He takes the concept as an independent unit of thinking (p.22), but, on the other hand, he considers its semantic field as the crucial matter. According to him the semantic field of a concept is a covarying ensemble of associated and neighboring terms that constitute a system of terms (p.82). It seems that with the semantic field the interconnections with other concepts are taken into account, i.e., that there is a 'system of terms'. And without doubt, the products are associated with their processes generating them, and a system has something to do with its processes and objects so that the concepts describing all these phenomena belong to a semantic field. But there is no other criterion for belonging to it as 'is related somehow' which is too unspecific for a system of concepts. Even Sartori concedes that "the extraction of the characteristics (from our list of definitions) will leave us with a sheer enumeration of characteristics that appears intractable: We simply see no way of bringing this enumeration together into some meaningful kind of organization" (p.46). From a system theoretical point of view, however, a meaningful kind of organization follows from the different components of a system so

that the concepts under study can be grouped into processes (development, revolution, indicators/observables (power, consensus, integration), and state descriptions (ethnicity, political culture). Although there are some system theoretical approaches, the authors - bound to the guidelines - do not make use of them. They do not come to the conclusion that concepts describing different levels of reality require a different treatment: The established semantic fields and the characteristics of the concepts reveal a confusing cross-section through all aspects of a system.

Operational definitions are inadequate. An operational definition is viewed as a definition that establishes the meaning of the definiendum in terms of observable-measurable indicators (Sartori, p.80) which is in accordance with the early Carnap. The later Carnap came to the conclusion that operational definitions are inadequate, becoming in a way his own strongest critique. That makes is all the more surprising to find the operationalistic body of thought flourishing in a contemporary science. "Consensus is a level of agreement reaching 75%" (McClosky, ct.Graham, p.103) is a typical operational definition discussed in this book as a ' single-point measure' (Graham, p.108). In physics, single-points are bound to special states of the system (like freezing point), having thus a physical meaning. One feels no need to become more precise by replacing, for instance, the vague term 'hot water' by 'water is hot if its temperature exceeds 60°C' faking exactness. But this is in fact the intension found in social science: a fuzzy state like consensus should get a precise meaning by introducing a more or less arbitrary threshold. But what good is that? Sartori criticizes rightly that "the operationalization of a concept often entails a drastic and eventually distorting curtailment of its connotation" (p.31). But more important it the contradictory intension to hold on to natural language terms, and, on the other hand, to look for their refinement by means of an operational definition. In order to define, e.g., 'hot water' or 'consensus' operationally, a measurement procedure for temperature and agreement has to be available. By having such a procedure, a continuous spectrum of states (not only 'hot', 'cold', ...) can be identified sparing just those concepts which should be improved. Pre-scientific concepts may serve well in natural language conversations; but for scientific application it should not be made the attempt to refine, but to replace them by better ones. In doing so, one extends beyond the range of natural language.

The measurement principles are unclear. An operational definition presupposes measurability, not vice versa as Sartori asserts (p.34). Measurements are not based on a definition, and certainly not on an operational one. If mercury varies its volume when the temperature is changed, and if these two events are causally connected with each other, then the measurement of temperature can be reduced to that of volume and vice versa. If not, and yet a volume can be measured, then the volume is only an indicator, otherwise a measure for the temperature. 'Measure' should not be confused with 'unit' as Sartori (p.79) does. Consensus or agreement may be measured by survey results with percent as their unit. In some contributions the problem of measure is correctly reflected (e.g. Riggs, p.145) but mostly is the measure confused with the quantity to be measured, or, it fails to introduce a measure. Teune claims (p.246f, p.250) that a diminution of the degree of integration is a property of entropy. Normally, entropy is considered as a measure for order, and possibly it may be justified to take it as the measure for integration, too. Teune perhaps wants to say that entropy should be the measure of integration in such a way that the less the entropy the higher the integration. Terms like *'massive* violence', *'sudden* transformation of the society and polity', *'extended* process', 'concepts are *more fundamental* than theories' (Sartori, p.9) evoke the idea that something can be more or less massive (sudden, extended, fundamental) there. To be correct, a measure has to be introduced before using it; otherwise it would be left to the discretion of the reader to use his own measure which is a source of conceptual confusion. Often the quantitative nature is not so apparent as in the examples above. 'Development' or 'integration' seem to be pure concepts of the first glance. But their characteristics like westernization, modernization, stable economic production, quality of life, complexity, centralization and so on, reveal clearly quantitative aspects demanding a measure.

The interdependence between theory and measurement was overlooked. The search for a suitable measure is the crucial problem in each measurement adventure. Because of the causal connection between the quantity to be measured and its measure, the finding of a measure means either recurring to a known law, or discovering a new one. And, of course, the same also holds for an indicator, since the crucial point is not the metrization which was performed for a measure and not (yet) for an indicator but that they are representatives of something. By bounding to a law, a valid measure or defining characteristic promotes theory building, as well as a theory that will influence the measurement method and the distinction between an accidental or defining characteristic. Theory and measurement are not separate worlds, rather they depend mutually on each other. It is not correct, therefore, to say that whatever we measure refers to "named" variables (Sartori, p.15), or that concept formation is one thing and the construction of variables is another (Sartori, p.9), which is a widespread mistaken belief in social science and in the humanities. Arguing in this way, a chance for strengthening the theoretical base is wasted. It should be noted that if no causal connection exists, the further use of the measure or characteristics means to pretend to have a law with which the measure or the characteristics are in accordance. When, e.g., the development of a society is measured by its economical performance, then it is tacitly claimed that economical performance causes the development of a society; further characteristics are then either in contradiction to this, or they are accidental in the sense that they can be reduced to economic performance.

Sartori suggests a substitution test as an expedient way of assessing whether a concept is ill-termed (or could be better termed): if the word A can be substituted by the word B not only without alteration of the presumably intended meaning but indeed with a gain in clarity and/or precision, then the word A is being misused or inappropriately used (Sartori, p.53).

Well now, let's test some examples from Teune (the critical terms are emphasized, the substitute is put in parentheses): "Integration is a *precise logical concept* (mathematical quantity), which can be a property of observable things"; the concept of integration is "a *logical* (mathematical) one in the way that adding and subtracting are *logical* (arithmetical) operations" (p.238); "the *logical* (basic arithmetic) operations are addition, subtraction, multiplication, division, and all of the other *derivative operations* (?) that are allowed by *those logics* (in mathematics?), including those in statistics with all of the restrictions entailed by the *logic* (theory) and procedure of measurement" (p.240), etc. It should be noted that nonsense like 'a precise logical concept can be a property of observable things' cannot be made clear even by substitution.

In a book devoted to curing misused concepts, I take exception to the misuse of concepts by the authors as soon as they leave their own research field. Concepts well-defined in other disciplines should not be confused again. The most misued concept in the book is ' logical' ; besides that there is a number of other examples: *'Variable'* is confused by all authors with 'quantity' according to Sartori's definition: "anything that may take on more than two values, or successive values" (p.85). A quantity (e.g., length) may be represented mathematically by a variable (e.g., x); but length is not a variable. The opposite term of 'variable' is 'constant' . A quantity can be a constant. Some examples of the misuse: "the better the concepts the better the variables that can be derived from them" (Sartori, p.10), "terms have been coined to signify scales of variation (e.g., 'temperature for the 'hot/cold' variable' (Riggs, p.134). Jackson reports three variables which have been associated with ethnic mobilization: national selfdetermination, socioeconomic modernization, and political democracy (p.216). *'Condition'* (Bedingung, Voraussetzung) is confused with 'state' (Zustand) by Riggs ("condition versus process", p.133-135). It is admittedly a problem of the English language which is ambiguous in this point. The same reason (to cause/causality - bewirken/Kausalität) may have given rise to the lengthy discussion of whether causality is a characteristic of power (Lane/Stenlund, p.327-343).

Clear thinking requires clear language and a clear language requires that its terms be explicitly defined (Sartori, p.22). Graphical elements and mathematical formulas are specific knowledge representation tools symbolizing concepts, and also for those it should be clear what is meant by them. Only a few figures and formulas in the book are free from elementary shortcomings. There are lines and arrows from one concept to another with an unclear meaning. Lines could symbolize a class/element relation or an inclusion, etc.; arrows simply stand for 'has' , or 'belongs to' or something else. Classes in a hierarchy of concepts are opened having only one element. Some figures show that the authors are unexperienced in the field of mathematics. Especially in the paper from Lane/Stenlund, where nearly each mathematical term is either mysterious or misused. The same authors offer quotations in German with numerous mispellings. Deficient also is the poor didactic layout of the expositions. The headlines used in the guidelines are more or less uninformative, as they are repetitive. The final definition (if it exists) is submerged among the numerous preliminary definitions. Thus, the book is unsuitable for looking up the reconstructed concepts. Interested persons have to read the whole text; but because the final result is not emphasized, it may happen that in waiting for a better definition, the reader has already missed the final one. These findings are in contrast to the ambitious demands of the authors.

To summarize, the authors have compiled an extensive piece of material (even though restricted to English textbooks). The divergent opinions found in the literature are confronted with each other. From this it becomes clear to which extent the concepts in the social sciences are insufficient. The concept analysis thus offers a justified criticism to the only too careless dealing with concepts in the social sciences. As long as the conceptual confusion is caused by methodical defects, like ambiguity or vagueness, concept analysis can help to cover them, and the semantic field can make transparent the different interrelations to other concepts. In most cases, however, the conceptual disorder is caused by the lack of clarity about the research subject itself. In reconstructing a concept a synthesis is demanded: the question 'what is the correct meaning of a concept?' has to be answered, and that cannot be done with linguistic methods as suggested in the guidelines: scientific problems are not reduceable to linguistic ones. As a consequence, the concept analyses in the book come to a more or less indeterminate conclusion. There is only one exception: ethnicity (Jackson).

The establishing of guidelines for concept analysis should actually be up to philosophy of science. In its current models there is very little "that social scientists are able to imitate or even to approximate. As a result social science practitioners are taught what they do not know, and are not told what is needed for their own knowing" (Sartori, p.56f). Thus, the present book provides (with all its shortcomings) plenty of material for both, the social scientist to improve the concept system, and the philosopher to reflect on the usefulness of philosophy of science.   · Peter Jaenecke

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