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A Scientist's Contribution to Values, Morals and Ethics

Harold G. Cassidy

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The late French philosopher Maurice Merleau-Ponty wrote that the distinguishing trait of a philosopher is "that he possesses inseparably the taste for evidence and the feeling for ambiguity." In the spirit of this remark, and without claiming to be a philosopher, I shall try to show how a taste for evidence serves the unifying themes of cybernetics and coaction theory as developed in Haskell's "Unified Science" and how these serve to reconcile ambiguities without destroying them in the realms of values, morals and ethics.

In discussing this subject I feel poignantly that, as a recipient of your justly renouned hospitality I should include in my discussion wise thoughts from your own sages. Unfortunately, I am limited by not knowing your musical language, and by the requirements of my profession which jealously have consumed my time.

To value something is to think highly of it; to prize it; to hold it in esteem. From a person's behavior one can often infer what is valued, and related to this what is the person's moral stance. That is, one can infer from the evidence of what people actually do their standards of conduct and character.

In a given culture there may coexist many value systems since, as Professor Yujiro Hayashi of the Tokyo Institute

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of Technology pointed out at the fourteenth Nobel Symposium, [A. Tiselius and S. Nilsson, The Place of Value in a World of Facts, Wiley Interscience, New York, 1970, 258.] value is related to human desire, which affects and arises out of the person's habitat in dynamic and complicated ways. He gives a simple example:

"Let's discuss [he says] a hypothetical family unit in Japan which consists of an old man who has lived more than 80 years, his son, his grandson, and his great-grandson. When the old man was a boy, trains did not exist. At that time, there was no other way to go from Edo (now Tokyo) to Kyoto than by palanquin along the road. This took about one month. When the boy got old enough to be aware of it, the first locomotive was put into operation, and it then took only about two days to get to Osaka from Tokyo. For him, this was a very fast vehicle compared with the palanquin which had been used prior to that time. When he was in middle age, express trains were running between Tokyo and Osaka taking only one night. Of course this was a very fast vehicle for him. Then, when he got old, the New Tokaido Line was opened up and it took only three hours to travel the same distance.

"For the old man, this was an unbelievably fast vehicle. But his son, the grandfather of the youngest boy, never experienced traveling by palanquin. When he was born, the locomotives were already running, although it took two days from Tokyo to Osaka.

For him, express trains and the New Tokaido Line were very fast, but he would surely feel that travelling by palanquin would be too slow...." And soon.

"In this hypothetical family, there coexist four different evaluation systems concerning the speed of vehicles. Among them there is a discontinuity which cannot be filled. It is not a question of right or wrong, because after all, it is the evaluation systems that are fundamentally different. Therefore, discussing the speed of vehicles among the different systems is irrelevant....

"This is what I call invisible innovation," continues Professor Hayashi. "In other words, visible innovations may cause invisible innovation...."

Professor Hayashi formulates the process in general terms as:

Figure 1

This scheme agrees with the more general evolutionary scheme of Unified Science, in which each arrow would now have a reverse arrow showing feedback, and an arrow showing feed-forth.

This explains how value-systems may change, and how several may co-exist in a culture, as in the case of the great-grandfather, grandfather, father, and son in Professor Hayashi's illustration. [See, for example, Edward Haskell, ed., Full Circle. The Moral Force of Unified Science. Gordon & Breach, New York, 1972.] From this analysis it is apparent that, given many different value systems, and therefore many varieties of behavior that disclose them, there can be many different criteria of moral behavior developing together in these human cultures.

These considerations do not exclude the possibility of a universal ethic that prescribes what men ought to do, and that supports this prescription of men's duties with reasons why this is proper behavior.

This is because, if we have a range of behaviors such as from 'undesirable' to 'desirable', wherein relative behaviors may be compared at different parts of the range, it may appear that some behavior that is good relative to another is, from another view, bad relative to some superior good:

Figure 3

Then a behavior, b_B, may be construed as both good and bad. This ambiguity is resolved (with its accompanying paradox) when the whole range is disclosed.

We ask next what light can be shed upon the possibility of a universal ethic formulated by Unified Science, beset as these problems are by ambiguities and paradoxes. In order to keep our discussion on a practical level, I shall make use of concrete-examples. First I shall remind you of the theoretical background.

Values, morals, and ethics are all related to human behavior (that is, human action of one kind or another) and to thinking, desiring, and so on. These are processes. That is, they are dynamic and not static. One might conclude that this would be the case from a knowledge of biology, for no living thing can be static. A living form of whatever kind can appear in a steady state, but this is always maintained by functions that are dynamic. Thus we deal with processes.

Processes are always the result of interactions of at least two factors. Let us name them X and Y. (There are always present contingencies which, since they might not happen and are not in general predictable—for then they would become factors—we

include with the controllable factor 'X'. 'Y' is the label given to the controlling, or governing, factor. For example, in a person-automobile interaction Y represents the driver who steers and X the car that does most of the work. Contingencies during a drive might be the appearance of curves, the behavior of stoplights and the state of the road surface. All of these are variables, thus the system may be thought of (cybernetically) in terms of a list of variables. It is often convenient, in talking about such systems, to embody a cluster of variables in concrete form, *i.e., 'person' and 'car.'*

Haskell has shown by elegant cross tabulation that there are only 9 kinds of possibilities in an interaction of X with Y. In the interaction, X may be speeded up, or enhanced in some way; there may be no change in X; or X may be slowed or suppressed in some way. Representing these as (+)(o), (-) for X and similarly for Y, we obtain the cross-table I.

Figure 4

To show degrees of qualitative and quantatative change in the values of the variables (x,y) the table is given axes, as in Figure 5a. To expand its reference it is geometrized as shown in Figure 5b, the Periodic Coordinate system. In this figure a third axis has been introduced (SO, the "scalor zero" axis) and it must be observed that with respect to X and Y only the first quadrant is Cartesian. Now there can be sketched by the usual methods the curve generated by the coactions of Table I. This curve takes the form of a cardioid. The cusp in quadrant III takes the form shown for reasons we shall not have time to discuss. [See E. F. Haskell "A Clarification of Social Science," Main Currents in Modern Thought, 1, 45 (1949)]

Figure 5 a

supplemented by

Figure 5 b

An important feature of this coordinate system is the SO axis. This is the (o,o) axis from which net (+) behavior (outside of the SO circle) and net (-) behavior (inside of the circle) are plotted. For example, in the Scanlon plan, by which labor (X) participates with management (Y) in managing a company, and shares profits, the normal pre-plan operation of the company would set the position of the SO axis. Then, as the plan bomes into operation, it becomes possible to compute net (+) or net (-) behavior of the organization with respect to this base line.

When the coactions plotted in this Periodic Coordinate system are those of <u>people</u>, then clearly they will have a moral component, for it is well known that human conduct may be judged

in moral terms. Since the coaction cardioid traces all possible outcomes of interaction relative to the SC axis, it follows that it traces all possible moral assignments. Then if the coaction is represented by a vector arrow from the NO (natural zero) point to the cardioid, it is evident that the angle it makes to the +X axis, an angle represented by θ , is related to the quality of the coaction. The length of the vector, represent the quantity of the coaction, also is related to θ . This gives the basis for the Moral Law enunciated by Haskell

$$\text{Coaction} = f(\theta)$$

Now we have shown a formulation of moral law, both qualitative and quantitative. On this basis we can enquire about ethics. This takes us to consideration of a second pattern that repreats throughbut nature. This is hierarchy.

A System Hierarchy has the general structure shown in Figure 6.

Figure 6

Each new Period contains one Stratum additional to those present in the previous Period, and this new stratum modifies the others present and is itself modified. For our purposes we can illustrate with the System Hierarchy that describes the Kingdom of Man, Figure 7 [See Haskell, (1972), loc. cit.]

Figure 7

In this figure it suffices to notice that Period 6, Lower Industrial

Man, our period, comprises some six Strata. Each corresponds to a lower Period, but is modified by the others. For example, the people in the first Stratum, the Lower Lower, wear clothes and drive cars and hunt with guns, made by upper Strata, rather than wearing skins and using primitive weapons.

When we examine the series of Natural Kingdoms: of Particles, of Atoms, of Molecules, of Plants, of Animals, and of Human Cultures, we see quite clearly that the grand sweep of evolution is from less complex and less organized toward more complex with corresponding organization. It is a Systems Hierarchy of System hierarchies. This has been formulated by Haskell [1972, loc. cit.,] in agreement with the late French Paleontologist Pierre Teilhard de Chardin [The Phenomenon of Man (translated by B. Wall) Harper, New York, 1959.] and many other scientists, as progress toward an extrapolated absolute "Ω" called, in the language of religion, "The One," or "God."

Figure 8 a

The manifest evidence is that the evolutionary trend is biased net (+). Also, historical evidence tells us that in human cultures, when essential parts conflict, the culture becomes unstable, and tends to break down. Further, biological and biochemical evidence concerning the nature of the life process described by Schroedinger [Erwin Schroedinger, What is Life?, Macmillan, New York, 1947] leads us to recognize (with Haskell), in this sweep of evolution, a drive toward increasing

ectropy (negative entropy) in these open systems. This trend, or drive, or net (+) bias, displayed by the course of evolution opposes the universal law of entropy-increase that describes closed systems. [E. Haskell, (1972), loc. ~~cit.~~]

We have, in the rule that "The Universe has a positive value-bias", the basis for an ethic. Moreover, Omega is an absolute. Therefore it must be recognized that although men may aspire toward this Perfection, it cannot be reached. This is because the closer one approaches any absolute the more difficult it becomes to approach closer. [Cf. H. G. Cassidy, Knowledge, Experience and Action. An Essay on Education. Teachers College Press, Columbia University, New York, 1969, p. 38 f.] Ambiguity, inherent in ethical relativity, which appears along the ectropy continuum, is subdued because this continuum is anchored at both ends: at one in maximum entropy, $\dot{A}$, at the other in Ω. With these two extrapolated touchstones we may be able to evaluate positions along the continuum. This does not remove problems, but it would seem that it aids their solution.

Problems are not removed because, since at every level in the hierarchy people differ in temperament and in complicated ways, their behavior may spread over the ethical range. But the solutions of the problems that ensue when these different persons interact may be aided if ~~they~~ the problems can be discussed in coaction terms: in degrees of (+,+) behavior (normal behavior, cooperation); of (-,+)

behavior (aggressive, predatory, choleric, or even paranoid behavior); of (-,-) behavior (conflictive, destructive behavior); of (+,-) behavior (submissive, parasitic, sanguine behavior) using less emotion-ridden expressions containing (+), (-) and zero, rather than the common terms with their ambiguities and subjective, emotional, connotation-festooned meanings.

Figure 8b

In conclusion, I quote a prediction by the German philosopher who, independently of Isaak Newton, invented the calculus: Leibniz. My purpose is, to ask you to decide whether you think that Leibniz' prediction is in process of fulfillment; and if so, how you could futher its development. -- In 1677 Leibniz predicted the discovery of a Geometric construct which would be capable of expressing the characteristics which all natural and human systems have in common. [See P.P.Wiener, editor,"Leibniz Selections", pp 3-25, Scribners, New York, 1951]

"The characters which express all our thoughts," Leibniz wrote,"will constitute a new language which can be written and spoken; this language will be very difficult to construct but very easy to learn. ... It would embrace both the techniques of discovering new propositions and their critical examination in a language whose signs or characters would play the same role as the signs of arithmetic for numbers and those of algebra for quantities in general. ... What I am advocating," he pointed out, "is already being done by geometers when they arrange their propositions in a consecutive order so that in a proof one proposition proceeds from others in an orderly way. ... Once the characteristic numbers are established for most concepts, mankind will possess a new instrument which will enhance the

capabilities of the mind to a far greater degree than optical instruments strengthen the eyes. ..."

And he concluded that once this Universal Characteristic had become operational then, "If someone were to disagree with me I should say to him, 'Sir, let us calculate!' And by taking to pen and ink we should settle the question."

If this prediction were fulfilled - and we have found it to have been on many occasions - the benefits of this instrument would be almost incalculable. - So I repeat: Do you consider the Periodic coordinate system to be a model, however crude, of Leibniz's Universl Characteristic? And if you think so, how can we improve it and use it to reach the objective of this conference, the Unity of the Sciences?

Legends for the Figures

1 Cycle of innovation. Presented by Yujiro Hayashi at the First International Conference on Unified Science. To appear in its proceedings: Moral Orientation of the Sciences, Edward Haskell, editor; Glenn Strait, associate editor, 1974.

2 Cybernetic structure of Hayashi's Cycle of Innovation. Edward Haskell, ibid. © Edward F. Haskell, 1973

3 Cosmic evaluation of local values. Harold G. Cassidy

4 Theoretical totality of two-component coactions.

5a,b The Periodic coordinate system's coactions or Groups.

6 Periods, Strata, and Sub-strata which all Periodic tables have in common. Harold G. Cassidy

7 Periods, Strata, and Sub-strata of the Periodic table of Human Cultures

8a,b The Periodic coordinate system's Major Periods: each circle represents the Periodic table of a natural kingdom.

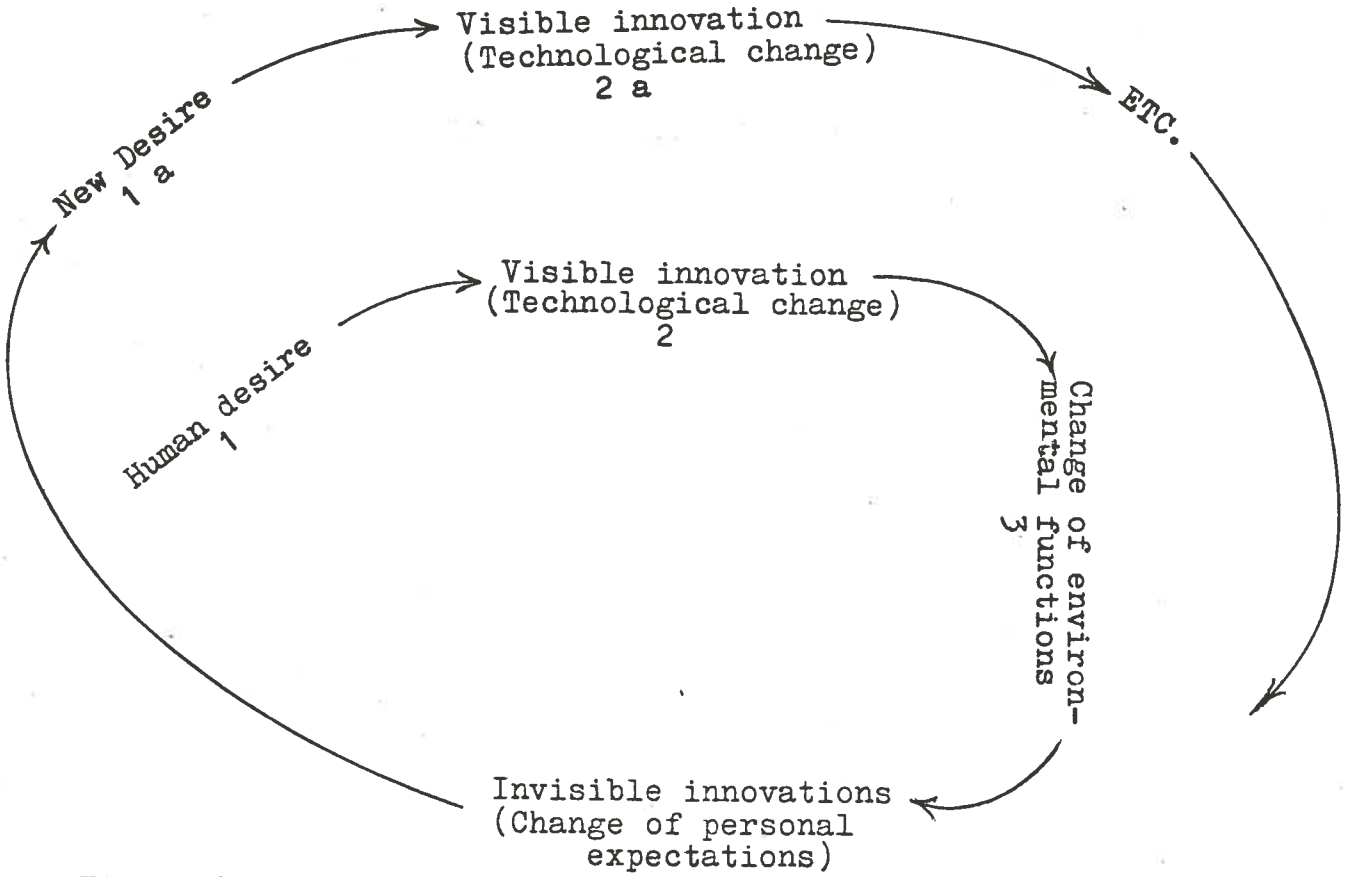


Figure 1

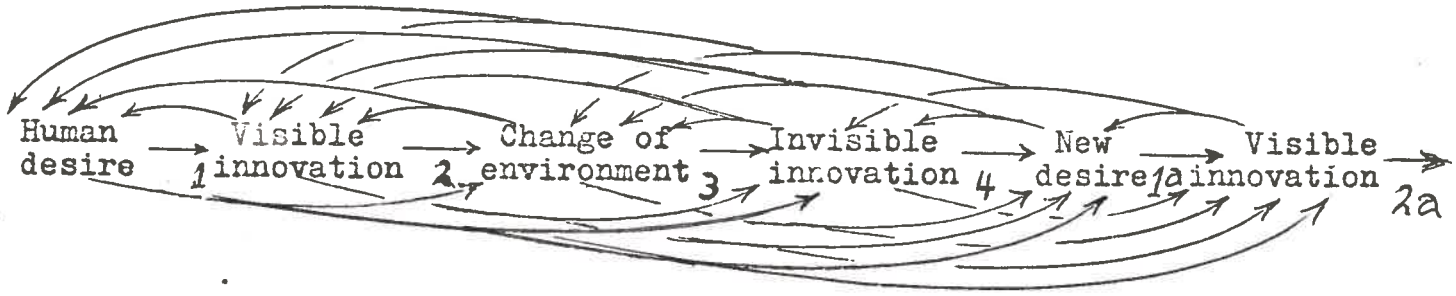


Figure 2

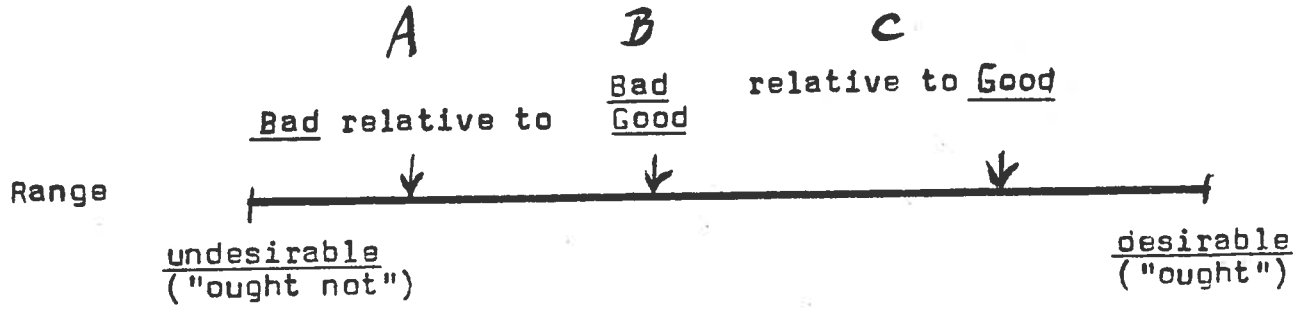
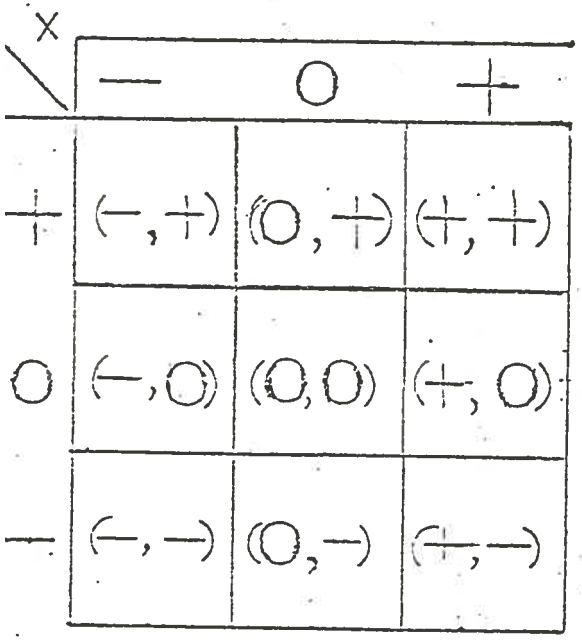
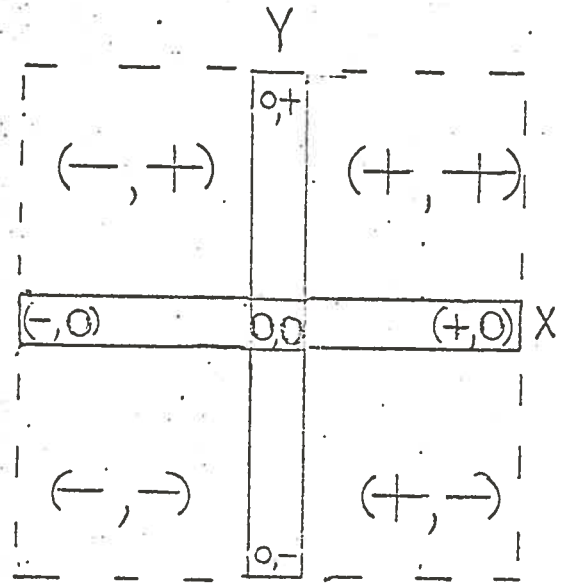

A
B
C
Bad relative to
Bad
Good
relative to Good
Range
undesirable
("ought not")
desirable
("ought")

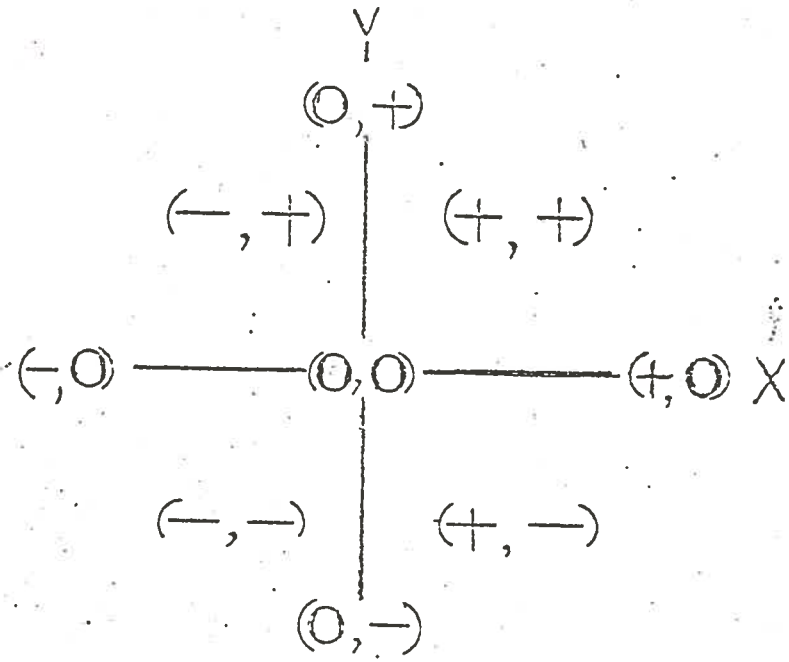
Figure 3



The number and kinds of coactions between any system's work component X and controller Y.



Transition from cross-table to coordinate system: coactions with zeros become axes



Coordinate system with directionless axes.

Figure 4 Cross-table changed into coordinate system.

modified

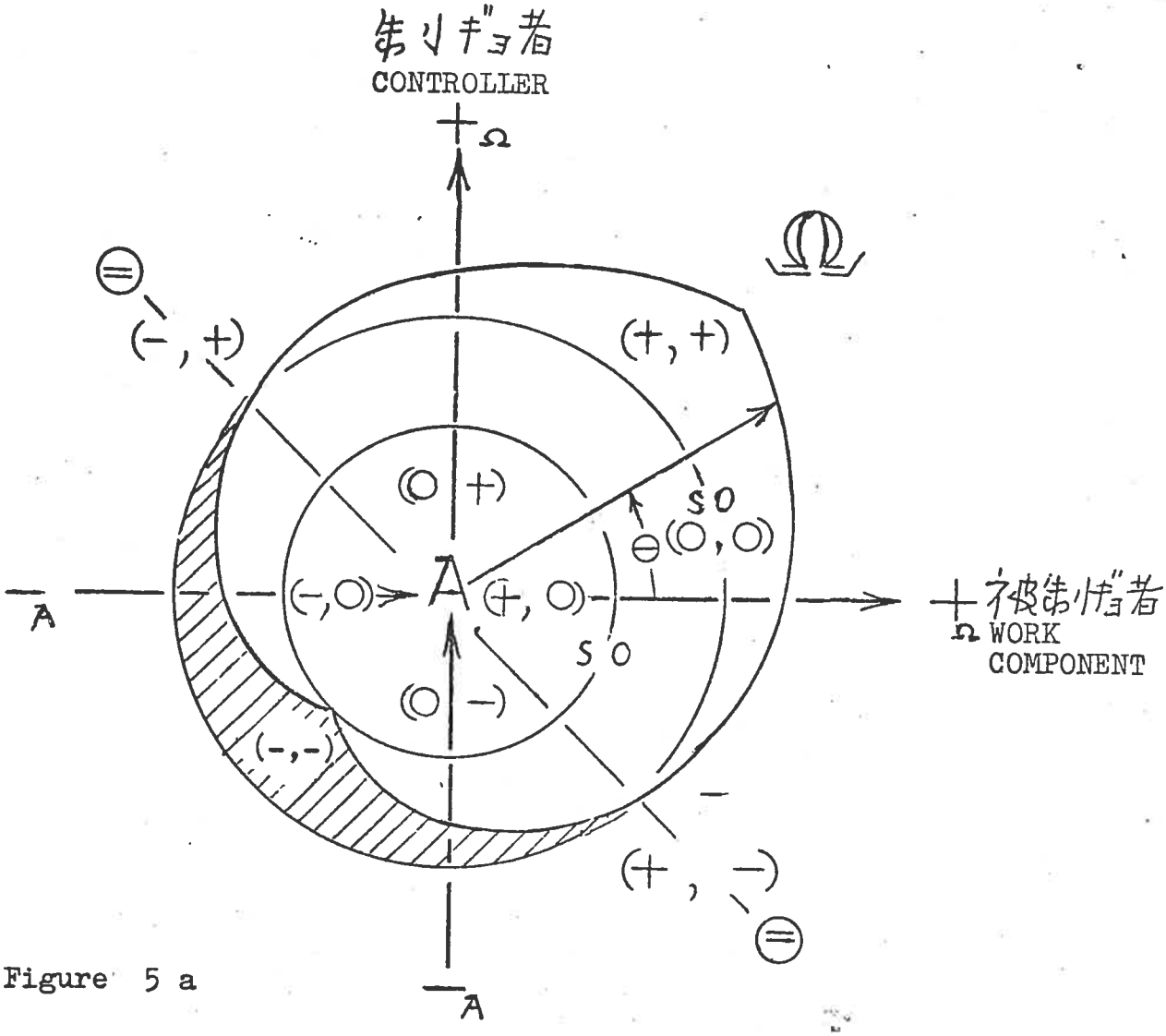


Figure 5 a

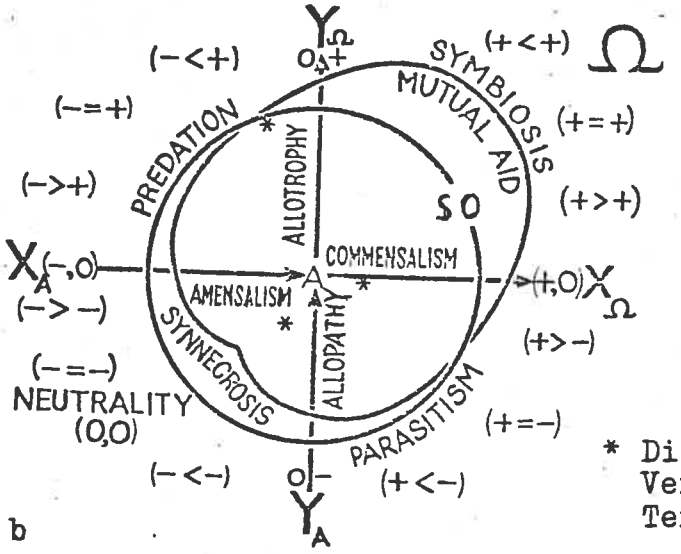


Figure 5 b

* Discovered geometrically
Verified empirically
Terms coined

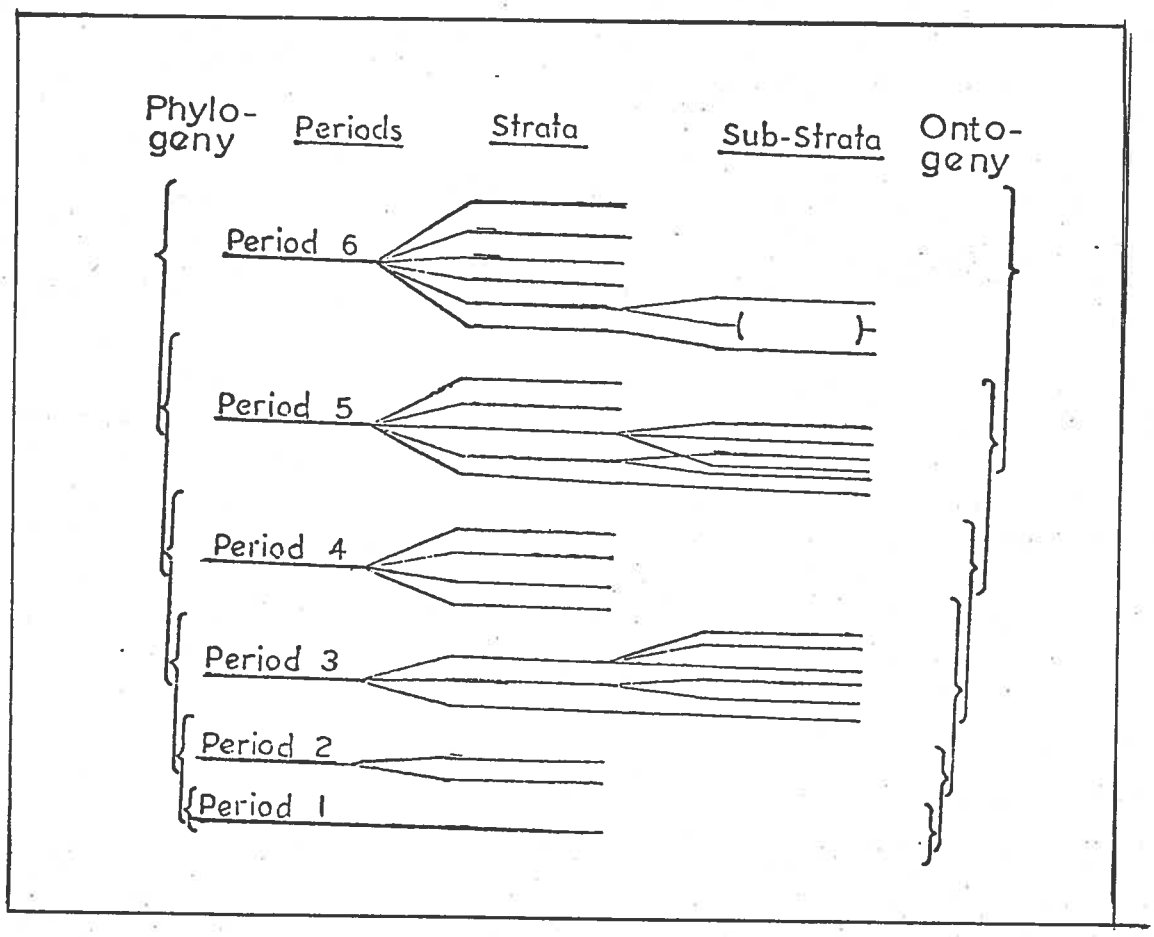

Phylo-
geny
Periods
Strata
Sub-Strata
Onto-
geny
Period 6
Period 5
Period 4
Period 3
Period 2
Period 1

Figure 6

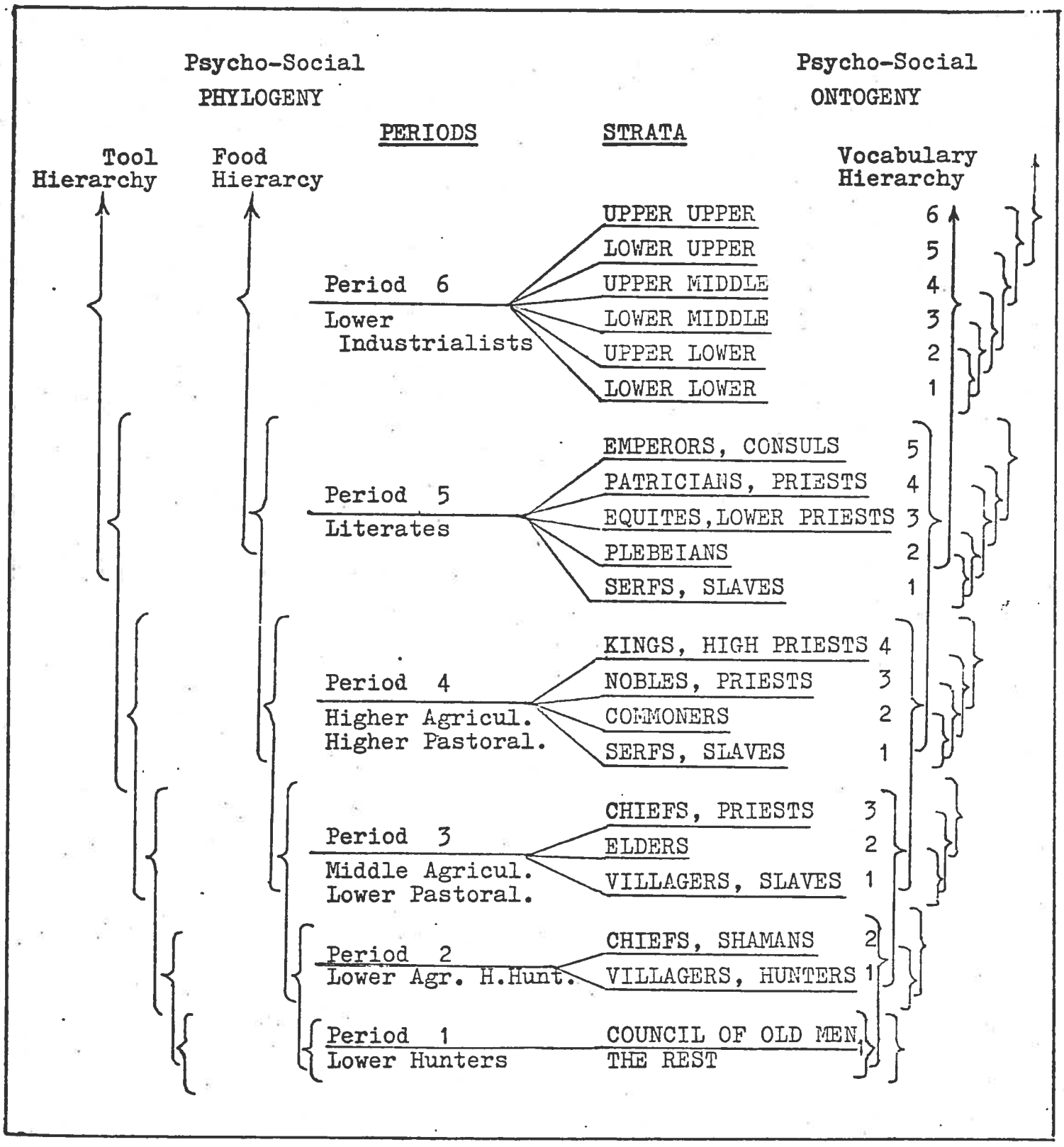


Figure 7 The Kingdom of Human Cultures: Periods, Strata, Sub-strata.

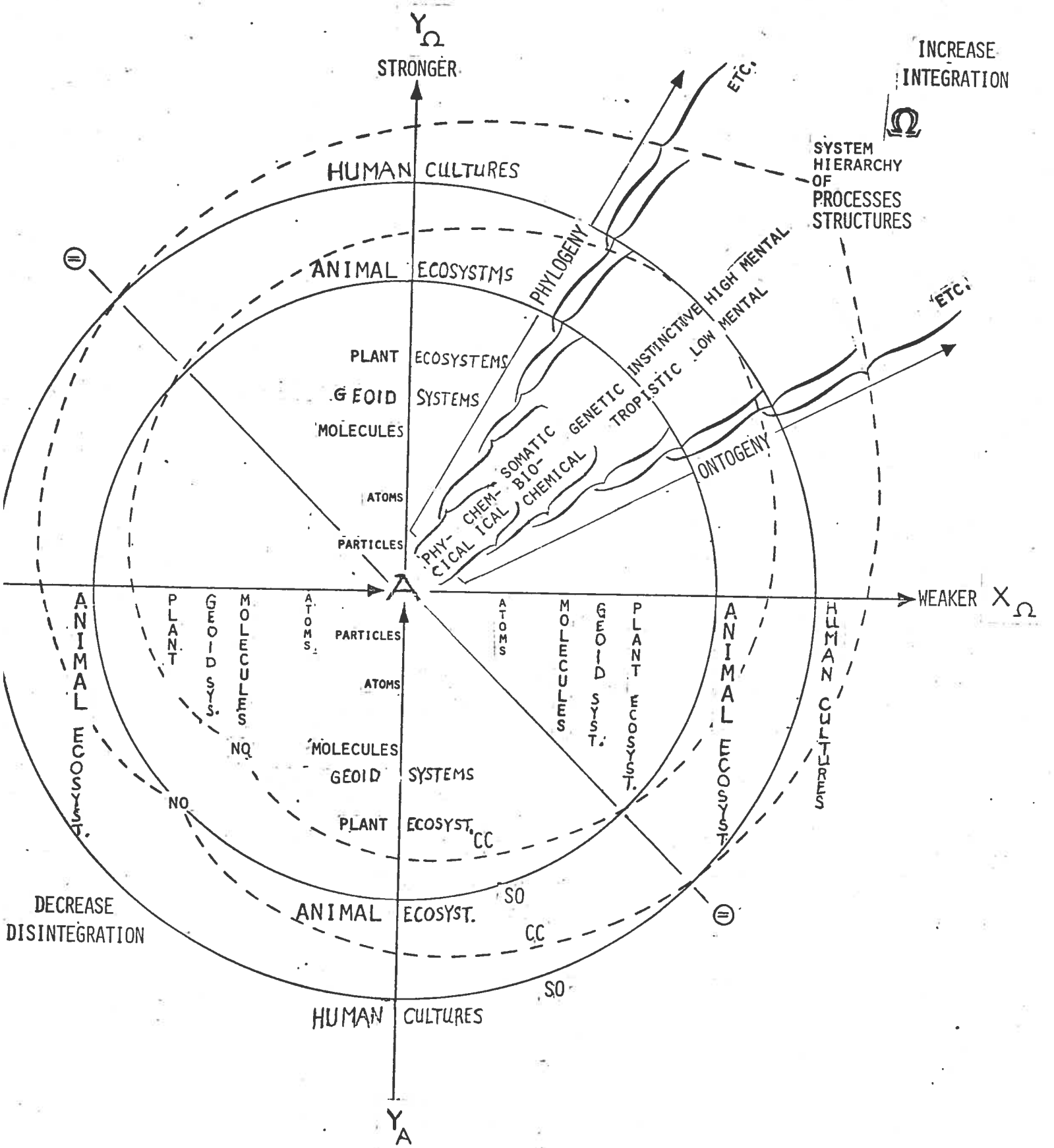


FIGURE 8 a Rough Sketch of the Periodic Coordinate System
(A model of Leibniz's Universal Characteristic)

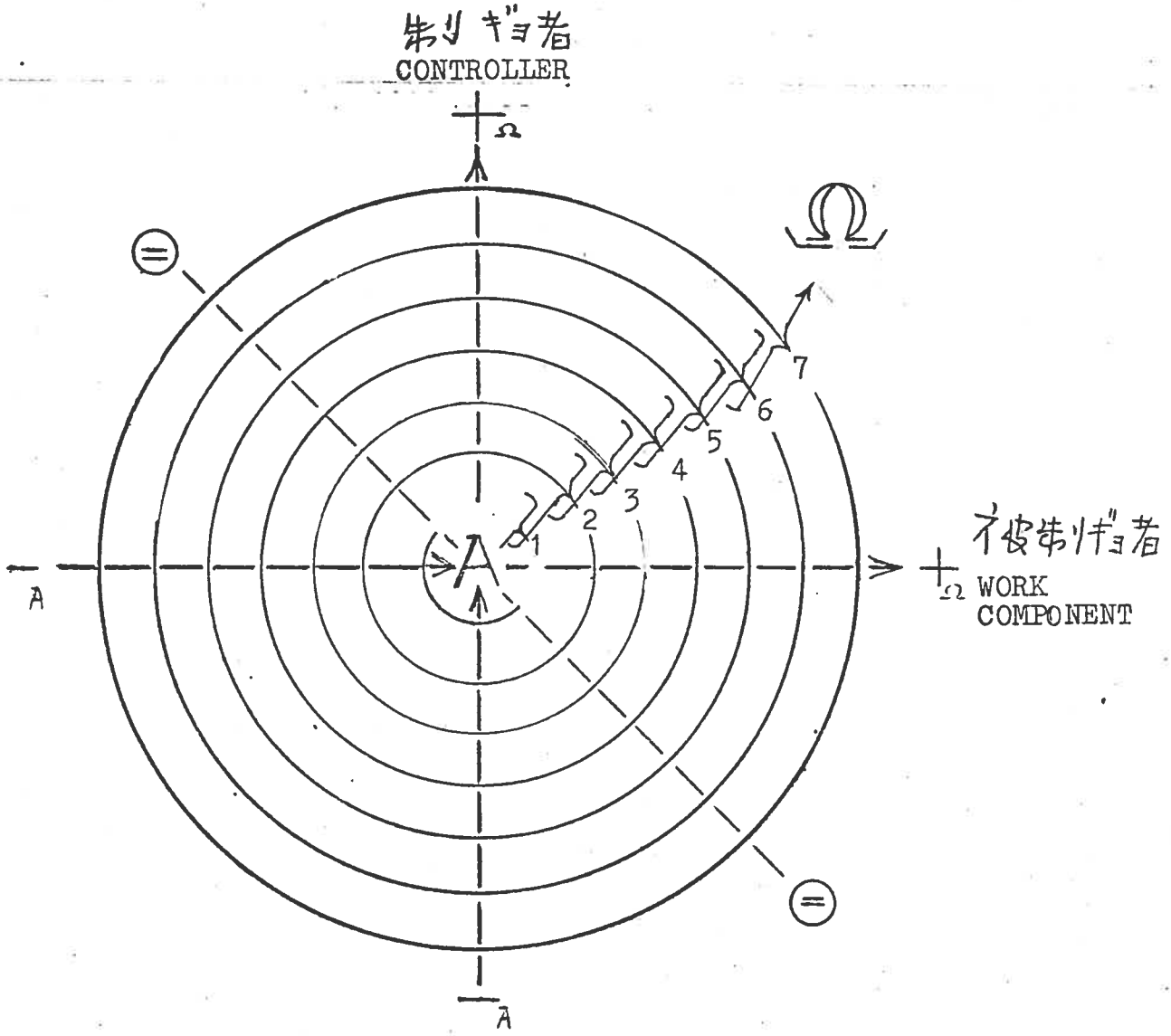


Figure 8b The Periodic Coordinate System.
Symbolic representation of seven Periodic Tables, of which the second is the Periodic Table of the Chemical Elements.