The Nature of CLASSIFICATION in the Human Sciences

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Classification is the ordering, or the order of, classes of a universe. Every definition produces a class of things or events. Class here means some division of a universe according to a criterion. A universe is any number of events, any set. Thus every class can be a universe in turn. For example, all manual workers may be counted out of a general population into a class, and joined with other classes (including one composed simply of all non-manual workers) to constitute the classification, the latter thus being a result -- and the process of making such distinctions being also termed a classification.

The forming of sets of subjects into classes begins several years after birth and proceeds to more and more sophisticated inclusions and exclusions, with progressive self-consciousness. Life is spent in a veritable Mississippi of classification, spilling into major and minor channels, stagnant bayous, forceful directed currents, and neat canals for the irrigation of science.

The primordial universe of perceptions is the only class-free concept; it is the everything. But even that primal order of unsegregated impressions is a fiction, because it is produced by perceptive structures that vary with individuals, that is, by classes of perception.

In social science, classification of course abounds. Each special area of study claims its own sets and intermingles its classifications with those of other fields. The description and enumeration of them would be an

unrewarding task, although some impression and examples of their variety are essential. It is more important to go on to an understanding of the psychology of classification, the sociology of classification, the logic of classification, and the applications of classifications. These aspects of the subject may be known by genetic or historical study, by observation, and by experiment.

The Product of Classification

Classification has been applied to the ultimate generalities of fact and wish, of knowledge and aspiration: Earth-Air-Fire-and-Water; Good and Evil; Democracy-Aristocracy-Monarchy; The City of God and the City of Man; the Four Horsemen of the Apocalypse; the cardinal sins; the nine muses; and the eight kinds of nail-marks of the Kamasutra. The Bureau of Census dispenses classified statistics by the tens of thousands of sets, seconded in this regard by all other government agencies. Scores on tests are classified by age groupings; counties are compared with respect to the incidence of classes of crime committed therein; the voting for President is correlated with religious affiliation, and a profusion of other examples presents itself daily as the product of the social sciences.

In the history of social science, some classifications are more famous than others. The daily newspapers still carry the most ancient astrological divisions relative to human behavior, recurrent charts of the sky. The week and the sabbath led St. Augustine to divide human history into a partially empirical, partly projective set of seven periods, beginning with the epoch from Adam to the Deluge, and ending with the day of rest for the Saints in God. Giambattista Vico's phases of history, assertedly scientific

and sociological, present an Age of the Gods, an Age of the Heroes, and an Age of Men. Karl Marx, in applying the Hegelian dialectic by the criterion of property relationships, provides a five-phase spiralling of history upwards from primitive communism through slavery, feudalism, capitalism, and finally communism, where the primitive classnessness and common ownership again prevail, but on a higher level. Of the contemporary scientists of history, Sorokin and Toynbee are the most prominent. Sorokin puts forward a three-fold succession of historical periods in any given major culture -- the ideational, idealistic, and the sensate. Toynbee in turn sees a progression and regression from the birth stage of challenge and response into the growth of civilization and ultimate breakdown. Sorokin's attempts at statistical establishment of trends are noteworthy.

Neither they nor other historians appear to be pleased by the material and mechanistic tendencies of modern cultures. Western civilization seems to be conquering the world, but Spengler, Sorokin and Toynbee to name only a few pessimists have written it off as a loss. What spreads is not the part of culture they wish would spread. In these, as in the other cyclical classifications of history, an abundance of of material affords frequent inspiration to hypothesis, but also a warm welcome to fantasy.

The genetic approach invites the cyclical theory, which, flattened out, provides a classification on a scale of time, wherein each period of existence has its indices of class characteristics. The time dimension removed, a classification still remains. Thus Plato was of the opinion that time was an important consideration in the cycle of types of government, which moved

from aristocratic through democratic to tyrannical forms of types of governments, but Aristotle, who drew up a more elaborate classification removed the cyclical element from his classification and otherwise deprived the Platonic theory of its overly great dependence upon historical mysteries and therefore purely deductive generalization. The classification is no longer genetic but analytic.

Governments have also been classified by degree of centralization as confederational, federational, and unitary; as one-party, two-party and multi-party states; as laissez-faire, welfare state, and socialist; and in current scholarship, as traditional authoritarian, democratic, and collective centralist. Max Weber's division of forms of legitimate authority into rationalistic, traditional, and charismatic is also much used today. Nor can one abandon illustrations from political science without mentioning the threefold classification of powers of government into legislative, executive, and judicial; it was one of the most compelling divisions ever devised, with large theoretical effect beginning with Montesquieu and larger practical effect beginning with the law and procedures of the American Constitution.

The abundance of classifications in law is apparent. Law has been classified by formal authorship as common law, judge-made law, legislation, and popular law. It can be classified also by the types of interest affected, that is functionally; it can be classified by the type of judicial procedure that is required to determine cases that arise, such as criminal procedure, administrative procedure, procedure in equity, and civil procedure; or by types of jurisdiction, kinds of cases; and so forth. The Roman law, imperially deductive, has lent its high potential for classification to a great many legal systems; by contrast, the "case method" of English and American legal procedure is by definition incompatible with classification.

This inherent attribute has been regretted. The wave of successful classification in the natural sciences of the eighteenth and early nineteenth century led J.S. Mill, for instance, following J. Bentham, to argue that

a training in the natural classifications of comparative anatomy and physiology would stand one on good stead for bringing about the needed codification of law. (Logic, II, 286-7)

Sociology has often turned upon crucial classifications, as of social class. There, every often, heated disputes have ensued over the inclusion or exclusion of "subjective" factors in the allocation of individuals to the social sets being contrived, and where, perhaps more than anywhere else, the intimate connection of the sociological with the political struggle has been revealed, giving a rather pedantic ring to the dictum of Max Weber that "the usefulness of the above classification (he was speaking of legitimate authority) can only be judged by its results in promoting systematic analysis." To treat the American population in the 1940's for example, but its subjective self-asserted class position would pose quite a different group of problems of analysis and political action than would occur if the population were assigned objective ratings of class membership.

In anthropology, and of course, overlapping into other areas of social science, the dispute over the classification of the races of mankind is centered. Again a three-fold grouping of races into the white, yellow, and brown, or the Caucasian, Mongolian, and Negro is prominent. Both skeletal and superficial features are used as criteria, with an increased tendency, given modern, technical improvements, to measure more subtle qualities of blood types, metabolism, endocrinal, and psychological traits. At the same time, the increasing pace of discovery of primitive forms of higher primates, hominids, and prototypical homo sapiens has introduced new uncertainities into the simplistic classifications, already burdened

by interracial miscegination and unclassifiable minority races.

The definition of, 'culture-area', as a method by which social groups are classified according to similar culture traits, first for identification, second for historical and comparative generalization, is a considerable achievement of C. Wissler, A. Kroeber, and others. Anthropology also houses and tends, with perhaps less cordiality than of old, a number of classifications of social groups, such as by kinship, and types of families, and shares responsibility with philology for linguistic "families" was and continues to be a rich resource in process of development by the social sciences.

Economics is productive of classifications of taxes, of economic systems, and of schools of economics which themselves have been elaborately classified by Othmar Spann and others. L.M. Fraser discusses the well-used four-fold classification of the factors of production: land, labor, capital and enterprise. De Vite De Marco classifies collective wants according to their degree of urgency for man in society: the first group centers about the need for internal and external defence; the second about activities that were once individual but that become social perforce, such as sanitation and hygenic regulations; and a third that groups around wants that are still individual but that require regulation, such as a water supply monopoly. Schemes for classifying economic systems are manifold. Pareto gives a simple division of economic relations into free competition, monopoly exercised in the interests of certain individuals, and monopoly exercised in the interests of the community. He adds, in words whose significance can be later more fully appreciated, "However, it is possible to consider an infinite number of other types according to the conditions which it is desired

to impose." (Progress #5 [1955] 58-102)

In the field of psychology, famous classifications are not lacking, whose validation has caused no less of an uproar than similar attempts in sociology with respect to social class. The clasifying of instincts is an example. Hundreds of systems have been elaborated, ranging from the detailed specification of unlearned infant behaviors, such as sneezing, grasping, sucking, and the like, to the highly general and only vaguely confirmed "instincts" of aggression, workmanship, and so forth. William McDougall bespoke the prolific instinct psychology of the turn of the century. (An Introduction to Social Psychology). Freud's famous triplet -- id, superego, and ego -- evolved as a dynamic explanation of behavior but was used by Freud and others as a formal classification of behaviors. Contemporary psychology has less of the classificatory urge, it would appear, for the reasons to be advanced below.

Of concern to all fields of social science is the classification of motives, values, or valuing behavior. At bottom is often the feeling that man's activities must relate back to some fairly simple scheme of hereditary or inculculated desires. In consequence, classifications exist that divide by the sources, (W. James, W. McDougall, Freud, et al.) by the character type, (Spranger, Kretschmer, Lasswell, et al.), by the observed conduct, (W.I. Thomas, et al.), by the objects sought, (Lasswell, et al), by the institutions reflecting the motives, (Plato, et al.), and by the effects of the operations of the motive. (J.S. Mill, et al.).

Thus Lasswell, following to a degree Spranger, proposes the study of behavior according to an eight-fold classification of values sought or

obtained, or used as means to win each others's power, wealth, rectitude, respect, well-being, enlightenment, skill and affection.

The product of classifying behavior of social scientists may be seen also in the methodological concerns of the fields, and in general logic and statistics. Rather closely related to classification are the activities in several sciences that generate formal models, that construct statistical tables, that scale a phenomenon; models, tables and scales create distinct classes for subsequent analysis. They introduce, in fact, such a plethora of classifications that there comes to be a considerable gap between the famous classifications that are supposed to define the while of a body of knowledge, or all of the sciences (cf. Aristotle's theoretical, productive, and practical; Compte's Inorganic sciences of Astronomy, Physics, Chemistry and Organic Sciences of Physiology and Sociology or Social Physics) and the everyday coinage of a multitude of classifications. Each field of knowledge is criss-crossed by hundreds of them, consciously offered or unconsciously explicated and implied.

The Sociology of Classication

The number and kind of classifications appearing in the works of scholars may have a connection with ideology, social conditions and the state of a science. For example, the present paradoxical situation in which classification of largest generality and scope is eshewed in favor of countless unspoken classifications needs explanation.

John Dewey was especially astute in uncovering the ideological element in classical logic. According to Aristolelian logic, he wrote in his

Logic: The Theory of Inquiry (1938), p. 86, "knowledge, in its logical forms, consists exclusively of definition and classification. Neither of these processes is linquistic, psychological, nor yet an aid in reflection;" They are "expressions of necessary forms of Being" to the classical mind.

Social philosophy, the operating ideology of scientists, before the new social science began, saw the world as conposed of qualities. Quantity was an accidental state of a qualitative essence. Invention was discovery, not new devices or prediction and control, as they are conceived today.

Certainly there lies in the growth of statistical and quantitative modes of thought one reason for traditional classification (which was almost entirely qualitative in formulation and absolute in thought) to fall into desuetude. As modern thought has become probabilistic and quantitative, it has grown to abhor the spurious finality of many an ancient classification.

The transition from realism to nominalism in philosophy and science certainly has contributed to the dethronement of classification too.

Instrumentalism and operationism have also lent a hand in the process. This is true whether in reference to the ancient divisions that were supposed to have sprung from the mind of God or to the nineteenth century's spirit of building-block physics, faculty psychology, and biological classification. That great radical endeavor, the Encyclopedia of Diderot and his associates, was nevertheless a momument of classifying. It sorted out nature as seriously as Pliny had done in ancient Rome.

Many scientists believe that the victory against the classificatory strongholds has been won. Not at all. The population is still largely classificatory of ideology. They use classifications to find Truth; a

great many scientists both natural and social are also of this persuasion, consciously or unconsciously. And of course the elites, of whatever political complexion, are under constant pressure to categorize the virtues and practices for which they may be held accountable. Hence one must regard the falling off of traditional classifications in the sciences as a possibly temporary phenomenon.

The scientific community probably rebelled excessively. The new theory became a new tradition right away. The traditional teaching, as Joseah Royce told American psychologists in 1902, is that "the stage of a science in which it made much of classifications was a relatively imperfect stage. A science passed to a higher stage when it learned to substitute explanations for classifications. And its explanations, in their turn, became exact whenever they passed to the highest stage of scientific knowledge, where they became quantitative."

But then, continues Royce, mathematics has become not merely the science of quantity, but is rather "the science of exactly definable relationships of all types." (p. 28) This invites a new emphasis upon exact and complicated classification. Finally, Royce, citing in turn A.B. Kempe, in a passage prophetic of the rise of comtemporary set theory and computer technology, declares: "Classification from such a point of view reigns then everywhere on the highest levels of exact science. Sharp classification is the goal as well as the beginning of the thought that gets embodied in the special sciences. To say 'yes' or 'no' to the question: 'Does this object belong or does it not belong, for this purpose, to this collection of objects?' is the last as well as the first task of

> the human thinker in all his dealing with particular facts. Now the logical interest of this generalization about the nature of science lies in the consideration that, from this modern point of view, for which the special sciences are descriptions of phenomena, all our valid explanation of facts, just so far as they are valid, all our knowledge of the laws of nature, all our quantitative insight into things must be reduced merely to such classifications of facts, and to serially ordered systems of such classifications."

As the history of the concept undulates and the reception given it flashes now one facet and another, there occurs some demonstration of all its possibilities in the operations of the moment. Lazarsfeld and Barton accomplished the difficult task of theoretically synthesizing the logical dynamics of classification in science when they showed that "there is a direct line of logical continuity from qualitative classification to the most rigorous forms of measurement, by way of intermediate devices of systematic ratings, ranking scales, multidimensional classifications, typologies, and simple quantitative indices." (p.155)

Fragmentation of science into special fields must be credited with the decline of the highly general type of scientific classifications. The anti-authoritative element that abounds in the formation of any sub-field or new field of science easily and even eagerly rejects the old master classifications as useless, indeterminate, based upon false premises, and irrelevant. The jargon that envelops the movement into the new field provides a substitute set of terms, to which at an early stage in the development in the field the old concepts and classes lose application. There is much in common between the older study of power groups in such

settings as political factions, underground political cells, and so forth, and the developing area of group dynamics, which has tended to concentrate on school, neighborhood and work settings, but the two fields are scarcely perceived to be related by their practitioners.

The split between the old, ethically and juridically oriented social science and the new science, which is to a high degree stripped of such elements, has also made unusable a number of the older classifications that appear to have been based upon natural law and divine law. It would be relatively simple, for example, to organize a library collection around the fine classification of human action developed by St. Thomas Aquinas, but libraries have everywhere, including Catholic universities, resorted to haphazardly constructed systems such as the Dewey Decimal System and the Colon Classification system, systems which in practice have become nothing but the merest protozoan strings of subjects. For, no one wishes to say that any words are alike if someone else prefers them to be treated as different, and place is made for both groups and as many other sets of words as there are writers coining them. The unexpurgated dictionary grows by leaps and bounds. It is held in restraint somewhat by the ignorance and conservatism of most people with respect to the coinage of terms; but the fertile minds of the scientists, ever prone to confuse new names with new ideas, and fed by the arrogance of complete nominalism, which is an intellectual rather than a practical movement, know such bounds hardly at all.

So long as libraries function uncritically to shelve books, without empirical studies of the effects of classification upon use, the retrieval crisis lies dormant. Every new term gets its few feet of shelf space where

it can be retrieved by its cabalists. Else the term is ignored and the work using it resorts to a traditional shelving location. The result in either case is the same -- frustration. Library classification, true, should not be confused with a grand classification of knowledge; it must receive and house overlapping classifications; but it must be based upon the behavior of scholars. That its system may be a maze of contradictions is to be expected; this is far different from being rudderless.

The recent injection of computer technology into the methods of the sciences has introduced another possibly disorganizing factor into the processes of classification in science. The computer every year permits more license in the cataloguing of materials; a dictionary of gross size can be incorporated into its memory storage, leading some authorities to make statements to the effect that there need be no further attempt at cutting down the number of categories of knowledge. Practically every event can have its own category, and the event still be retrieved and used in calculations.

Apart from the question whether this is possible, there is the question whether it is good to desynthesize so much the factual basis of judgment and policy, whether in a scientific or in a political investigation. Decisions may come to be made largely from the scattering of uncontrolled knowledge that may remain in the old, brain system of storage and retrieval.

However, it must be added that computers can also be used as highly efficient tools for determining habits of use by lightning-like content analysis and this feature may induce integrated classification ultimately. Library administration and information retrieval systems can well use both the habit-recording capacity and the categorizing facility of the computer.

Furthermore, computers can regurgitate a great many classified tables on order, giving the fortunate scholar the ability to examine data not only in a raw state but in a semi-finished state of a thousand classified forms.

In the boundary area of sociology and psychology are found several other phenomena associated with classification behavior. One is the "magic of naming," already alluded to above. It is often felt by scientists, as well as laymen, that to name is to know. Whole subjects of the social sciences are sometimes covered by classification and then left for greener pastures, on the supposition that reality and relations have been satisfactorily conveyed. This occurs, for instance, in certain areas of writings about administration; it occurs in handbooks of military strategy; it is seen in textbooks of educational administration; and it is common in penology, law generally, and a number of topics significantly whose closeness to moral, juridical, and authoritative orders of behavior is apparent. The definiteness that is required under historical conditions for a "successful" legal, religious, or administrative regime is carried over into scientific labors and resists strenuously the breaking down of language and thought into more operational contexts.

The "magic of naming" would also include those instances in which a hard word is needed to elicit a soft phenomenon, that is, a subject that is scarcely perceived but merely felt to be there in the setting. The Freudian id-superego-ego combination would seem to qualify in this regard; even if its use by rigorous minds can be defended, its function in the popular mind is largely magical.

The mania for order and consistency, which is present in Aristotelian logic, inspires classification. It also inspires special views of classification such as the principle that if a thing is of one order it cannot be of another at the same moment and in the same place. "Two points cannot occupy the same space." is a principle that has blocked many an incipient useful classification. It is likely, furthermore, that the impulse to classify, when exaggerated beyond the norm, is part of that rigid - authoritarian compulsiveness syndrome that has occupied the attention of many psychologists in recent years.

The Psychology of Classification

The psychological investigation of classifying activity can begin with children. Inhelder and Piaget have followed the process most closely. They arrive at several conclusions: The idea that a thing is a class, and use of a thing as a member of its class, come very early. A chair is seen as such and used as such. The idea that a minor class belongs to a major class comes early in life too. Thus the chair is seen as furniture. The idea that an object belongs to two or more classes simultaneously by virtue of its several qualities begins the process of true inference. Abstractive classification comes later: at first spatial and graphic wholes are understood and then the reasoning progresses to other quality-groupings. Propositional reasoning comes later because it is far advanced beyond the initial classificatory behavior in degree of abstraction.

Classification depends upon the abstraction and retention of clear criteria of inclusion and exclusion, and the ability to classify precedes and underlies the understanding of number. "We therefore see the coordination

of extension and intension as the central problem in the development of classificatory behavior."(p.283) The development of classificatory and later forms of logical operations enter into the most diverse kinds of conduct and is largely autonomous in respect to perception, learning, or language.

There is some question whether the tests imposed to determine the logical advancement of the young into the classifying of things are not themselves Aristotelian, that is, tests to see how quickly classical logical forms are recognized by the young. Inhelder and Piaget are, to put it another way, definitely not interested in determining whether non-western or non-Aristotelian forms of logic come more "naturally," are being bred out, or are operative within the western forms. Growth is measured by the capacity to classify in formal ways.

If a child says that "all A's are Y's" (which is graded correct) and then that "more A's than Y's exist" (which is graded incorrect), the child may still be right in several senses: namely that a preponderant part of a grouping of objects is so impressive, leading, forceful, colorful, significant, and sufficiently numerous, that in some functional ways (though not perhaps in the strict, derived, and imposed, numerical sense) the "whole" group is <u>included</u> in the numerically smaller group. Are not the experimenters, in line with their long line of "logical" predecessors imposing the egalitarian or democratic logic of numbers upon the child's mind? This logic, for some purposes other than whatever utilities are present in this form of arithmetical reasoning, may be blocking other reality-logics of perhaps greater utilities under various circumstances.

The Logic of Classification

Be it as it may, the classical logic that lies behind classification in the sciences performs well for certain tasks, if it is broadly construed and united with some non-Aristotelian concepts, especially the ideas of nominalism, idealism, and functionalism. Thus it is preferable to define classification as the ordering of subjects, rather than the ordering of objects. The term subjects is preferred to objects so as to imply that classifications may be entirely "subjective" or quite "objective." It may matter much to ideology and its ethical derivatives such as ethical conduct, but little to science that classes "really exist." It is remarkable not how many scientists but how many philosophers are deluded into insisting upon the real existence of the criteria of classification.

Few scientists today would hold with Agassiz that the phylogenetic classification is divinely created and that we must only discover it, asking: "When, in our pride of philosophy, we thought that we were inventing systems of science and classifying creation by the force of our own reason, have we followed only, and reproduced, in our imperfect expressions, the plan whose foundations were laid in the dawn of creation?" (p.9) And answering "Yes." Not so apparently metaphysical are most other scientists, whose divinity is the fixed order of the universe, human and non-human, where mental and external structures are manacled together by the iron realism of natural law. So one reads in Auguste Compte that "The class must proceed from the study of the things to be classified, and must by no means be determined by a priori considerations," and further that,

"...the mutual dependence of the sciences, -- a dependence resulting from that of the corresponding phenomena, -- must determine the arrangement of the system of human knowledge." (Vol.I, p.20, Pos.Phil.)

Against this theory can be postulated another, one more flexible and open to useful classification. There is little utility except ideological in insisting upon the realism of classes. The insistence brings only tours de force in the process of justifying a classification. True, one may engage in classification deliberately to prove the existence of a divine and perfect hand, or to assure oneself that there is one right order of things. But all those who have other ends in mind, most commonly the control and prediction of events, can better use a theory of classification that is justified by its results. The universe is any plurality of events, actions, or being. Inversely, it is anything that can be the basis of a classification. Since any event, action, or existence is, so far as we know or care in this context, of practically infinite aspects, no set of classes equals the universe it divides.

In classical logic, classification has been treated not only realistically, but rationalistically. In the latter context, classification is seen first of all as a science of definitions, that is, as the rules for including as A's all examples of A and no examples of B, C, ... N, and for dividing any group Z into classes Z_1, Z_2, Z_3, ...ZN. Every definition segregates objects in order to perceive and manipulate them; it segregates so as to perceive dissimilarities of like things. The process of definition uses the knowns to reach the unknown that is being defined. And a definition generalizes subjects. A class is very

close, yet distinct; the purpose of classification is to take a defined (segregated) set of subjects and divide it into classes differing according to some preferred principle, the preference being occasioned, as just stated, by a belief in the Natural, a traditional usage, a simple formulation (Occam's razor, which itself is a most vague principle), and usefulness to a goal (which as science evolves, is more and more the sole basis of class).

Modern logic, including symbolic logic and set theory, has employed a varying terminology to restate the ancient theory of classification and certain new approaches. Set theory, for instance, offers a more complete system for relating the aspects of things than classical logic. It promotes the mathematical manipulation of classes and the more integrated treatment of the onetime "contraries" of explanation and classification.

If an instrumental view of classification is adopted, the classification behavior that one actually encounters in science becomes more intelligible. For instance, the limits of classification (the complexity and extensiveness of a classification) is not logically determined but is a combination of the empirically and theoretically possible and desirable. The limits of any given class is the point at which the purpose of making the class is erased.

For example, men and women are classes of the set homo sapiens; they appear to be such natural classes that they are rarely subdivided or a substitute classification defined. And it may be that for many purposes, such as reading the Bible, "strengthening the family," fostering some kind of division of labor in simple societies, and providing a rule of thumb for organizing esteemed social activities, the division of sexes

into men and women is ideal. However, for a number of other purposes, more refined classifications may be sought, even along continua largely dependent upon the major criterion (i.e. conventional self-identification to the publicly-asked question) of the two-fold one. Thus, respecting the division of labor between men and women, many classes of considerable utility may be derived by basing classes on propensity to fatigue, digital dexterity, height, and other traits in all of which much overlapping of the public-identification or even the child-bearing criterion will occur.

In fact, even the last criterion, so absolute and influential, can be treated as a variable exhibiting an extreme bi-modal distribution with a scattering of cases defying placement on fundamental organic grounds, with others -- mostly "female" -- showing less essential incapacities, still others a psychological factor disrupting a simple positioning, and a number capable of shifting places under the artificial conditions of surgery and the administration of drugs. If such is true of an "absolute" and "natural" classification such as the sexes, much more is to be expected of an appropriate theory of classification when dealing with other subjects.

Even as it has no "natural" boundaries, a classification has no necessary precision of exclusion or inclusion. One may not say <u>a priori</u> that a classification is "bad" if it does not include 100% and only 100% of the subject of its universe in its categories. Classifications are "good" in proportion to their utility in achieving the goal for which they were created.

A mnemonic classification, for instance, may be superior if it helps teach children to remember. Historians of the calendar will have their own rubrics, even while teaching their children that "Thirty days have September; April, June, and November..." And the fables that linked the stars for the early navigators have given way to automatic mathematical calculations.

The suspicious spawning of three-fold classifications bears study but can be presumed to have firm heuristic foundation and at the same time breaks up a large number of universes into categories that have a considerable intellectual validity and practical value.

Perhaps more difficult to conceive is the value of classifications that are open-ended whether by design, indeterminacy or non-utility of closure (all A's are U and U = A + x), other classifications that exceed 100% (i.e., all A's and B's are U and A + B $\geqslant$ U), many whose classes are overlapping and thus in another sense exceed 100% (i.e., A + AB + BC + B = $U_1 + U_2$), still others that are founded upon subjects that have "everything" in common save the categorized trait (U = $[B_1B_2B_3...B_n]$ - A) and those that share nothing but the categorized criterion (U = B_A, C_A, D_A,...N_A). All of these types occur frequently, viz.:

1) "Families are generally patriarchal, though other types exist..."

2) "Constitutions of democracies are of the written and unwritten types..."

3) "Students in a typical American university attend out of motives of finding a husband, getting a better job, remaining with their old friends, and pursuing knowledge..."

4) "Soldiers matched by every obvious trait behave differently under fire depending upon the length of time they have spent with their platoon..."

4) "Regardless of whether we speak of kings, cabbages, or sealing wax, with each increment of supply offered, the price is lower..."

Yet they are all useful to a degree, provided their structure and limitations are appreciated. And often the question, "Why not more exactitude, why not more completeness?" cannot be answered on grounds of disutility, pointlessness, or excessive cost, whereupon a more complete classification would appear to be in order.

The Uses of Classification

The functions of classification are the actual typical processes ending in predictable consequences, viewed as they aid or harm the participating and affected interests. They may be desired or unwanted, conscious or unconscious, controlled or uncontrolled. A number of them have already been alluded to. Here a more limited meaning of function is chosen. "Uses" means the controlled, conscious manipulation of classifying operations according to a rationalistic ethic of science. These uses are:

1. To facilitate recall and memory. A humble but vital function, part of which can be assumed by mechanical devices, but must always be based upon classification.
2. To stimulate new hypotheses. "If A_1 is related to X, are all or some of A_2, A_3,...A_n's related to X as well?"
3. To prepare material for generalization. The ordering and sorting function, that enables one more clearly to state and generalize.
4. To isolate factors or elements for generalization or analysis. "If a universe of A's is sometimes associated with the occurrence of Y, whatever factor in A (i.e., "Ax") is producing Y may be revealed by a classification of one or another element of A."

5. To uncover missing elements in a cross-classified set of phenomena. "If for the sets A,B,C, there is found the element A_1,B_1,C_1, will not the set D contain the element D_1?"

In all cases, several possibilities of misuse of classification (again, according to the rationalistic model) exist: Mere naming as a substitute for finding; excessive inventorying of fact; excessively fine classifying without reference to utility or possibility of empirical referents; the fostering of simplism and stereotypes. Moreover, classification necessarily directs one away from knowledge as well as, and incidental to, directing one towards knowledge. A classification points to one direction and mobilizes attention in that direction. A classification obscures the unclassified. (Indeed, it may deliberately eliminate the unassimilable, as in many forms of scaling where items that cannot be classed are dropped.) A classification implies importance by its logic and presentation and thus can impede the development of more dynamic propositions in a field. (For example, the classical three-fold classification of governments, as in Plato's Republic, tended to impede for two thousand years a consideration of the more realistic hypothesis that all governments are governments of the few, as stated by Mosca and Pareto.)

If all of these uses and problems are contained in the purely scientific classificatory activity, they must be present too in human activity that has the quality of applied social science, as in psychiatry, welfare service, politics, administration, and law. In law, to offer an instance, the classification of law into public and private heightens the

distinction in practice between the two spheres of life, obscures the highly important overlapping developments of "private governments" and "groups acting in a public capacity," while it forestalls a reorganization of courts, judicial procedures, sanctions, and law. It is an open question, too, whether the usual classifications of forms of insanity have not estopped as many cures as they have effected, by, for example, lumping many diverse illnesses under the rubric of schizophrenia, labelling illnesses symptomatically, and performing other acts of classifying, which, while in some instances mere errors and therefore not germane to this essay, are in other instances cases of classification operating as the enemy within the precincts of science.

Universal Classification

The history of science has enjoyed many a universal classification, that is, systems into which the logic of whole areas and even all of knowledge is compressed or at least ordered. Practically everyone except rather poorly trained amateurs has given up the hope that such a scheme can be devised, validated, and accepted. Probably the expectation is too pessimistic. If it is understood that the classification of knowledge is a socially determined event, then the condition for a universal classification should be sought not in the nature of knowledge but in the nature of society.

The secret lies in the word "validate." Validation is a social, not an empirical absolute. When the time comes that the prevailing forces of science (as appended to the general social forces) are ready to "validate" a classification, the validation will produce both the design and the acceptance. Meanwhile, the technique of grand classification will be more

or less assiduously practiced by more or less qualified persons in the degree to which it may be reasonably suspected that the time for a universal classification is approaching.

In an age like the present, universal classification is a subject matter for cultural barbarians, using the latter term in Toynbee's generic sense. The house of science today has infinite windows; its occupants are as busy with housekeeping chores as the proverbial Dutch Housewife on Saturday; and they are as prim and proper in their attitudes.

Rules of Classification

In conclusion, the rules of classification may be outlined.

1. The first rule is to define the universe.
2. Set the goal for analyzing the universe.
3. Decide whether the goal will be more easily achieved if a distinction is made among sub-groupings of the universe. That is, will result much trouble from handling the group as if composed of all-alikes?
4. Postulate the classification. Definitions of classes are to be fabricated.
5. Validate the classification. Does reality lend itself to it?
6. Determine the effects of its use upon the achievement of the goal.
7. Make internal adjustments -- as by reducing or increasing the number of classes.
8. Postulate other classifications and set up models of possible comparative performance of the different classifications.
9. Return to question the universe. Need it be re-defined so as to promote more useful class definitions, keeping in mind the guiding instrumental goals of the classifying activity?

10. Settle upon the most useful classification.

11. Seek compliance. That is, communicate the classification and its effects upon the goals to others who share the goal. If they are in accord, the classification becomes part of the corpus of science. If compliance is difficult to achieve, the general utility of the classification is limited. (This is a better (kind of) "Occam's Razor".)

12. (Should the classification not enter into the practices of ~~relevant~~ related scientific workers, then the invention has failed and a sociological investigation of use and non-use is needed to determine the source of system ic resistences.)

If any final proposition may be ventured concerning the modern role of classification in science, it may be this: that classification is the eternal source of new grips upon the sense world and is merged into more and more subtle renderings of data-handling and data-analysis as the machinery (the objectivizing) of science externalizes the infinite mental possibilities of man.

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