

ABSTRACTION PRIOR TO SPEECH.<sup>1</sup>

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SAVE in extremely rare cases,<sup>2</sup> where the mind, like a mirror, passively reflects external impressions, intellectual activity may always be reduced to one of the two following types: associating, combining, unifying; or dissociating, isolating, and separating. These cardinal operations underlie all forms of *cognition*, from the lowest to the highest, and constitute its unity of composition.

Abstraction belongs to the second type. It is a normal and necessary process of the mind, dependent on attention, i. e., on the limitation, willed or spontaneous, of the field of consciousness. The act of abstraction implies in its genesis negative and positive conditions, and is the result of both.

The negative conditions consist essentially in the fact that we cannot apprehend more than one quality or one aspect, varying according to the circumstances, in any complex whole,—because consciousness, like the retina, is restricted to a narrow region of clear perception.

The positive condition is a state which has been appropriately termed a “psychical reinforcement” of that which is being abstracted, and it is naturally accompanied by a weakening of that which is abstracted from. The true characteristic of abstraction is this partial increment of intensity. While involving elimination, it is actually a positive mental process. The elements or qualities of a percept or a representation which we omit do not necessarily involve such suppression. We leave them out of account simply because they do not suit our ends for the moment, and are complementary.<sup>3</sup>

<sup>1</sup> Translated from the French by Frances A. Welby.

<sup>2</sup> For example, in moments of surprise and in states approximating to pure sensation.

<sup>3</sup> Schmidkunz, *Ueber die Abstraction*. Halle: Stricker, 1889. This little work of forty-three pages contains a good historical and theoretical exposition of the question.

Abstraction being, then, in spite of negative appearances, a positive operation, how are we to conceive it? Attention is necessary to it, but it is more than attention. It is an augmentation of intensity, but it is more than an augmentation of intensity. Suppose a group of representations  $a + b + c = d$ . To abstract from  $b$  and  $c$  in favor of  $a$ , would ostensibly give  $a = d - (b + c)$ . If this were so,  $b$  and  $c$  would be retained unaltered in consciousness; there would be no abstraction. On the other hand, since it is impossible for the whole representation  $d$  to be suppressed outright,  $b$  and  $c$  cannot be totally obliterated. They subsist, accordingly, in a residual state which may be termed  $x$ , and the abstract representation is hence not  $a$  but  $a + x$  or  $A$ . Thus the elements of abstract representations are the same as those of concrete representations; only some are strengthened, others weakened: whence arise new groupings. Abstraction, accordingly, consists in the formation of new groups of representations which, while strengthening certain elements of the concrete representations, weaken other elements of the same.<sup>1</sup>

We see from the above that abstraction depends genetically upon the causes which awaken and sustain attention. I have described these causes elsewhere,<sup>2</sup> and cannot here return to their consideration.

It is sufficient to remark that abstraction, like attention, may be instinctive, spontaneous, and natural; or reflective, voluntary, and artificial. In the first category the abstraction of a quality or mode of existence originates in some attraction, or from utility; hence it is a common manifestation of intellectual life and is even met with, as we shall see, among many of the lower animals. In its second form, the rarer and more exalted, it proceeds less from the qualities of the object than from the will of the subject; it presupposes a choice, an elimination of negligible elements, which is often laborious, as well as the difficult task of maintaining the abstract element clearly in consciousness. In fine, it is always a special application of the attention which, adapted as circumstances

<sup>1</sup> Schmidkunz, *loc. cit.* This author, who rightly insists upon the positive character of abstraction (which is too frequently considered as a negation) observes that no concept, not even that of infinity, is in its psychological genesis the result of negation, for, "in order to deduce from the idea of a finite thing the idea of infinity, it is first necessary to abstract from that thing its quality of finality, which is certainly a positive act; subsequently, in order to reach infinity, it is sufficient either constantly to increase the time, magnitude, and intensity of the finite which is a positive process; or to deny the limits of the finite, which is tantamount to denying the negation."

<sup>2</sup> *Psychology of Attention*. Chicago: The Open Court Publishing Co.

require to observation, synthesis, action, etc., here functions as an instrument of analysis.

A deeply-rooted prejudice asserts that abstraction is a mental act of relative infrequency. This fallacy obtains in current parlance, where "abstract" is a synonym of difficult, obscure, inaccessible. This is a psychological error resulting from an incomplete view: all abstraction is illegitimately reduced to its higher forms. The faculty of abstracting, from the lowest to the highest degrees, is constantly the same: its development is dependent on that of (general) intelligence and of language; but it exists in embryo even in those primitive operations which are properly concerned with the concrete, i. e., perception and representation. Several recent authors have emphasised this point.<sup>1</sup>

Perception is *par excellence* the faculty of cognising the concrete. It strives to embrace all the qualities of its object without completely succeeding, because it is held in check by an internal foe,—the natural tendency of the mind to simplify and to eliminate. The same horse, at a given moment, is not perceived in the same manner by a jockey, a veterinary surgeon, a painter and a tyro. To each of these, certain qualities, which vary individually, stand in relief, and others recede into the background. Except in cases of methodical and prolonged investigation (where we have observation, and not perception) there is always an unconscious selection of some principal characteristics which, grouped together, become a substitute for the totality. It must not be forgotten that perception is pre-eminently a *practical* operation, that its mainspring is interest or utility, and that in consequence we neglect—i. e., leave in the field of obscure consciousness—whatever at the moment concerns neither our desires nor our purposes. It would be superfluous to review all the forms of perception (visual, auditory, tactual, etc.), and to show that they are governed by this same law of utility; but it should be remarked that the natural mechanism by which the strengthened elements and the weakened elements are separated, is a rude cast of what subsequently becomes abstraction, that the same forces are in play, and are ultimately reducible to some definite direction given to the attention.

With the image, the intermediate stage between percept and concept, the reduction of the object represented to a few fundamental features, is still more marked. Not merely is there among the different representations which I may have of some man, dog, or tree, one that for the time being necessarily excludes the others

<sup>1</sup> See especially Hoeffding, *Psychologie*. German translation. Second Edition, pp. 223 et seq.

(my oak tree perforce appears to me in summer foliage, tinted by autumn, or bereft of leaves,—in bright light or in shade), but even this individual, concrete representation which prevails over the others is no more than a sketch, a reduction of reality with many details omitted. Apart from the exceptionally gifted men in whom mental vision and mental audition are perfect, and wholly commensurate (as it would seem) with perception, the representations which we call exact are never so, except in their most general features. Compare the image we have, with our eyes closed, of a monument with the perception of the monument itself; the remembrance of a melody with its vocal or instrumental execution. In the average man, the image, the would-be copy of reality invariably suffers a conspicuous impoverishment, which is enormous in the less lavishly endowed; it is here reduced to a mere schema, limited to the inferior concepts.

Doubtless it may be objected that the work of dissociation in perception and representation is incomplete and partial. It would be strange and illogical indeed if the abstract were to triumph in the very heart of the concrete; we do but submit that it is here in germ, in embryonic shape. And hence, when abstraction appears in its true form, as the consciousness of one unique quality isolated from the rest, it is no new manifestation but a fruition, it is a simplification of simplifications.

The state of consciousness thus attained, by the fixation of attention on one quality exclusively, and by its ideal dissociation from the rest, becomes, as we know, a notion which is neither individual nor general, but abstract,—and this is the material of generalisation.

The sense of identity, the power of apprehending resemblances, is, as has justly been said, “the keel and backbone of our thinking”; without it we should be lost in the incessant stream of things.<sup>1</sup> Are there in nature any complete resemblances, any absolutely similar events? It is extremely doubtful. It might be supposed that a person who reads a sentence several times in succession, who listens several times to the same air, who tastes all the four quarters of the same fruit, would experience in each case an identical perception. But this is not so. A little reflexion will show that besides differences in time, in the varying moods of the subject, and in the cumulative effect of repeated perceptions, there is at least between the first perception and the second, that radical difference which separates the new from the repeated. In fact, the

<sup>1</sup>W. James, *Psychology*, Vol. I., p. 459.

material given us by external and internal experience consists of resemblances alloyed by differences which vary widely in degree,—in other words, analogies. The perfect resemblance assumed between things vanishes as we come to know them better. At first sight a new people exhibits to the traveller a well-determined general type; later, the more he observes, the more apparent uniformity is resolved into varieties. "I have taken the trouble," says Agassiz, "to compare thousands of individuals of the same species; in one case I pushed the comparison so far as to have placed side by side 27,000 specimens of one and the same shell (genus *Neretina*). I can assure you that in these 27,000 specimens I did not find two that were perfectly alike."

Is this faculty of grasping resemblances—the substrate of generalisation—primitive, in the absolute signification of the word? Does it mark the first awakening of the mind, in point of cognition? For several contemporary writers (Spencer, Bain, Schneider, and others) the consciousness of difference is the primordial factor; the consciousness of resemblance comes later. Others uphold the opposite contention.<sup>1</sup> As a matter of fact this quest for the *primum cognitum* is beyond our grasp; like all genetical questions, it eludes our observation and experience.

No conclusion can be formed save on purely logical arguments, and each side advances reasons that carry a certain weight. There is, moreover, at the bottom of the whole discussion, the grave error of identifying the embryonic state of the mind with its adult forms, and of presupposing a sharp initial distinction between discrimination and assimilation. The question must remain open, incapable of positive solution by our psychology. The incontestable truth with regard to the mind, as we know it in its developed and organised state, is that the two processes advance *pari passu*, and are reciprocally causative.

In sum, abstraction and generalisation considered as elementary acts of the mind, and reduced to their simplest conditions, involve two processes:

1. The former, *abstraction*, implies a dissociative process,

<sup>1</sup> Herbert Spencer, *Principles of Psychology*. Vol. I., Part 2, Chapter II.—Bain (in the last chapter of *Emotions and Will*), says that nothing more fundamental can possibly be assigned as a mark of intelligence than the feeling of difference between consecutive or co-existing impressions. "There are cases, however, where agreement imparts the shock requisite for rousing the intellectual wave; but it is agreement so qualified as to be really a mode of difference. For review and ample discussion of this problem see Ladd's *Psychology, Descriptive and Explanatory*, Chapter XIV. The earlier psychologists, in considering the 'faculty of comparison' which acts by resemblance and difference, as primordial, had observed the same fact, although they described it in different terms.

operating on the raw data of experience. It has subjective causes which are ultimately reducible to attention. It has objective causes which may be due to the fact that a determinate quality is given us as an integral part of widely different groups.

“Any total impression whose elements are never experienced apart must be unanalysable. If all cold things were wet and all wet things cold, if all liquids were transparent and no non-liquid were transparent, we should scarcely discriminate between coldness and wetness and scarcely ever invent separate names for liquidity and transparency. . . . What is associated now with one thing and now with another tends to become dissociated from either, and to grow into an object of abstract contemplation by the mind. One might call this the law of dissociation by varying concomitants.”<sup>1</sup>

2. The latter, *generalisation*, originates in association by resemblance, but even in its lowest degree it rises beyond this, since it implies a synthetic act of fusion. It does not, in fact, consist in the successive excitation of similar or analogous percepts, as in the case where the image of St. Peter's in Rome suggests to me that of St. Paul's in London, of the Pantheon in Paris, and of other churches with enormous dimensions, of like architecture, and with gigantic domes. It is a condensation. The mind resembles a crucible with a precipitate of common resemblances at the bottom, while the differences have been volatilised. In proportion as we recede from this primitive and elementary form, the constitution of the general idea demands other psychological conditions which cannot be hastily enumerated.

And thus we reach the principal aim of our inquiry which purports, not to reinforce the time-worn dispute as to the nature of abstraction and generalisation, but to pursue these operations step by step in their development, and multiform aspects. Directly we pass beyond pure individual representation we reach an ascending scale of notions which, apart from the general character possessed by all, are extremely heterogeneous in their nature, and imply distinct mental habits. The question so often discussed as to “What takes place in the mind when we are thinking by general ideas?” is not to be disposed of in one definite answer, but finds variable response according to the circumstances. In order to give an adequate reply, the principal degrees of this scale must first be determined. And for this we require an *objective notation* which shall give them some external, though not arbitrary, mark.

<sup>1</sup> W. James, *Psychology*. Vol. I., pp. 502 and 506.



The first distinguishing mark is given by the absence or presence of words. Abstraction and generalisation, with no possible aid from language, constitute the inferior group which some recent writers have designated by the appropriate name of *generic images*<sup>1</sup>—a term which clearly shows their intermediate nature between the pure image, and the general notion, properly so called.

The second class, which we have termed *intermediate abstraction*, implies the use of words. At their lowest stage these concepts hardly rise above the level of the generic image: they can be reduced to a vague schema, in which the word is almost a superfluous accompaniment. At a stage higher the parts are inverted: the representative schema becomes more and more impoverished, and is obliterated by the word, which rises in consciousness to the first rank.

Finally, the third class, that of the *higher concepts*, has for its distinguishing mark that it can no longer be represented. If any image arises in consciousness it does not sensibly assist the movement of thought, and may even impede it. Everything, apparently, at least, is subordinated to language.

This enumeration of the stages of abstraction can for the present only be given roughly and broadly. Every phase of its evolution should be studied in itself, and accurately determined by its internal and external characteristics. As to the legitimacy, the objective and practical value, of this schematic distribution, nothing less than a detailed exploration from one end to the other of our subject, can confirm or overthrow it.

We shall go over certain of the lower forms, dwelling upon these at some length, because they are usually neglected, or altogether omitted. This is the *pre-linguistic* period of abstraction and generalisation: words are totally wanting; they are an unknown factor. How far is it possible without the aid of language to transcend the level of perception, and of consecutive images, and to attain a more elevated intellectual standpoint? In replying empirically, we have three fairly copious sources of information: animals, children who have not yet acquired speech, and uneducated deaf-mutes. We shall speak of this in subsequent articles.

<sup>1</sup>This term is borrowed from the well-known works of Galton on composite photographs, which are scarcely more than twenty years old. Huxley in his book on Hume (Chapter IV.) appears to be the first who introduced it into psychology, as shown by the following passage: "This mental operation may be rendered comprehensible by considering what takes place in the formation of compound photographs—when the images of the faces of six sitters, for example, are each received on the same photographic plate, for a sixth of the time requisite to take one portrait. The final result is that all those points in which the six faces agree are brought out strongly, while all those in which they differ are left vague; and thus what may be termed a *generic* portrait of the six is produced. Thus our ideas of single complex impressions are incomplete in one way, and those of numerous, more or less similar, complex impressions are incomplete in another way; that is to say, they are generic. . . . And hence it follows that our ideas of the impressions in question are not, in the strict sense of the word, copies of those impressions; while at the same time they may exist in the mind independently of language." Romanes employs the word "recept" for "generic images," as marking their intermediate place between the "percept" which is below, and the "concept" which is above them.