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＊キリスト教学特殊講義＊＊＊＊ S.Ashina

第一部：自然の宗教哲学の構築を目指して

第一章：自然の宗教哲学の構想とティリッヒの次元論

第二章：宗教言語と科学言語

2－1：問題状況

2－2：隠喩論から見た科学と宗教

1．現代言語論における隠喩

＜補足・確認＞

・ヘッセ：区別（古典的な言語論）→類似（新しい隠喩論）→区別

現実を「～として見る」という認知の問題として。

現実を再記述する言語表現

拡張・転換

言語世界と現実世界との媒介　→　隠喩：類似関係

ミクロとマクロ

換喩：現実世界の隣接関係（時間と空間）

提喩：言語世界の包含関係（種と類）

・区別という基盤の上で（区別を認めつつ）類似を語る条件

真理の対応説は捨て去られたのか？

⑦ In the metaphorical view, logical consistency is no longer at the heart of language. Rather, as we in our discussion of Piaget, the reconciliation of logical discrepancies assumes a driving role for change of meaning; similarly in science, we reconfigure both theory and observation language to allow us to describe and explain a wider range of phenomena. This does not mean, however, that the metaphoric view entails abandonment of logic and deduction in science. Indeed, we may see this as chief distinction between use of metaphor in science and in poetry. Good poetic metaphors are initially striking, unexpected, and perhaps shocking. They extend and ramify by association and analogy not by logic..... Scientific metaphor, on the other side, may be initially unexpected; once established as useful, however, they are extended and developed by logic as well as by analogy. They are meant to be internally tightly knit by logical and causal interrelations.

(157)

＜参考文献＞

神野慧一郎　「真理論の系譜」（『新岩波講座　哲学2　経験 言語 認識』）岩波書店
1985年　281-312頁

２．科学言語と隠喩

(1) 科学言語の多様性：単純な「実験と理論」の二層構造ではなく。

生の事実？　実験言語の理論的付加

科学的知の多層構造（アインシュタイン）

科学をその営み、科学的知の形成に即して捉えること

→　レトリック

(2) ブラック、ヘッセのモデル論

1. Max Black, *Models and Metaphors. Studies in Language and Philosophy*,
Cornell University Press　1962

III: Metaphor　pp.25-47

XIII: Models and Archetypes　pp.219-243

Scientists often speak of using models but seldom pause to consider the presuppositions and the implications of their practice. (219)

In such all cases, I shall speak of scale models.　This label will cover all likenesses of material objects, systems, or processes, whether real or imaginary, that preserve relative proportions.　1,2,3,4,5,6 (220)

In peirce's terminology, the model is an icon, literally embodying the features of interest in the original.... In making scale models, our purpose is to reproduce, in a relatively manipulable or accessible embodiment, selected features of the "original": (221)

Let us now consider models involving change of medium. I am thinking of such examples as hydraulic models of economic systems, or the use electrical circuits in computers. In such cases I propose to speak of analogical models. An analogical model is some material object, system, or process designed to reproduce as faithfully as possible in some new medium the structure or web of relationships in an original. ... by the more abstract aim or reproducing the structure of the original.... the dominating principle of the analogical model is what mathematics call "isomorphism." (222)

In order now to form a clear conception of the scientific use of "theoretical models," I shall take as my paradigm Clerk Maxwell's celebrated representation of an electorical field in terms of the properties of an imaginary incompressible fluid. (226)

Here we might speak of the use of models as heuristic fictions. In risking existential statements, however, we reap the advantages of an explanation but are exposed to the dangers of self-deception by myths (as the subsequent history of the ether sufficiently illustrates). The existential use of models seems to me characteristic of the practice of the great theorists in physics. (228)

they worked not by analogy, but through and by means of an underlying analogy. Their models were conceived to be more than expository or heuristic devices. (229)

To make good use of a model, we usually need intuitive grasp ("Gestalt knowledge") of its capacities, but so long as we can freely draw inferences from model, its picturability is of no importance. (233)

2. Sallie McFague, *Models of God. Theology for an Ecological, Nuclear Age.* Fortress 1988

a model is a metaphor with "staying power." A models is a metaphor that has gained sufficient stability and scope so as to present a pattern for relatively comprehensive and coherent explanation. The metaphor of God the father is an excellent example of this. (34)

（３）科学における隠喩・モデル

Andrew Ortony(ed.), *Metaphor and Thought. second edition*, Cambridge University Press 1993(1979)

Richard Boyd：21. Metaphor and theory change: What is "metaphor" a metaphor for ? pp.481-532

Thomas S. Kuhn：22. Metaphor in science pp.533-542

① Boyd:

interaction theory of metaphor(Black, Hesse)＋ causal theory of reference (Kripke, Putnam) cf. Soskice

to accomplish the task of accomodation of language to the causal structure of the world (483)

There is, no doubt, a considerable variety of sorts of metaphor that play a role in science, and in theory change. Certain metaphors, which might be plausibly termed exegetical or pedagogical metaphors, play a role in the teaching or explication of theories which already admit of entirely adequate nonmetaphorical (or, at any rate, less metaphorical) formations. I have in mind, talk about "worm-holes" in general relativity. the description of the spatial localization of bound electrons in terms of an "electron cloud," or the description of atoms as "miniature solar systems." (485-486)

Nevertheless, it seems to me that the cases of scientific metaphor which are most interesting from the point view of the philosophy of science(and the philosophy of language generally)are those in which metaphorical expressions constitute, at least for a time, an irreplaceable part of the linguistic machinery of a scientific theory: cases in which there are metaphors which scientists use in expressing theoretical claims for which no adequate literal paraphrase is known. Such metaphors are constitutive of the theories they express, rather than merely exegetical. It might seem doubtful that such theory-constitutive metaphors exist; after all, it is at least plausible that metaphorical language is fundamentally pretheoretical, and lacks the explicitness and precision characteristic of scientific theories. Still, if one looks at theory constitution in the relatively young sciences like cognitive psychology, one finds theory-constitutive metaphors in abundance. The examples that I know best are metaphors in cognitive psychology that are drawn from the terminology of computer science, information theory, and related disciplines.

(486-487)

I do not want to maintain that all of these examples are of fundamental importance to theoretical psychology. Nevertheless, the prevalence of computer metaphors shows an important feature of contemporary theoretical psychology: a concern with exploring analogies, or similarities, between men and computational devices has been the most important single factor influencing postbehaviorist cognitive psychology.

Moreover, it is clear that these computer metaphors are theory-constitutive: psychologists do not, generally speaking, now know how to offer literal paraphrases the same theoretical claims. In important respects, however, these theory-constitutive metaphors are highly atypical. In the first place, they undergo a sort of public articulation and development that is uncharacteristic of literary metaphors.

interaction theory of metaphor ＋ causal theory of reference
epistemic access: the basis of a theory of reference.

山梨正明　『認知科学選書17　比喩と理解』東京大学出版会
芳賀純・子安増生編　『メタファーの心理学』誠信書房
Pascal Boyer (ed.), *Cognitive aspects of religious symbolism*,
Cambridge University Press 1993

② Kuhn: to Boyd

as both Black and Boyd suggests, it is sometimes (perhaps always) revealing to view metaphor as creating or calling forth the similarities upon which its function depends.... I shall supply no arguments for it.

the open-endedness or inexplicitness of metaphor (533-534)

To establish and explore the parallels between metaphor and reference fixing, Boyd resorts both the Wittegnsteinian notion of natural families or kinds and to the causal theory of reference. (534)

When one makes the transition from proper names to the names of natural kinds, ... an unfortunate move,.... epistemic access, (535)

"dubbing" was introduced in an attempt to understand how, in the absence of definitions, the reference of individual terms could be established at all. When dubbing is abandoned or shoved aside, the link it provided between language and the world disappears as well. (536)

I take metaphor to be essentially a higher-level version of the process by which ostension enters into the establishment of reference for natural-kind terms. The actual juxtaposition of a series of exemplar games, highlights features which permit the term "game" to be applied to nature. The metaphorical juxtaposition of the term "game" and "war" highlights other features, ones whose salience had to be reached in order that actual games and wars could constitute separate natural families. (537)

I have so far emphasized the metaphorlike process which plays an important role in finding the referents of scientific terms. But, as Boyd quite rightly insists, genuine metaphors (or, more properly analogies) are also fundamental to science, providing on occasions "an irreplacable part of the linguistic machinery of a scientific theory," playing a role that is "constitutive of the theories they express, rather than merely exegetical." Those words are Boyd's, and the examples which accompany them are good ones. I particular admire his discussion of the role of the metaphors which relate cognitive psychology to computer science, information theory, and related disciplines.

I would suggest that what Boyd does say about these "constitutive" theories may well have a bearing wider than he sees. He discusses not only "constitutive" but also what he calls "exegetical or pedagogical" metaphors, for example those which describe atoms as "miniature solar systems." These, he suggests, are useful in teaching or explaining theories, but their use is only heuristic, for they can be replaced by nonmetaphorical techniques.

Once again, I agree with Boyd but would nevertheless draw attention to the way in which metaphors like that relating atoms and solar systems are replaced. Bohr and his contemporaries supplied a model in which electrons and nucleus were represented by tiny bits of charged matter interacting under the laws of mechanics and electromagnetic theory. That model replaced the solar system metaphor but not, by doing so, a metaphorlike process. Bohr's atom model was intended to be taken only more-or-less literally; electrons and nuclei were not thought to be exactly like small billiard or Ping-Pong balls; only some of the laws of mechanics and electromagnetic theory were not thought to apply to them; finding out which ones did apply and where the similarities to billiard balls lay was a central task in the development of the quantum theory. Furthermore, even when that process of exploring potential similarities had gone as far as it could (it has never been completed), the model remained essential to the theory. Without its aid, one cannot even today write down the Schrödinger equation for a complex atom or molecule, for it is to the model, not directly to nature, that the various terms in that equation refer. Though not prepared here and now to argue the point, I would hazard the guess that the same interactive, similarity-creating process which Black has isolated in the functioning of metaphor is vital also to the function of models in science. Models are not, however, merely pedagogic or heuristic. They have been too much neglected in recent philosophy of science. (538)

Both of us are unregenerate realists. Our differences have to do with the commitments that adherence to a realist's position implies.

Metaphor plays an essential role in establishing links between scientific language and the world. Those links are not, however, given once and for all. Theory change, in particular, is accompanied by a change in some of the relevant metaphors and in the corresponding parts of the network of similarities through which terms attach to nature. (539)

the world to which Boyd refers is the one real world, still unknown but toward which science proceeds by successive approximation. (541)

(4) 科学知と日常性－隠喩･モデルの場－

① Edmund Husserl, *Die Krisis der europäischen Wissenschaften und die transzendentale Phänomenologie*, 1935 (Gesammelte Sciriften 8 , Felix Meiner Verlag)

Galileis Mathematisierung der Natur

In der geometrischen und naturwissenschaftlichen Mathematisierung messen wir so der Lebenswelt --- der in unserem konkreten Weltleben uns ständig als wirklich gegebenen Welt --- in der offenen Unendlichkeit möglicher Erfahrungen ein wohlpassendes Ideenkleid an, das der sogenannten objektivwissenschaftlichen Wahrheiten, d.i. wir konstruieren in einer (wie wir hoffen) wirklich und bis ins Einzelne durchzuführenden und sich ständig bewährenden Methode zunächst bestimmte Zahlen-Induzierungen für die wirklichen und möglichen sinnlichen Füllen der konkret-anschaulichen Gestalten der Lebenswelt,... (51)

Das Ideenkleid "Mathematik und mathematische Naturwissenschaft", oder dafür das Kleid der Symbole, der symbolisch-mathematischen Theorien, befaßt alles, was wie den Wissenschaftlern so den Gebildeten als die "objektiv wirkliche und wahre" Natur die Lebenswelt vertritt, sie verkleidet. (52)

② Albert Einstein

1. Physics and Reality(1936), in:Albert Einstein*, Out of my later years*,
The Citadel press 1956

The whole of science is nothing more than a refinement of every day thinking. It is for this reason that the critical thinking of the physicist cannot be restricted to the examination of concepts of his own specific field. He cannot proceed without considering critically a much more difficult problem, the problem of analyzing the nature of everyday thinking. (59)

stratification of the scientific system

The aim of science, on the one hand, a comprehension, as complete in their possible, of the connection between the sense experiences in their totality, and, on the other hand, the accomplishment of this aim by th use of a minimum of primary concepts and relations.

the primary concepts, i.e. concepts directly connected with sense experiences, and theorems connecting them, ... first layer

lacking in logical unity

The new "secondary system" pays for its higher logical unity by having, as its own elementary concepts (concepts of second layer), only those which are no longer directly connected with complexes of sense experiences.

> Thus story goes until we have arrived at a system of the greatest conceivable unity, and of the greatest poverty of concepts of the logical foundations, which are still compatible with the observation made by our senses. (63)

2. The Fundaments of Theoretical Physics(1940), ibid.

Science is the attempt to make the chaotic diversity of our sense-experience correspond to a logically uniform system of though. In this system single experiences must be correlated with the theoretic structure in such a way that the resulting coordination is unique and convincing.

The sense-experiences are the given subject-matter. But the theory that shall interpret them is man-made. It is the result of an extremely laborious process of adaptation: hypothetical, never completely final, always subject to question and doubt.

The scientific way of forming concepts differs from that which we use in our daily life, not basically, but merely in the more precise definition of concepts and conclusions; more painstaking and systematic choice of experimental material: and the greater logical economy. By this last we mean the effort to reduce all concepts and correlations to as few as possible logically independent basic concepts and axioms. (98)