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ATTENTION.[1]

AFFECTIVE CONFLICT AND UNITY OF CONSCIOUSNESS.

ALTHOUGH attention may boast of possessing more abundant literature than any other psychical phenomenon, yet it is still far from being fully explained; that is to say, it has not been brought to any extent into relation and association with other psychic phenomena, especially with those to which it is most closely related. And although attention, as Titchener rightly emphasizes, forms the very pivot upon which all psychology hinges, yet to-day the question as to its inmost nature is still very far from solution. What a great loss this branch of science suffers thereby it is easy to conceive.

The cause of this delinquency in the scientific explanation of attention holds true also for all other psychic activities, namely, that the investigation of all these phenomena has been begun at just the point where they are the most complex and intricate instead of beginning with the simplest forms. The question of attention has usually been taken up by means of self-contemplation and at the moment of philosophical reflection, instead of by observing, for instance, the beast of prey, impatient to fall upon the quarry he has espied and for which he has long lain in wait, or the child who would fain put a white pellet in his mouth but is in doubt whether it is a piece of candy as usual, or may turn out to be a bitter pill as was yesterday the case.

[1] Translated from the German which is to appear in the *Archiv für Psychologie.*

The expediency of beginning the investigation with the simplest forms involves the expediency of pursuing the phylogenetic method and following the course of evolution back as far as possible in order to reveal the phenomenon in the very moment of its first appearance. This is the course we pursued when investigating the inmost nature of another psychic phenomenon no less important and fundamental, namely that of affective tendencies, and the phylogenetic research which showed us their mnemonic origin and nature at once threw light upon that class of phenomena previously so obscure.[2]

We believe that this procedure will attain the same success in our study of attention, which however as we shall see is only a secondary phenomenon directly derived from affective tendencies.

In the treatise just mentioned, "On the Mnemonic Origin and Nature of Affective Tendencies," we have seen that these tendencies are originally only expressions of one and the same intrinsic tendency of the organism to preserve or restore the state of its physiological equilibrium, or to reestablish a previous physiological state which had been determined in the past by certain environmental relations. As soon as these relations are even partially repeated they bring about the "discharge" of the mnemonic accumulation which this former physiological system had left behind.

Then from these affective tendencies of direct mnemonic origin which strive to reestablish certain environmental relations as a whole, arise, according to the known law of affective transference of the whole to the

[2] E. Rignano, "Dell' origine e natura mnemonica delle tendenze affettive," *Scientia*, No. XVII, 1, 1911; "Ueber die mnemonische Entstehung und die mnemonische Natur affektiver Neigungen," *Archiv für die gesamte Psychologie*, Vol. XX, No. 1, 1911; "On the Mnemonic Origin and Nature of Affective Tendencies," *Monist*, July, 1911. This treatise later appeared also as Appendix to the English edition of the author's work, *On the Inheritance of Acquired Characters; An Hypothesis of Heredity, Development and Assimilation*. Chicago, The Open Court Publishing Company, 1911.

part, all the other affective tendencies of indirect mnemonic origin which strive to reestablish only very definite parts or details of these environmental relations. Besides the most important environmental relations usually striven for eagerly in their original totality, the higher animals, and especially mankind, always possess a large number of secondary and even quite specific, environmental relations which in this way are capable of becoming in their turn objects of desire.

At this point we must emphasize the fact that when a physiological system has been disturbed by altered environmental conditions and reduced to a potential state in the form of a mnemonic accumulation, it can become fully reactivated and continue active in a stable physiological state only when its internal and external relations are entirely and exactly the same as when they induced this physiological state. Thus the physiological system of an infusorian which has previously lived in a certain temperature or in a salt solution of a certain proportion will generate an affective tendency toward return to its former habitat as soon as it is removed to other environmental relations; and this tendency will be expressed by negative reactions to every other change of its environmental relations which tends to remove it still further from its original habitat, and by positive reactions to every change which brings it nearer to its former habitat (Jennings). But the original physiological state can not be perfectly reestablished and made to persist in regular activity until the little animal by its own movements has succeeded in getting again into an environment identical with the former one.

Likewise the diminution of histogenetic substance in the blood which prevents the continuance of the metabolic state hitherto active and stable, will provoke the affective tendency of hunger and all the acts of seeking and absorbing nourishment proceeding therefrom; but the normal

metabolic state can not be completely reestablished until hunger is allayed; that is to say, until the acts carried on for the purpose of seeking and absorbing nourishment and the processes of digestion have endowed the blood with the same intrinsic quality, hence the same proportion of histologic substance, as formerly.

As with all mnemonic evocations in general, a small part of a certain former complex environmental state is sufficient, if not to "satisfy" the associated affective tendency, at least to "discharge" it. That is why the sensations in so far as they represent parts of environmental conditions, become in a very special manner the "dischargers" of affective tendencies. But in this respect there is an essential difference between the "non-distance receptors" and the "distance-receptors" which Sherrington rightly emphasizes, so that a very significant phylogenetic advance was made when the latter gradually developed from the former. For the non-distance receptors (senses with direct contact) usually permit the immediate or almost immediate satisfaction of the affective tendencies which they "discharge." Frequently the sensation discharging a certain affective tendency is identical with its satisfaction. On the other hand the "distance-receptors" usually produce that particular state in which an affective tendency is discharged and held in suspense, and which we are now ready to investigate.

"Between touch and assimilation," says Spencer, "there exists in the lowest creature an intimate connection. In many Rhizopods the tactual surface and the absorbing surface are coextensive. The ameba, a speck of jelly having no constant form, sends out in this or that direction prolongations of its substance. One of these meeting with and attaching itself to some relatively fixed object, becomes a temporary limb by which the body of the creature is drawn forward; but if this prolongation meets with some

relatively small portion of organic matter it slowly expands its extremity around this, slowly contracts, and slowly draws the nutritive morsel into the mass of the body, which collapses around it and presently dissolves it. That is to say, the same portion of tissue is at once arm, hand, mouth, and intestine—shows us the tactual and absorbent function united in one."[3]

Sherrington in his turn says: "Animal behavior shows clearly that in regard to these two groups of receptors the one subserves differention of reaction, i. e., swallowing or rejection, of material already found and acquired, e. g., within the mouth. The other, the distance-receptor, smell, initiates and subserves far-reaching complex reactions of the animal anticipatory to swallowing, namely, all that train of reaction which may be comprehensively termed the quest for food. The latter foreruns and leads up to the former. This precurrent relation of the reaction of the distance-receptor to the non-distance receptor" (as well as the 'conative feeling' which the distance-receptor induces) "are typical."[4]

Accordingly non-distance-receptors occasion no "suspended" affective tendencies, no "conative feeling," but instead they bring about the immediate satisfaction of affective tendencies at the moment they are discharged, or the immediate accomplishment of the acts contributing to their satisfaction ("final or consummatory reactions," as Sherrington expresses it). Distance-receptors, on the other hand, discharge the affective tendency involved and keep it active during the entire time of expectation and during the whole series of acts required of the animal before it can carry out the last consummatory act which is to satisfy this affective tendency. Therefore in general

[3] Herbert Spencer, *The Principles of Psychology*, 4th ed., Vol. I, p.307. London, Williams and Norgate.

[4] C. S. Sherrington, *The Integrative Action of the Nervous System*, page 326 f. London, Constable, 1906.

only the distance-receptors but not the non-distance-receptors can bring about a more or less lasting condition of unfulfilled desire: "If all motive impulses could be at once followed up desire would have no place."[3]

Now the question arises how can we explain the fact that the affective tendencies discharged or evoked by the distance-receptors, nevertheless remain "suspended"; in other words, how is it that although they have been evoked and persist in this state, yet for a long time they occasion no actual performance of any of those consummatory acts which to be sure would not now have any result but to which they nevertheless impel, as is shown by the incipient performance of these acts? The beast of prey, for instance, whose appetite is aroused from afar by the scent and sight of his victim coming towards him without presentiment of danger and is whetted constantly more and more, nevertheless does not bound at once toward the longed-for victim, but waits motionless and trembling with all the muscles tense, until the poor victim has come within springing distance. What then prevents the affective tendency so evoked from being at once completely discharged in the consummatory act of springing upon the prey and tearing it to pieces?

This can only be the counteraction of a conflicting tendency by which the first tendency is prevented from accomplishing its consummatory act. And the conflicting tendency in this case can be only the combined result of all consummatory acts which were actually performed in the past at the first awakening of the affective tendency, but every time without result. Accordingly we may make the assertion that it was the "deception" at each premature activation of the affective tendency called forth by the dis-

[3] A. Bain, *The Emotions and the Will*, 4th ed., p. 423. London, Longmans Green, 1899.

tance-receptor, which called into being the opposite tendency by which the other is now held in suspense.

A familiar instance is Möbius's experiment with the pike. By means of a pane of glass he divided a large glass bowl full of water into two parts. In one side he placed the pike and in the other he put tiny whitings which provide the pike's customary food. It now happened that whenever the pike dived after one of the small fishes he fell against the obstructing pane of glass. For a week he continued to make these vain attempts. Then he gave up entirely the pursuit of his unattainable prey and did not change his behavior even when the obstructing pane of glass had been taken away.

Now the constantly repeated deceptions which resulted when the affective tendency released by a distance-receptor produced immediately the performance of a consummatory act which was necessarily unsuccessful, must have a very similar effect on all animals provided with these senses. And so it has come to pass that the very discharge effected by the distance-receptors of any affective tendency and the premature beginning of the movement connected with it, now, thanks to the memory of former unsuccessful attempts, provoke the antagonistic tendency, like that which prevented the pike from falling upon its prey. And this conflict produces that state of an affective tendency "held in suspense" which constitutes the state of attention.

Accordingly we may say that phylogenetically attention originated with the distance-receptors, and that it consists in the conflict of two affective tendencies, the second of which is "discharged" by the first, prevents it for a time from complete activation and hence keeps it "in suspense."

The state of attention therefore does not consist of a single affective state but of the conflict of tendencies arising from the coexistence of two affective states. It is because this fact has been overlooked that it has not been pos-

sible heretofore to understand in what the specific nature of this state of attention really consists, and so to understand the real significance of the holding of an affective tendency "in suspense" which is characteristic of attention, nor to understand why all those movements which the first of the two affective tendencies would itself have provoked at once, are arrested "in the nascent state," whereas had this affectivity alone been active they would have proceeded directly to completion.

But aside from the case just considered of a premature performance of the consummatory act involved, the distance-receptors under many other circumstances arouse a second affectivity in conflict with the first which for some time prevents the complete activation of the former, as a consequence of the unexpected, unpleasant results which had some time previously been associated with it. However and whenever such an affective conflict occurs there at once arises also a corresponding state of attention; and *vice versa,* there is no state of attention without such a conflict of tendencies. For we need only consider carefully a few of the most significant cases, selected so as to be as different as possible from one another, in order at once to see in operation this conflict of tendencies in every state of attention.

"A young chick two days old, for example," says Lloyd Morgan, "had learned to pick out pieces of yolk from others of white of egg. I cut little bits of orange-peel of the same sizes as the pieces of yolk and one of these was soon seized but at once relinquished, the chick shaking its head. Seizing another he held it for a moment in the bill but then dropped it and scratched at the base of his beak. That was enough. He could not again be induced to seize a piece of orange-peel. The obnoxious material was now removed and pieces of yolk of egg substituted but they were left untouched, being probably taken for orange-peel. Sub-

sequently he looked at the yolk with hesitation, but presently pecked doubtfully, not seizing but merely touching. Then he pecked again, seized, and swallowed it."[6]

Accordingly we see here how the first act of attention of the newly hatched chicken arose from the conflict between its first tendency to seize the yolk of the egg and the conflicting tendency aroused by the memory of the unpleasant experience produced by picking up the orange-peel. The "effective guidance and control of consciousness," of which Lloyd Morgan speaks as one factor which influenced the instinctive pecking of the chicken, was thus only the arousing of a new affectivity, repugnance, that inhibited the first affectivity, hunger, which of itself impelled toward the completion of the instinctive act.[7]

A little girl is taken out walking by a servant. The child unexpectedly catches a glimpse of her mother on the other side of the street and wishes to run over to her at once. But the maid warns her with a cry, "Look out for the carriage!" and the little one stops. The carriage has hardly passed and she has almost taken a step ahead when another approaching vehicle forces her to give way again. The conflict of the two tendencies of hope and fear, kept alive in the child by the sight of her mother and the repeated passing of vehicles, is shown very clearly by the direction of her steps first forward and then backward. It is faithfully reflected in the expression of the small bright eyes which shine with anticipation and joy as soon as they are turned upon her mother and the child takes a step nearer to her, but at once look anxious and confused when they observe one of the heavy wagons of which there seems to be no end. Finally, however, the street-crossing is unobstructed. The state of fear and also the "state of attention," has entirely disappeared so that the

[6] Lloyd Morgan, *Habit and Instinct*, p. 40 f. New York, Arnold, 1896.

[7] Lloyd Morgan, *op. cit.*, pp. 129-131, 135, 139 f.

little girl may at last satisfy her wish and throw herself into her mother's arms.

The conflict of tendencies is likewise exhibited with great distinctness in certain typical states of attention where it is expressed in the exceedingly subtle choices between almost imperceptible modalities of a certain act.

A billiard player, for instance, who has already directed his cue at the ball, wishes first of all to make a successful stroke. He is ready to make the stroke but the extreme tension of the muscles in his arm causes him to fear that the stroke may turn out to be too strong, as it did shortly before. In consequence of this conflicting affectivity his muscles become somewhat lax. Nevertheless the weaker tension he now feels reawakens in him the memory of an earlier unsuccessful stroke when the movement of the ball had not been swift enough, and now he finds himself perplexed by the opposite fear lest the stroke may be too weak. By the swings of his arm, now longer and now shorter, which precede the stroke and bring the point of the cue nearer to the ball or farther from it, a spectator can discern the rapid alternation of conflicting affectivities which discharge each other and exaggerate or moderate each other in order finally to bring about the result of giving to the ball exactly the necessary force.

The same is true when a person who is writing attempts to remove with his finger a tiny hair from his steel pen. This rarely succeeds at the first attempt because the fear of soiling his finger-tips causes him to press them together before they are near enough to the point of the pen and the hair. The first failure gives rise to care lest the second attempt may also fail, and this opposite fear partly suppresses and moderates the fear of soiling the fingers, so that the wish to remove the hair by this time lends to the arm and fingers exactly the degree of muscular contraction

necessary to get hold of the extending end of the hair without touching the inky pen.

From this conflict of tendencies, inevitably occurring as soon as we attempt to perform an act "carefully," arises the well-known fact that attention, when directed to actions which by long practice have become mechanical, makes their execution less rapid and perfect than if they had taken place quite automatically.

"An automatic connection of contents or movements has nothing to gain from the intervention of attention,—nay suffers a very positive loss in accuracy and rapidity of realization, if the attention be directed upon it."[8]

Thus the recitation of a poem which has been learned so well by heart that it can be repeated mechanically becomes uncertain and hesitating when the speaker gives it his whole attention. And a person who writes his name with the greatest facility when he gives no thought to it is pretty sure to do it disconnectedly and without ease as soon as some one asks him for his autograph. For in this case every stroke of the pen needs a short preparation and requires a certain application of the will to begin and complete it, whereas the transference from one stroke to another becomes studied and awkward instead of easy and running as usual.[9]

Nevertheless there are individual cases, even where the attention is greatly aroused, in which the conflict of tendencies appears less distinct. For instance in Sardou's drama, "Tosca," we have the scene where Tosca's lover is tortured. It arouses the keenest sympathy and attention of all the spectators. Where is there any conflict of tendencies in this case? And yet we shall find it if we reflect a little. On the one hand there is the tendency, according

[8] O. Külpe, "The Problem of Attention," *Monist*, XIII, p. 61. Chicago, Oct. 1902.

[9] H. Maudsley, *The Physiology of Mind*, p. 520 f. London, Macmillan, 1876.—*The Pathology of Mind*, p. 143. London, Macmillan, 1895.

to the character of the spectator, either to fall upon the crafty Scarpia and slay him, or to throw oneself at his feet and with Tosca beg his mercy for her lover; or one might hasten to the aid of the unfortunate man and liberate him after driving away or killing the agents of the torturer. On the other hand the cultured man has acquired a tendency by education or custom to do nothing which conventionality does not permit, and not to make himself ridiculous by acts which would be the more ridiculous since every one knows that he is not beholding a reality but a mere invention. And that this is really the case is proved by the village theaters where the actor who plays the part of the tyrant is often hissed by the public, and sometimes even becomes the target of more or less harmless missiles thrown by the more unsophisticated spectators. The author once attended such a spectacle. Some conspirators were in hiding behind a curtain, waiting to kill the king, who by this time had won the favor of the public by his generosity and fearlessness. He had hardly appeared when a voice was heard to call out at the first movement of the curtain, "Look out, they are going to kill you!" The entire audience laughed uproariously, and the simple spectator was overcome with confusion. He will doubtless succeed another time in repressing his magnanimous outburst, thanks to the conflicting tendency not to make himself again the object of derision.

Attention which is aroused by novelty is likewise the result of a conflict of tendencies arising from the fact that just because the object is new, it has not yet been "affectively classified," and therefore arouses both hope and fear at the same time.

If the space at our disposal permitted, we could easily show that any "classification" whatever is based either directly or indirectly upon an affective tendency. The principle upon which it rests consists originally in the fact that

no sensation or perception of the distance-receptor has any value for the organism except as a symbol of a possible environmental state, near or remote, to be striven after or avoided. As long as this symbol has not been placed in either category, the conflicting affectivities of hope and fear oppose each other and hold each other in suspense. This opposition is seen distinctly, for instance, in a child who is undecided whether or not he should drink the tea offered him by his mother and which this time has an unusual color, because he is not sure whether it is a sweet or bitter draught; or in a beast of prey that sees a strange looking animal and is in doubt whether it is a dangerous enemy or perhaps a suitable quarry and therefore makes its muscles tense, ready at the same time for either attack or flight.

Curiosity is only one of the least forms of this conflict of tendencies or of this particular state of attention produced by novelty. "The craving for knowledge in its instinctive form is called curiosity. It exists in all degrees, from that of the animal which touches or smells an unknown object, to the all-examining, all-embracing scrutiny of a Goethe." "Curiosity consists of two questions expressed or implied: What is it? What use is it?. . . . The dog brought face to face with an unknown object, looks at it, smells it, approaches, withdraws, ventures to touch it, returns, and begins again; he is pursuing this investigation after his own fashion; he is solving a double problem of nature and utility."[10]

On the other hand the "not new"—and this also may be any specific object when we see it for the first time—comprises everything we know how to classify in one of our various affective categories. It either brings about immediately the evocation and satisfaction of the affectivity con-

[10] Th. Ribot, *Psychologie des sentiments*, pp. 369, 371. Paris: Alcan, 1906. Second English edition, pp. 368, 370. London, Walter Scott, 1911.

cerned, like the little waterfall in the mountain which awakens the desire to drink from it; or it evokes the affective tendency but holds it in suspense for fear lest its immediate complete satisfaction might involve some evil consequences as we have previously seen; or finally it may at that moment be altogether unable to evoke any tendency, like the sight or odor of a familiar dish when we have had enough. In this case the affective activity is reduced to a minimum, the state of attention entirely ceases, and we experience *monotony* or *tedium*. If this state of minimum affective activity is reduced to zero, we have the condition of *sleep*. "Sleep," as Bergson very truly says, "means to disinterest oneself (*se désintéresser*). We sleep in direct proportion to our disinterestedness."[11]

Finally there is only a very slight distinction between "curiosity" and the state of attention of the investigator. The investigator observes a certain object or a certain phenomenon in order to convince himself whether this object or this phenomenon really proves to possess certain properties whose presence has been asserted by others, or which he himself thought he noticed at the first glance, or which in his opinion should exist. The presence or absence of these properties is of exceedingly great value to the observer as is apparent from the fact that he applies himself with such great care to observe them, for they may for instance confirm certain preconceived theories or represent a highly important scientific discovery. Hence on the one hand he cherishes the ardent hope that the supposed properties would really be found to exist. On the other hand he is restrained from prematurely making known a discovery whose accuracy might later be contested by other inquirers to the great injury of his own scientific prestige. Just think for instance with what great

[11] H. Bergson, "Le rêve," *Bulletin de l'Institut Psychologique International*, p. 118. Paris, Alcan, May 1900.

attention—that is to say, with what great care lest he may have been a victim of an optical illusion—Schiaparelli must have carried on his ovservations before he decided to make known his discovery of the canals of Mars. Here too this hope and this care furnish the conflict of two affectivities without which here as elsewhere no actual state of attention would or could be present.

As we have by this time come to recognize the inmost nature of the affective conflict which, as appears from the few examples here adduced, is characteristic of every state of attention, so all other properties which always accompany this state prove at the same time to be so many simple and direct consequences of its nature.

Especially are we able to perceive at once the unconvincing character of Ribot's definition of attention as the state of "relative monoideism." We might if necessary call it a state of "monoaffectivity held in suspense," but as we have seen, it is still better to define it as a state of "double conflicting affectivity."[12]

Ribot's motor or peripheral theory proves to be equally erroneous: "Are the movements of the face, the body and the limbs, and the respiratory modifications that accompany attention, simply effects, outward marks as is usually supposed? Or are they, on the contrary, the necessary conditions, the consistent elements, the indispensable factors of attention? Without hesitation we accept the second thesis."[13]

On the other hand the so-called theories of "central origin" seem to be perfectly correct.[14] Attention is indeed a "central," psychological phenomenon; for the awakening of the primary or active affectivity and the counter-awak-

[12] See Th. Ribot, *Psychologie de l'attention*, pp. 6-8, 6th edition. Paris Alcan, 1902. English edition, p. 10.

[13] Ribot, *op. cit.*, p. 32. English edition, p. 25.

[14] See, e. g., J. Sully, "The Psycho-Physical Process in Attention," *Brain*, July 1890, especially pp. 155-157. London, Macmillan.—Vaschide and Meunier, *La Psychologie de l'attention*, pp. 196 f. Paris, Blond ,1910.

ening of the secondary affectivity which holds the other in suspense, are phenomena of this nature. Attention therefore is first of all an essentially affective phenomenon and only indirectly and in a subordinate manner does it become a motor phenomenon by the fact that the awakening of any affectivity whatever always produces motor and peripheral phenomena which are therefore only accompanying or derived phenomena.

Ribot's error comes from the fact that he has not succeeded in correctly comprehending the nature of affective tendencies, for he sees very well that "attention always depends upon affective states," but he adds soon after: "How are we to represent to ourselves these tendencies? The only positive idea that we can get of them is to consider them as movements (or as inhibitions of movements), be they real or nascent."[15]

Accordingly for this inquirer the motor elements would by themselves constitute the entire essence of affective tendencies. But it is the affective tendencies which are the foundation of the motor elements, and the reverse is false.

As we have seen in our frequently cited treatise "On the Mnemonic Origin and Nature of Affective Tendencies," an affective tendency is only a gravitation, so to speak, toward that environment or those environmental relations which permit the reactivation of the mnemonic accumulation constituting this affective tendency. But of itself, it does not produce any preferential impulse toward one rather than toward another series of movements. For even if these movements were such as could eventually bring the organism back into the desired environmental conditions, yet in themselves they have nothing to do with the ultimate satisfaction of this affective tendency. It is only when one series of movements succeeds in bringing the organism back to the requisite environmental condi-

[15] Ribot, *Psychology of Attention*, pp. 166, 172. English edition, pp. 112, 116.

tions sooner or better than the others and only from this moment, that it becomes preferred to the others. Only from this moment will the awakening of the affective tendency give rise to definite motor elements.

But before this occurs, that is to say before the affective tendency has found preferable any one of the movements capable of leading to the desired end, the affective tendency towards that end will already exist. The very fact of this affective choice proves that in point of time the choosing factor precedes the element chosen, whence it follows that there can be an affective tendency even in the absence of any motor element. For instance a new and unusual indisposition which may attack us arouses the affective tendency to be freed from it, but this does not and cannot initiate any motion whatever.

Hence if affective tendencies and motor elements are two different things, and if the latter are based upon the former but not the reverse, then this is also true with regard to attention for which the motor elements are not an indispensable condition but merely quite secondary phenomena.

Since every conflict of affective tendencies is expressed in a conflict of the motor elements induced by them, so a clear explanation is afforded even with the "central origin" for the fact that "muscular tension," "motor innervation," "tonic contraction," and the "elevation of the entire psychic life," characterize every state of attention, as all have observed.[16]

Affective choice determines not only the particular movements of locomotion, of seizing, etc., which make for the desired object, but also the adjustment of the sense-organs, itself a musculo-motor phenomenon on which depends the more or less successful result of the movements,

[16] Maudsley, *The Physiology of Mind*, p. 313.—Ch. Féré, "Physiologie de l'attention," *Revue philosophique*, Oct. 1800, pp. 401, 404.—K. B. R. Aars, "Notes sur l'attention," *Année psychologique*, VIII, p. 216. Paris, Schleicher, 1902.

of whatever kind they are, and in which therefore both of the two conflicting affectivities cooperate. Now for instance when we are surprised by a sudden noise and direct our glance at once to the distant object from which it seems to come, the state of attention is alert during the whole interval preceding the moment in which the eyes have become adjusted to the new distance, which requires a certain length of time when the object is far away. Thus attention is awakened (here too in conformity with the theory of central origin) before and not after the adjustment of the organ concerned.[17]

Since on the other hand the peripheral sensory relations remain the same, the attention may be directed now to some and now to other sense-perceptions, just as when, confined within our room, we give more heed to certain noises in the street than to others which come from the same direction; for instance, to the hoof-beat of the horses belonging to an equipage that stops before our door, in order to determine by the sound which of our friends has come to call; or to the roll of the wheels in order to find out whether the friend who has come to take us out driving is riding in a closed or open carriage. Attention may even be directed to certain properties of a sense-impression, for instance to the strength or pitch of a note of music, or to certain other characteristics such as its *timbre*. No other examples could demonstrate better than these how entirely attention is independent of the adjustment of the sense, as well as in general of every other "peripheral factor."[18]

From this "central origin" of attention which has been so fully established, and from the inmost nature of the opposition between two mutually conflicting affectivities as above discussed, a conclusion of the utmost importance

[17] See W. B. Pillsbury, *Attention*, p. 13. London, Swan Sonnenschein, 1908.

[18] O. Külpe, *loc. cit.*, p. 50.

may be drawn, namely that the object of attention is observed simultaneously from two quite distinct points of view. Thus a large number of properties and characteristics, of advantages and disadvantages are perceived, observed, recalled and emphasized, which would by no means be the case if only a single affectivity were operative.

Wundt's well-known metaphorical definition of the "apperception" produced by attention as consisting in the transition of the image "from the internal visual field to the internal visual point of consciousness," accordingly, might better be replaced by that of an internal double reflector illuminating the object or the image from several sides at the same time.[19]

That is why attention prevents the mnemonic addition of sensation-evocations, which the affectivity adds to the rough elementary sensation at the moment it is aroused, from distorting the perception produced by this mnemonic contribution into an illusion or hallucination, which on the contrary is always the case when the affectivity thus aroused remains alone.

Sudden and intense fear, for instance, makes any state of attention quite impossible and may give rise—as in the classical case of the wanderer walking at night through a dense forest—to those characteristic hallucinations cited and described in all text-books of psychology and psychopathology. On the other hand that man is "cold-blooded" who does not flee at the sudden rustling of leaves which arouses in him at the first moment the vision of some hidden robber or dangerous beast behind the trees, but who, restrained by his repugnance to so cowardly an action, looks around "with attention" to see whether there really is a living creature there, and what sort of a one it is, or whether indeed it was not the wind that made the noise.

[19] W. Wundt, *Grundzüge der physiologischen Psychologie*, 5th ed., Vol. III, p. 333. Leipsic, Engelmann, 1903.—Ostwald, *Vorlesungen über Naturphilosophie*, 3d ed., pp. 400, 403. Leipsic, Veit, 1905.

Likewise in a state of passion any attention to all that is connected with this passion becomes impossible and the passionate man is therefore exposed to all the auto-suggestions and hallucinations of an Othello because of the very singleness of the control by the hypertrophic affective tendency characteristic of this state. In monomaniacs also as well as in those suffering from a chronic persecution-mania and similar psychical diseases, the thing lacking is the counter-affectivity which would tend to make them fear that they were making a mistake. They are mono-affective in the proper sense of the word, therefore incapable likewise of a real and proper state of attention.

The absence of any counter-affectivity produces in all these cases a total absence of "opposing inhibitors," as Taine would say, which could inhibit the auto-suggestions and hallucinations produced by the one existing affectivity, and permit the latter to reign unhindered and exclusively. On the other hand, great attention always protects from suggestion practised by others just because the opposite affectivity, the fear of being deceived, becomes very strong, as is proved for instance by Binet's experiments on the susceptibility of school children to suggestion.[20]

* * *

Now as we pass to the relations existing between attention and consciousness we must first briefly mention our theory with regard to the conditions which determine the consciousness and those which determine the unconsciousness of the different psychic states.[21]

In the above mentioned treatise we have come to the conclusion that a given psychic state is neither conscious nor unconscious in itself, but that it seems to possess either

[20] H. Taine, *De l'intelligence*, 8th ed., Vol. I, pp. 95 ff. Paris, Hachette, 1897.—A. Binet, *La suggestibilité*, pp. 166, 177 f., 186, 191, 196, 200 etc. Paris, Schleicher, 1900.

[21] E. Rignano, "Qu'est-ce que la conscience?" *Scientia*, 1907, Vol. II, No. IV, 4.

one or the other of these properties only when, having been previously present, it is now referred to another psychic state at present existing. And the necessary and sufficient condition permitting a complex past psychic state to present itself again as "conscious" in relation to a complex present psychic state is that the affective portion of the mnemonic evocation of the former correspond at least in part with the coexisting affective portion of the latter and therefore coalesce with it.

Since, as we have seen in our frequently cited treatise, the possession of a "diffuse seat" is characteristic of affective tendencies—which in this respect are so different from sensations and their images whose seat is localized at a single point or center and which therefore may exist and be active simultaneously in great numbers in one and the same brain—it is difficult even for only two affective tendencies to have their seats in localities which shall not coincide more or less, so that when these tendencies strive to be operative at the same time, they either conflict with each other, or hold each other in suspense, or partially coalesce.

If the discharge of one does not depend on the discharge of the other, and if the respective nervous activities in the part of their seats common to both differ specifically from each other, then the activation of one tendency will of itself imply the exclusion of the other and *vice versa*. If the discharge of the one is caused by the discharge of the other and the two tendencies are antagonistic, we will then have the state in which the primary affective tendency is held in suspense by the secondary; which condition, as we have seen above, is characteristic of the state of attention. If on the other hand the respective nervous activities in that portion of their seats common to both are specifically similar, then their blending together will make the complex psychic state to which one of the tendencies belongs "con-

scious" with reference to the psychic state to which the other belongs.

Finally a fourth case will occur but much more rarely for reasons given above, in which the two affective tendencies have no part of their seats in common, and accordingly both can be present and operative at the same time without hindering each other or bearing any relation whatever to one another. This case comprises all the phenomena of the so-called double personality. These phenomena nevertheless are by no means always of a pathological character, like the typical ones studied especially by Janet, but they may appear also in normal persons in so-called instances of absent-mindedness. Such was the case, for instance, when we were climbing down into the valley from Ca' di Janzo by a very steep mule path. Leaping from one stone to another constantly demanded our whole attention in order to measure exactly the distance of the leap and lest a foot should slip or dislodge a stone. Yet nevertheless the descent sometimes proceeded "unconsciously" with reference to some other very different affectivity which produced at the same time quite another train of thought.[22]

In the first case the exclusion of all other tendencies with independent discharge as soon as one of them becomes active—an exclusion which persists throughout the whole time during which the first of the two affective tendencies of the state of attention remains "held in suspense"—forms the so-called "unity of consciousness."

In other words, the impossibility for more than one primary affective tendency to be active at any one time results in the impossibility of giving heed to more than one object at one time: "A plurality of stimulations of the nerves may co-exist, but they affect the consciousness only

[22] P. Janet, *L'automatisme psychologique*, pp. 263 ff. Paris, Alcan, 1907... Taine, *De l'intelligence*, pp. 16 ff.—Rignano, *Qu'est-ce que la conscience?* pp. 11-13.

by turns, or one at a time. The reason is that the bodily organs are collectively engaged with each distinct conscious state, and they cannot be doing two things at the same instant."[23]

Consequently attention ordinarily is never divided or dispersed. If it is greatly roused it will continue to be directed toward any given objects for a while and hence can not be directed to any others during this entire period. If it is less aroused it passes from one object to another in quick succession and accordingly seems to be divided among many objects at the same time; but in reality even in this case it is directed at each moment to one object only, that is, to the one which corresponds to the momentary affective tendency. Accordingly the speaker who passes judgment upon his own speech, the actor who has command over himself, the chess player who plays several games at one time, Julius Cæsar who dictated several letters at once, do not prove the simultaneous presence of several states of attention, but rather their rapid succession and the alternating predominance of first one and then another.[24]

For this reason the attention directed by self-contemplation upon any affective state brings about the end and disappearance of that state. It is impossible to direct one's attention upon an affectivity. If the attempt is made that particular mood ceases at once, and we are turned aside by a compelling sensation or idea which we have not the slightest desire to observe.[25] For the attention which is directed upon an affectivity within ourselves is a newly originated affectivity, namely the one that impels us to

[23] Bain, *The Emotions and the Will*, p. 5.

[24] E. Meumann, *Intelligenz und Wille*, pp. 22 ff. Leipsic, Quelle & Meyer, 1908.

[25] E. B. Titchener, *The Psychology of Feeling and Attention*, p. 69. New York, Macmillan, 1908.

this observation and investigation, and therefore it displaces the other we wished to observe.

Since the primary affective tendency of the state of attention excludes every other affectivity independently evoked and in this way protects the unity of our consciousness, it makes it possible at the same time for every past state of attention involved to appear conscious to us if we now think back to it and to the object which at that time constituted the end desired. For this memory will now be recalled to the same object by a more or less similar affective tendency which therefore will partially blend with the recollection of the former.

Every state of attention accordingly contains all elements within itself in order later to seem to us to be conscious; but not all past psychic states which now appear conscious were states of attention, as Kohn maintains to whom the state of attention and the conscious state are the same thing. For an affectivity which becomes at once completely active and therefore does not give rise to any state of attention — like a hurried flight caused by sudden terror—is nevertheless able to make the complex psychic state involved appear a conscious one.[26] In other words, the state of attention is a sufficient but not a necessary condition of consciousness. The only condi tion which is at the same time necessary and sufficient is the presence of some affective tendency, no matter whether it be in the state of suspense or of full activation.

The acts which have become automatic, for instance those which originated through affective choice as conscious movements, and which later by means of attention were perfected under the affective conflict of the tendencies to perform the act but at the same time to avoid one by one its many imperfections, are finally consummated after

[26] See H. E. Kohn, *Zur Theorie der Aufmerksamkeit*, pp. 19, 27. Halle, Niemeyer, 1895.

frequent repetition—according to the mnemonic law that the part gradually becomes independent of the whole—without requiring any "impulsion" or any kind of affective aid whatever, either primarily in the execution or secondarily by way of improvement. For this reason we are accustomed to say that rendering acts automatic liberates the attention so that it may be directed to other objects.[27]

And just because acts which have become automatic do not require attention on our part and take place without the assistance of any affective element, they always seem to us to be unconscious. Consciousness, as Maudsley says, directs the process of adaptation, the efforts to become expert in adjusting the various means to their proper ends and the successive stages of organization; it disappears as soon as the skill has been thoroughly attained.[28]

"Habit," says James, "diminishes the conscious attention with which our acts are performed. One may state this abstractly thus: If an act require for its execution a chain of successive nervous events, then in the first performances of the action the conscious will must choose each of these events from a number of wrong alternatives that tend to present themselves; for consciousness is always and chiefly a selective agency. But habit soon brings it about that each event calls up its own appropriate successor without any alternative offering itself and without any reference to the conscious will, until at last the whole chain rattles itself off as soon as the first event occurs, just as if this and the rest of the chain were fused into a continuous stream."[29]

Just as an act that has become automatic represents a nervous activity which in the absence of any accompanying

[27] Meumann, *Intelligenz und Wille*, p. 23.

[28] Maudsley, *The Pathology of Mind*, p. 9.

[29] Wm. James, *The Principles of Psychology*, Vol. I, pp. 114, 139. London, Macmillan, 1901. The same, briefer course, p. 139. New York, Holt, 1893.

affective tendency remains unconscious, so will every stimulation of our senses remain unconscious when it reaches its sensory seat if it can not arouse any affectivity in us. On the other hand every stimulation of our senses which succeeds in discharging any one of the many affective tendencies potentially present in the brain, will afterwards appear conscious to us; and this may also be expressed by saying that the "stimulation has succeeded in taking possession of the sensorium."[30] Whence it follows that if all objective and sensitive peripheral relations remain the same, it will depend on whether our attention is or is not directed upon something else and on the degree of strength and of opposition of the primary affectivity involved—for thence is derived the power to exclude every other affective tendency which differs from it—whether certain stimuli remain quite unobserved or whether they will appear to us as conscious sensations.[31]

Says James: "A million things in the outside world are present to my senses but do not enter my consciousness. Why? Because they do not interest me. Only that which arouses my attention makes up my experience. Only the objects to which I give heed constitute my understanding. Without selective interest experience is a veritable chaos. Interest first gives color and tone to the image, light and shadow, background and foreground, in a word a distinct perspective."[32]

The primary affectivity of a state of averted attention may be so strong that it can prevent even the most intense irritations, which at other times would seem altogether painful and arouse within us the most strenuous effort to remove them, from reaching our consciousness. Classical,

[30] G. E. Müller, *Zur Theorie der sinnlichen Aufmerksamkeit*, pp. 77. Leipsic, Edelmann.

[31] Müller, *op. cit.*, p. 1.—Külpe, *op. cit.*, p. 40 f.—Ostwald, *Vorlesungen über Naturphilosophie*, pp. 400 ff.

[32] James, *op. cit.*, Vol. I, p. 402.

for instance, is the case of the Christian martyr whose entranced attention was to such a degree absorbed by the beatific visions presented to his eyes, that it prevented him from feeling the pain of the horrible tortures to which his body was subjected. No less significant is the case of Robert Hall, some of whose "most eloquent discourses were poured forth whilst he was suffering under a bodily disorder which caused him to roll in agony on the floor when he descended from the pulpit; yet he was entirely unconscious of the irritation of his nerves by the calculus which shot forth its jagged points through the whole substance of his kidney, so long as his soul continued to be 'possessed' by the great subjects upon which a powerful effort of his will originally fixed it."[33]

However, a large number of facts go to prove that those very irritations which do not discharge any affectivity or are not capable of arousing our attention and therefore remain unconscious, nevertheless likewise succeed in reaching their sensory seats. "The fact that we sometimes become conscious of many sensuous impressions, such as for instance the stroke of a bell, after the stimulus has made itself felt in our sense-organ, tends to show that the excitation reaches its destination rightly enough, but that the sensory center happens at the moment to be in a state not suited for the reception of the afferent stimulus."[34]

The conflict also between the different states of attention which the varied stimuli from the outside world would strive to arouse—owing to the fact that only one single primary affective tendency can ever be operative at any one moment—indicates that, whatever the relation of the stimulations to consciousness may be, they always reach their habitual psychical center; for otherwise they could not all tend to discharge their respective affectivities.

[33] W. P. Carpenter, *Principles of Mental Physiology*, 7th ed., p. 138. London, Kegan Paul, 1896.

[34] Müller, *Zur Theorie der sinnl. Aufm.*, p. 105.

"When one of the various stimuli succeeds in the struggle to obtain possession of consciousness we say that we are attentive to it according to the intensity of the corresponding process of consciousness." "But we can not maintain that excitations which do not enter our consciousness because of averted attention do not enter at all into the organ of consciousness, the cortex of the brain."[35]

It often happens in my own case, for instance, that I am reading a newspaper while the other members of the family are chatting together in the same room or perhaps while one of them reads aloud from a book or a different paper. Sometimes I do not succeed in limiting my attention to what I myself am reading because my interest is aroused by what I hear read aloud. In other cases, however, I succeed very well, and then I no longer hear the words of those in the room. Nevertheless one word pronounced by the reader in exactly the same tone as all the other words—for he is reading right along in the same monotonous voice—suddenly draws me completely away from what I am reading and turns my attention to what he is reading aloud. Thus my attention vibrates constantly back and forth between what I am reading and what I am hearing read. The fact of this conflict between the two states of attention accordingly proves most positively, I repeat, that the irritations produced by the spoken words of another reach their sensory center, their sensory basis, in me even in moments when I am not aware of them; otherwise none of them would be able to rivet my interest or attention.

The same is obviously true for all so-called states of absentmindedness which at bottom, as we have already seen, are only the first physiological indications of that double state of one's own personality which hitherto has

[35] Kohn, *Zur Theorie der Aufm.*, p. 19; and Sigmund Exner, *Entwurf zu einer physiologischen Erklärung der psychischen Erscheinungen.* Part I, p. 72. Vienna and Leipsic, Deuticke, 1894.

been investigated almost exclusively in its pathological forms. As an example of this we mentioned in our essay on consciousness the locking of a drawer while attention was directed elsewhere. This showed that all stimulations of sight proceeding from the key-hole and the key placed in it reached their goal although they remained entirely unconscious. Every one has the experience of walking absentmindedly through the streets and yet without running into people, vehicles, or any other obstructing objects on the way. Our previously mentioned "unconscious" descent from the Ca' di Janzo proves how perfectly in every respect the perception of all the difficulties of the way must have been—the stones, their form, their position, their state of equilibrium—if I were to succeed in leaping from one stone to another without falling or knocking down a stone.

The primary affective tendency which constitutes that state of attention which is directed on a definite object, by no means excludes the intrusion of sensations which at the time have no interest; or, in other words, it does not prevent excitations of a sensory character from reaching their goal, their normal destination, even when we are unconscious of them; but they only oppose the affective tendency which would endeavor to arouse these sensations.

"The entrance of a stimulus into consciousness"—as it is expressed by Kohn and others—does not rest upon the possible intrusion of the stimulus at any particular part of the brain or sensorium whose specific function would be that of consciousness. No more does it depend upon a single "center of perception" as Wundt assumes. But it consists only in the fact that this stimulus evokes some affective tendency relating to the object which it represents. When this evocation takes place the stimulus reaches consciousness; if it does not take place, perhaps because at this moment another affective tendency referring to other

sensations is operative, then, although the stimulus may penetrate physiologically to the same point as usual, it cannot reach consciousness and hence remains unobserved and unconscious. The persistence of the mnemonic accumulations of those sensations which remain outside of consciousness and the possibility of evoking them again in the future are at a great disadvantage from the circumstance that they are not able to excite any affective state peculiar to themselves with which they could be connected or associated.

Having thus elucidated the inmost nature of the affective conflict peculiar to attention in its main points, and having seen wherein consists that unity of consciousness which so many inquirers declare to be one of its most essential fundamental properties, space does not now permit us to pass on to the study of the effects arising from this inmost nature and fundamental property of attention upon sensations and ideas, as in general for the whole process of intelligence.

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