

3. Abstraction from Abstractions

Starting from the base of conceptual development—from the concepts that identify perceptual concretes—the process of cognition moves in two interacting directions: toward more extensive and more intensive knowledge, toward wider integrations and more precise differentiations. Following the process and *in accordance with cognitive evidence*, earlier-formed concepts are integrated into wider ones or subdivided into narrower ones.

The role of language (which we shall discuss at length when we discuss definitions) must be mentioned briefly at this point. The process of forming a concept is not complete until its constituent units have been integrated into a single mental unit by means of a specific word. The first concepts a child forms are concepts of perceptual entities; the first words he learns are words designating them. Even though a child does not have to perform the feat of genius performed by some mind or minds in the prehistorical infancy of the human race: the invention of language—every child has to perform independently the feat of grasping the nature of language, the process of symbolizing concepts by means of words.

Even though a child does not (and need not) originate and form every concept on his own, by observing every aspect of reality confronting him, he has to perform the process of differentiating and integrating perceptual concretes, in order to grasp the meaning of words. If a child's

brain is physically damaged and unable to perform that process, he does not learn to speak.

Learning to speak does not consist of memorizing sounds—that is the process by which a parrot learns to “speak.” Learning consists of grasping meanings, i.e., of grasping the *referents* of words, the kinds of existents that words denote in reality. In this respect, the learning of words is an invaluable accelerator of a child’s cognitive development, but it is not a substitute for the process of concept-formation; nothing is.

After the first stage of learning certain fundamentals, there is no particular order in which a child learns new concepts; there is, for a while, a broad area of the optional, where he may learn simple, primary concepts and complex, derivative ones almost concurrently, depending on his own mental initiative and on the random influences of his environment. The particular order in which he learns new words is of no significance, at this stage, *provided he understands their meanings*. His full, independent conceptual development does not begin until he has acquired a sufficient vocabulary to be able to form sentences—i.e., *to be able to think* (at which time he can gradually bring order to his haphazard conceptual equipment). Up to that time, he is able to retain the referents of his concepts by perceptual, predominantly visual means; as his conceptual chain moves farther and farther away from perceptual concretes, the issue of verbal definitions becomes crucial. It is at this point that all hell breaks loose.

Apart from the fact that the educational methods of most of his elders are such that, instead of helping him, they tend to cripple his further development, a child’s own choice and motivation are crucial at this point. There are many different ways in which children proceed to learn new words thereafter. Some (a very small minority) proceed straight on, by the same method as before, i.e., by treating words as concepts, by requiring a clear, first-hand understanding (*within the context of their knowledge*) of the exact meaning of every

word they learn, never allowing a break in the chain linking their concepts to the facts of reality. Some proceed by the road of approximations, where the fog deepens with every step, where the use of words is guided by the feeling: "I kinda know what I mean." Some switch from cognition to imitation, substituting memorizing for understanding, and adopt something as close to a parrot's psycho-epistemology as a human brain can come—learning, not concepts nor words, but strings of sounds whose referents are not the facts of reality, but the facial expressions and emotional vibrations of their elders. And some (the overwhelming majority) adopt a precarious mixture of different degrees of all three methods.

But the question of how particular men happen to *learn* concepts and the question of what concepts *are*, are two different issues. In considering the nature of concepts and the process of abstracting from abstractions, we must assume a mind capable of performing (or of retracing and checking) that process. And we must remember that no matter how many men mouth a concept as a meaningless sound, *some* man had to originate it at some time.

The first stages of integrating concepts into wider concepts are fairly simple, because they still refer to perceptual concretes. For instance, man observes that the objects which he has identified by the concepts "table," "chair," "bed," "cabinet," etc. have certain similarities, but are different from the objects he has identified as "door," "window," "picture," "drapes"—and he integrates the former into the wider concept "furniture." In this process, concepts serve as units and are treated *epistemologically* as if each were a single (mental) concrete—always remembering that *metaphysically* (i.e., in reality) each unit stands for an unlimited number of actual concretes of a certain kind.

The distinguishing characteristics of these units are specified categories of measurements of shape, such as "a flat, level surface and support(s)" in the case of tables. In relation to the new concept, these distinguishing characteristics

are now regarded in the same manner as the measurements of individual table-shapes were regarded in forming the concept "table": they are omitted, on the principle that a piece of furniture must have *some* shape, but may have *any* of the shapes characterizing the various units subsumed under the new concept.

The *distinguishing* characteristic of the new concept is determined by the nature of the objects from which its constituent units are being differentiated, i.e., by their "Conceptual Common Denominator," which, in this case, is: large objects inside a human habitation. The adult definition of "furniture" would be: "Movable man-made objects intended to be used in a human habitation, which can support the weight of the human body or support and/or store other, smaller objects." This differentiates "furniture" from architectural features, such as doors or windows, from ornamental objects, such as pictures or drapes, and from a variety of smaller objects that may be used inside a habitation, such as ashtrays, bric-a-brac, dishes, etc.

The distinguishing characteristics of "furniture" are a specified range of functions in a specified place (both are measurable characteristics): "furniture" must be no larger than can be placed inside a human habitation, no smaller than can perform the specified functions, etc.

Observe that the concept "furniture" is an abstraction one step further removed from perceptual reality than any of its constituent concepts. "Table" is an abstraction, since it designates *any* table, but its meaning can be conveyed simply by pointing to one or two perceptual objects. There is no such perceptual object as "furniture"; there are only tables, chairs, beds, etc. The meaning of "furniture" cannot be grasped unless one has first grasped the meaning of its constituent concepts; these are its link to reality. (On the lower levels of an unlimited conceptual chain, this is an illustration of the hierarchical structure of concepts.)

Observe also that the concept "furniture" involves a relationship to another concept which is not one of its constitu-

ent units, but which has to be grasped before one can grasp the meaning of "furniture": the concept "habitation." This kind of interrelationship among concepts grows progressively more complex as the level of concept-formation grows farther away from perceptual concretes.

Now let us examine the process of subdividing the concept "table." By observing the differences in the size and function of various tables, man subdivides the concept into: "dining table," "coffee table," "end table," "desk," etc. In the first three instances, the distinguishing characteristic of "table," its shape, is retained, and the differentiations are purely a matter of measurement: the range of the shape's measurements is reduced in accordance with the narrower utilitarian function. (Coffee tables are lower and smaller than dining tables; end tables are higher than coffee tables, but lower than dining tables, etc.) In the case of "desk," however, the distinguishing characteristic of "table" is retained, but combined with a new element: a "desk" is a table with drawers for storing stationery supplies. The first three instances are not actually new concepts, but qualified instances of the concept "table." "Desk," however, involves a significant difference in its distinguishing characteristic; it involves an additional category of measurements, and is given a new linguistic symbol. (As far as the process of concept-formation is concerned, it would make no difference if "desk" were designated as "office table," or if a new word were coined for each of the other sub-categories of "table." There is, however, an epistemological reason for the present designations, which we shall discuss when we discuss definitions.)

When concepts are integrated into a wider one, the new concept includes *all* the characteristics of its constituent units; but their distinguishing characteristics are regarded as omitted measurements, and one of their common characteristics determines the distinguishing characteristic of the new concept: the one representing their "Conceptual Common Denominator" with the existents from which they are being differentiated.

When a concept is subdivided into narrower ones, its distinguishing characteristic is taken as their "Conceptual Common Denominator"—and is given a narrower range of specified measurements or is combined with an additional characteristic(s), to form the individual distinguishing characteristics of the new concepts.

Let us observe these two principles on another example: the ramifications of the concept "man."

Man's particular type of consciousness is the distinguishing characteristic by which a child (at a certain level of development) differentiates him from all other entities. By observing the similarities among "cat," "dog," "horse," "bird," and by differentiating them from other entities, he integrates them into the wider concept "animal"—and, later, includes "man" in this wider concept. The definition of "animal" (in general terms) would be: "A living entity possessing the faculties of consciousness and locomotion."

Man's distinguishing characteristic, his rational faculty, is omitted from the definition of "animal"—on the principle that an animal must possess *some* type of consciousness, but may possess *any* of the types characterizing the various units subsumed under the new concept. (The standard of measurement that differentiates one type of consciousness from another is its *range*.)

The distinguishing characteristics of the new concept are characteristics possessed by all its constituent units: the attribute "living" and the faculties "consciousness and locomotion."

With further knowledge, by observing the similarities among animals, plants and certain sub-microscopic entities (and their differences from inanimate objects), man integrates them into the concept "organism." The definition of "organism" (in general terms) would be: "An entity possessing the capacities of internally generated action, of growth through metabolism, and of reproduction."

These distinguishing characteristics of the new concept are possessed by all its constituent units. The distinguishing

characteristics of "animal" are omitted from the definition—on the principle that the "internally generated actions" must exist in *some* form (including "consciousness and locomotion"), but may exist in *any* of the forms characterizing the various units subsumed under the new concept.

With the growth of man's knowledge, a very broad concept, such as "animal," is subdivided into new concepts, such as: "mammal," "amphibian," "fish," "bird," etc. Each of these is then subdivided further and further into narrower sub-categories. The principle of concept-formation remains the same: the distinguishing characteristics of the concept "animal" (the faculties of "consciousness and locomotion") are the "Conceptual Common Denominator" of these subdivisions, and are retained but qualified by the addition of other (anatomical and physiological) characteristics to form the distinguishing characteristics of the new concepts.

(The chronological order in which man forms or learns these concepts is optional. A child, for instance, may first integrate the appropriate concretes into the concepts "animal," "bird," "fish," then later integrate them into a wider concept by expanding his concept of "animal." The principles involved and the ultimate choice of distinguishing characteristics will be the same, granting he reaches the same level of knowledge.)

Turning now to the process of conceptual subdivision, the concept "man" can be subdivided into innumerable sub-categories, according to various aspects or attributes. For instance, such concepts as "child," "adolescent," "youth," "adult" are formed according to measurements of time, i.e., according to the number of years lived. These concepts retain the distinguishing characteristic of "rational animal" but narrowed by a specified range of years.

The concept "man" can be subdivided according to special characteristics, such as racial (anatomical) descent: "Caucasian," "Negro," "Mongolian," etc.—or national (politico-geographical) origin: "American," "Englishman," "Frenchman," etc.—or professional activity: "Engineer," "Doctor,"

“Artist,” etc. (which involve concepts of consciousness)—or even according to such characteristics as the color of hair: “Blonde,” “Brunette,” “Redhead.” In all such cases, the distinguishing characteristic of “rational animal” is retained but narrowed by specified characteristics which represent specified categories of measurements.

The concept “man” can be subdivided according to special relationships—for instance, according to a biological relationship (“Father,” “Son,” “Brother”), or a legal relationship (“Husband,” “Wife”), or an economic relationship (“Employer,” “Employee”), etc. In all such cases, the characteristic of “rational animal” is retained but combined with a specified relationship.

Some concepts of relationships (such as “legal” or “economic”) involve concepts of consciousness. The most complex abstractions (both in regard to wider integrations and narrower subdivisions) are those which involve a combination of concepts of action with concepts of consciousness. (We shall discuss these in the next chapter.)

Two aspects of the cognitive content of abstractions are worth noting at this point.

1. The formation (or the learning) of wider concepts requires more knowledge (i.e., a wider range of conceptualized evidence) than was required by any one of the constituent concepts which they subsume. For instance, the concept “animal” requires more knowledge than the concept “man”—since it requires knowledge of man and of some of the other species. It requires a sufficient knowledge of man’s characteristics and of the characteristics of other animals to differentiate man from other animals, and to differentiate animals from plants or from inanimate objects.

A widespread error, in this context, holds that the wider the concept, the less its cognitive content—on the ground that its distinguishing characteristic is more generalized than the distinguishing characteristics of its constituent concepts. The error lies in assuming that a concept consists of nothing but its distinguishing characteristic. But the fact is that in

the process of abstracting from abstractions, one cannot know *what* is a distinguishing characteristic unless one has observed other characteristics of the units involved and of the existents from which they are differentiated.

Just as the concept "man" does not consist merely of "rational faculty" (if it did, the two would be equivalent and interchangeable, which they are not), but includes *all* the characteristics of "mán," with "rational faculty" serving as the distinguishing characteristic—so, in the case of wider concepts, the concept "animal" does not consist merely of "consciousness and locomotion," but subsumes *all* the characteristics of all the animal species, with "consciousness and locomotion" serving as the distinguishing characteristic. (We shall discuss this further when we discuss definitions.)

An error of that kind is possible only on the basis of assuming that man learns concepts by memorizing their definitions, i.e., on the basis of studying the epistemology of a parrot. But that is not what we are here studying. To grasp a concept is to grasp and, in part, to retrace the process by which it was formed. To retrace that process is to grasp at least *some* of the units which it subsumes (and thus to link one's understanding of the concept to the facts of reality).

Just as wider integrations of concepts require a more *extensive* knowledge, so narrower subdivisions of concepts require a more *intensive* knowledge. For instance, the concept "father" requires more knowledge than the concept "man"—since it requires knowledge of man, of the act of reproduction, and of the consequent relationship.

2. The formation of a concept provides man with the means of identifying, not only the concretes he has observed, but all the concretes *of that kind* which he may encounter in the future. Thus, when he has formed or grasped the concept "man," he does not have to regard every man he meets thereafter as a new phenomenon to be studied from scratch: he identifies him as "man" and applies to him the knowledge he has acquired about man (which

leaves him free to study the particular, individual characteristics of the newcomer, i.e., the individual measurements within the categories established by the concept "man").

This process of conceptual identification (of subsuming a new concrete under an appropriate concept) is learned as one learns to speak, and it becomes automatic in the case of existents given in perceptual awareness, such as "man," "table," "blue," "length," etc. But it grows progressively more difficult as man's concepts move farther away from direct perceptual evidence, and involve complex combinations and cross-classifications of many earlier concepts. (Observe the difficulties of identifying a given political system, or of diagnosing a rare disease.) In such cases, the knowledge of whether a concrete is or is not to be subsumed under a certain concept does not come automatically, but requires a new cognitive effort.

Thus the process of forming and applying concepts contains the essential pattern of two fundamental methods of cognition: *induction* and *deduction*.

The process of observing the facts of reality and of integrating them into concepts is, in essence, a process of induction. The process of subsuming new instances under a known concept is, in essence, a process of deduction.