

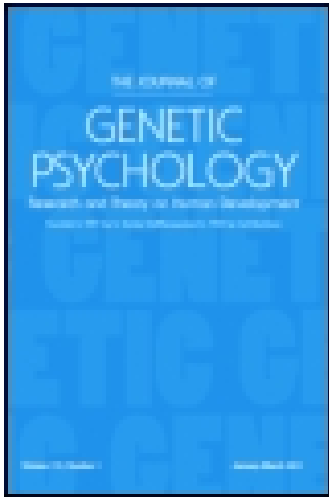
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THE PSYCHOLOGY OF THE THRILL

By IRVING R. KAISER

Perhaps the most impressive fact that one observes in the study of the history of man is the great difference that exists between what were his most primitive modes of conduct and those of the present time. History has revealed to us facts which show that, in his most primitive state, man's conduct was prompted solely by his instincts and that it was largely impulsive in its nature. In fact, his restrictions in doing whatever he wished were governed solely by his physical power and his skill in protecting himself from an enemy and in securing the gratification of his nutritional and his sexual desires; these three comprised what were the main factors of his life. The constant danger that attended his survival caused him to be in more or less of a continual state of heightened excitement of both mind and body. It was only when he was overcome by physical exhaustion that he relaxed his vigilance and sought rest. Judging from their findings in the study of the human body, scientists have come to the conclusion that man led such a mode of existence for many thousands of years, and while perceiving that his bodily development was ideally suited for the life he led, at the same time they have noted that it is not altogether adapted to his present customs of living.

When we come to consider the reasons why the human body is not well adapted to our present customs of daily living, we note that it is due to a marked *contrast* between what were man's former ways of daily life and the ways of life in the present times. Whereas formerly his conduct was prompted solely by his instincts, in our present times it is prompted by precedent and tradition.¹ His impulsiveness of action has been

¹ Trotter calls our attention to the fact that, even in our present degree of civilization, man's behavior is seldom guided by "rational" motives, using this term in the strictest sense of its meaning. He says that in most instances man is prompted to act from suggestions, the basis of which are the traditions and precedents of the herd. He mentions that, while the greater part of man's actions are of a non-rational nature, man justifies and maintains them by a process which is termed "rationalization." For a further study of this subject consult his writings.

gradually brought under control of a developed will-power; it has been subjected to a certain degree of repression by the individual. In the stead of a freedom of action to do as he wished, his daily activities are now limited to a more or less systematic routine, with which is oftentimes associated a feeling of monotony. His physical activities have in some instances been almost completely supplanted by the use of his brain in the form of his intellectual work, while in other instances they are limited to certain forms of manual labor. Whereas formerly man was forced by his circumstances to acquire a fair degree of skill in many ways, in the present times he has been forced to acquire a high degree of skill in some special form of work. In the past, man was obliged to protect himself from any enemy by means of a bodily encounter, or by the uncertain means of crude implements, such as a bow and arrow; today he is readily able to protect himself in immediate danger by the use of firearms or, in instances of a less immediate character, he may obtain protection by appealing to civil authorities. In addition, here it is against the present day customs for an individual to assault another, this being considered an offense or crime:—this illustrates, in another way, how civilization has restricted man's physical activities. Again, instead of, as formerly, being forced to enter the wilds in search of his food, today he can readily procure it by purchasing it from others. In regard to obtaining the satisfaction of his sexual desires man has been forced to undergo a marked abstinence. Finally, as a result of all these changes which civilization has forced him to undergo, the heightened state of excitement which was so intimately associated with these former activities has likewise been forced to undergo a change. This change, however, like many of those with which it was associated, is one whose nature is more apparent than it is real, its manifestations being inhibited solely by the presence of a constant process of repression going on in the mind. The stress which this process creates in the nervous system acts as a source of constant dissipation of the nervous energy, producing effects which we recognize in the form of a fatigue, a feeling of dullness, irritability, restlessness, or enervation. At times, this condition of dullness, restlessness, etc., becomes so acute that the individual is forced to seek relief by relaxing his repressive processes and indulging in some sort of exciting activity. As Mrs. Walter M. Gallichan has remarked, "There are primitive instincts of tremendous power, which, held in check by our dull and laborious yet sexually-exciting civilization, break out at times in many individuals like a veritable monomania."

Again, certain forms of exercise, golf, tennis, fishing, hunting, etc., owe their fascination to the fact that they are activities which, in a way, resemble those of man's more primitive lifetime. The use of alcohol and narcotics also serves to relieve the repressive influences, and, as Trotter expresses it, they afford "a means of securing, for however short a time, some way out of the prison-house of reality back to the Golden Age." Havelock Ellis has gone so far as to say that "even pain may be welcomed on account of the emotional waves it calls up, because it 'lashes into movement the dreary calm of the sea's soul,' and produces that alternation of pain and enjoyment for which Faust longed." In each instance here, whether it be sexual indulgences, various forms of play, the use of alcohol, narcotics, or the undergoing of pain for the sake of its stimulating effects, we are describing means whereby an individual is seeking to attain relief from the effects of this constant repressive action going on in the brain.

Since we are dealing with activities here in which the brain is the central or chief organ concerned, it is best that we first consider in a brief way the requirements of cerebral functioning.

Briefly mentioned, these requirements are oxygen, nutrition, and an abundant circulation of the blood. As long as these are of sufficient quantity and quality, the brain functions normally. Should any of these three factors become altered in the slightest degree, the alteration produces an immediate effect upon the brain. At the present time we lack means of sufficient delicacy to detect the more subtle derangements of function that occur, and the thrill manifestations, with which the present paper deals, are offered as being perhaps the most delicate of those means that we have at the present time. In a general way, however, we may say that all disturbances of cerebral functioning are brought about by the fact that the catabolic processes that occur with cerebral functioning exceed the anabolic processes; the utilization of nervous energy exceeds the power of the elaboration of this force.

Hence, when any portion of the brain is undergoing sustained activity of an intense degree, that portion rapidly becomes fatigued as the result of not being able to maintain a balanced metabolism. We must bear in mind here that each nerve cell within the body functions individually, as regards its specific energy, and that it is necessary that there be a certain amount of stored energy within each cell in order for it to function. It is due to the fact that the nerve cell cannot store energy as fast as it can utilize it that a disturbance in its functions is brought about. It is in this way that we can

account for the localized disturbances that occur, as well as the general disturbances. In addition the function of nerve cells may be disturbed by deleterious products of metabolism, created in the body and brought to them in the blood stream.

In the study of metabolism we find the relation of oxygen, nutrition and the circulation to be so intimate that a primary disorder of any one of them produces a secondary disturbance of the other two. Since in the present paper we are dealing with conditions where there is a disorder of metabolism, the subject of normal metabolism will not be considered. For convenience of description the factors of nutrition, circulation, and the oxidative processes will be considered under the general term of "defective systemic oxidation." This term will include not only the consideration of conditions where the disturbance is the result of an excessive oxidation, as in fatigue, but will likewise be used in describing those conditions where the disturbance is due to a diminished oxidation, as in diabetes, the auto-intoxications, etc.

Defective systemic oxidation may vary in its nature from a mild, transient condition following intense mental activity to a pronouncedly developed chronic condition such as we note in epilepsy, diabetes, etc. It is in its mild transient form that we first notice its relation to thrills.

In this form we find it associated with certain mental symptoms of restlessness, dullness, irritability, etc. There is a craving for excitement, a change of some sort, or a sense of dissatisfaction, which I term "thrill craving." By the term "thrill," here, is meant a momentary heightened state of bodily excitement, associated with a marked increase in the blood pressure and an intensely increased circulation of the blood. Physiologically, its purpose is to enhance the systemic oxidation; psychically, its effects are to produce a sense of well-being. The intensity of the thrill is governed by the general bodily tone of the individual. Likewise, whether or not the thrill is associated with a feeling of exhilaration or of strain depends upon the individual's general bodily tone. All thrills must be looked upon as being attempts at physiological adjustment, as attempts towards enhancing an individual's sense of well-being. They may occur as an unconscious process, as a response to a sudden objective stimulus; or they may be consciously and deliberately sought. In those diseases with which a pronouncedly developed defective systemic oxidation is associated thrills may serve as indicators of the individual's condition, as to whether or not he is improving or growing worse.

Although thrills are the manifestation of a single force,

vital force, acting in different conditions, for the sake of analysis they may be empirically divided into four elements, as follows:—positive and negative, which pertain to the sensory aspects of thrills; active and passive, which pertain to the motor aspects of them.

If the thrill experienced be accompanied by a feeling of pleasure, we may say that it contains a positive element.

Should the thrill experienced be accompanied with a feeling of stress or pain, we may say that it contains a negative element.

When the thrill is produced by the individual in an active initiated way, it may be said to contain an active element.

Finally, where the thrill is experienced in a passive uninitiated way, we have the presence of a passive element.

Just as we know that in the body every action occurring in the nervous system must have both a sensory and a motor manifestation associated with it, in an analogous way this same factor is true of thrills. Every thrill must have either a positive element associated with an active or a passive one, or a negative element likewise associated. In this way we may say that there are four types of thrills to be found occurring in the body, these being positive active, positive passive, negative active, and negative passive.

However, I wish to mention here that one type of thrill may shade over into another type and that this may be an occurrence that can take place immediately or by a process of graduation, according to the changes that occur in stimulation and the relation of these changes to the individual's general bodily tone at the time of the change. There are no instances where we may witness the presence of one type of thrills as a constant manifestation, though we are able to observe the predominance of a manifestation of one type over that of other types, a fact which is of importance in a diagnostic way.

For example, if an individual's general bodily tone is of sufficient strength to react to a stimulus without strain, we find the individual responding to this stimulus by a positive active thrill. Should the individual's general bodily tone be slightly less than enough to respond with a positive active thrill, we find him manifesting a positive passive thrill. When the individual's general bodily tone is not sufficient to react without great strain, we find him responding with a negative active thrill. Finally, if the individual's general bodily tone be too weak to manifest a negative active thrill, he will respond with a negative passive thrill; which, as we note here, indicates that this last type of thrill is always associated with the weakest degree of general bodily tone. In every instance

we must bear in mind that thrills are always to be considered as being attempts at physiological readjustment and that the purpose of this physiological readjustment is, in some instances, to attain a feeling of physiological well-being and in other instances to regain this feeling of physiological well-being when its presence is threatened. Further, we must consider the "ideal of physiological well-being" as representing the guiding principle of not only the intellectual activities of the mind but also of the physiological activities of the system generally.

It is by virtue of the former that we seek *to attain* this ideal of well-being; it is by virtue of the latter that we, in an instinctive way, seek *to regain* this ideal.

When we come to classifying the various forms of human activities in their relation with the four types of thrill manifestations, we find that every form of activity has a more or less distinct relation to one of these four types. All that one has to do in order to recognize which one of the four types of thrills a certain form of activity is a manifestation of, is to analyze the activity in relation to the two elements of which every thrill is composed.

Positive active thrills, as I have shown, are those that are produced by an individual in an active initiated way and afford a sense of pleasure to the individual. Dancing, certain forms of gymnastic exercises, golf, tennis, hunting, fishing, etc., are all instances of activities that afford a means of obtaining positive active thrills. Again, the performance of some artistic form of work, such as music, painting, sculpture, etc., afford a means of obtaining positive active thrills. In recent years modeling in concrete and in clay, structural iron work, basket weaving, and various forms of handicrafts have been used in some sanatoriums in the treatment of nervous ailments. The beneficial effects that they afford may be attributed to the fact that they are positive active thrill-producing factors. Again, excessive sexual indulgences, masturbation, etc., which are very prevalent manifestations in our present times, may be attributed to the fact that they afford means of positive active thrill production. Finally, the presence of marked sexual excitement in persons who are subjects of tuberculosis and of senile dementia may be accounted for by the fact that it is a ready means of positive active thrill-production. Hartenberg calls our attention to the presence of this same condition of sexual excitement occurring in neurasthenics and mentions that it is sought for the reinvigorating effects that it temporarily produces. It may be considered as merely one form of positive active thrill-producing activity akin to those mentioned in re-

gard to tuberculosis and to senile dementia. Positive active thrills have a predominating "motor" character, and since this feature has a therapeutic value, it is well to bear it in mind.

Positive passive thrills, as have been shown, are those that are produced in an individual by a pleasantly affecting objective stimulus in a passive uninitiated way. Owing to the fact that the individual is acted upon, this type of thrills is associated with less of a sense of effort than is the first mentioned type, and for this reason they are probably the more frequently observed of the two types. The fascination of moving pictures, vaudeville shows, witnessing of ballet dancing or of beautiful works of art, listening to musical concerts or to lectures, etc., is due to the fact that these stimuli produce positive passive thrills in us. While not altogether omitting the importance of hunger in regard to the enjoyment of eating, it may be said that oftentimes the presence of flavor, piquancy, daintiness, etc., serve to produce a distinct positive passive thrill in some persons.

Again, tea, coffee, tobacco, alcohol, and narcotics owe the attractiveness that they hold for some people to their positive passive thrill-producing qualities. The widespread use of perfumes by women is due in no small degree to the fact that they serve to create positive passive thrills. The various forms of gambling that are so commonly witnessed in our present times may readily be seen here to owe their attractiveness largely to the positive passive thrills which they produce. The reading of novels and of many other types of literature is due largely to the fact that they serve to create positive passive thrills. Day-dreaming may be attributed to this same cause. Probably the best indication that beneficial effects are following the use of massage or of hydrotherapeutic treatment is the feeling of a positive passive thrill afterwards. If this is lacking upon the completion of the treatment, it is doubtful that beneficial effects are being derived.

It is advisable to note here that while all the various forms of positive passive thrill-producing stimuli that have been mentioned so far are ones that are usually sought by an individual in order to have some sort of stimulating diversion, there are two forms of activity which, while producing positive passive thrills, are not directly sought by an individual. What are referred to here are abnormal phenomena that occur in epilepsy and in hysteria in the way of convulsions. L. Pierce Clark mentions that, "On careful inquiry one finds not a few epileptics who are not only little concerned about the continuance of attacks, but, if not preceded by an aura with its feel-

ing of oppressive anxiety, they do not particularly dislike having them. Often attacks are desired because they release the individual from the extra nervous tension he feels when a free period longer than usual intervenes. Moreover, in not a few instances one finds epileptics who actually say they take pleasure in having seizures." Havelock Ellis, discussing hysteria, quotes Ashwell as having remarked, "A lady whom I long attended always rejoiced when the fit was over, since it relieved her system generally, and especially her brain, from painful irritation which had existed for several previous days." Upon first thought it might appear that the classification of these convulsive phenomena as positive passive thrills is incongruous, especially since these convulsive phenomena are always found associated with a markedly lowered bodily tone and are most often found to occur subsequent to what the individual feels as an unpleasant stimulus.

Were it not for the fact that convulsions are states of unconsciousness we might readily surmise here that the individual would react with either a negative active or a negative passive thrill under given circumstances. The unconscious nature of a convulsion spares, however, an individual from experiencing these last two mentioned types of thrills, and when he regains consciousness he feels a certain degree of exhilaration or physiological well-being. Therefore, it is this conscious feeling of exhilaration, which follows a convulsive seizure, that has influenced me to classify epileptic and hysterical convulsions as being positive passive thrill-producing phenomena. We must look upon these convulsive phenomena in a way similar to the condition that we find present in individuals under the influence of narcotic drugs. Just as we know that narcotised individuals are capable of experiencing positive passive thrills from stimuli that under other circumstances would be intolerable, in a similar way we may say that a convulsion serves to make itself tolerable and, oftentimes, a desired occurrence, since it affords, like narcotics, a means of enhancing the state of physiological well-being.

In contrast to positive active thrills we note that positive passive thrills show a predominating "sensory" character. Oftentimes, because of this factor, positive passive thrills serve by their stimulating effects to arouse sufficient energy to cause an individual to seek experiencing positive active thrills. A notable example of this is the phenomenon of artistic or of inventive "inspiration." Also, as a result of an increased exhaustion of the nervous system which follows the first exhilarating effects of thrills we may find an individual reacting to a given stimulus with a negative active or a negative passive

thrill, depending upon the degree of exhaustion produced. As an example of this, we find a certain degree of irritability following the first exhilarating effects of sexual indulgences.

When we come to consider negative active thrills we find that they are thrills of an unpleasant or painful nature brought about by the presence of stimuli which threaten an individual's sense of well-being, and that the individual seeks to destroy, dispel, frighten or remove in some way this objectionable stimulus. While they may be brought about in otherwise healthy individuals by the presence of a stimulus of too intense a nature, more often this type of thrills is found in those to whom ordinary stimuli have an irritating effect; that is, in individuals whose lowered bodily tone either makes them hypersensitive to stimuli or to whom any attempt at reaction causes a stress within the nervous system. The petulance and the tantrums so often observed in the behavior of weak or neurotic children may be cited as examples of negative active thrills. Worry may be considered as being a very commonly observed form of negative active thrill. Other forms of this type of thrills are observed in tyranny, obstinacy, jealousy, envy, irritability, cruelty, etc.

The mildest form of negative active thrills is probably that of grief. In epilepsy one of the most characteristic features of temperament noticed is the anti-social behavior. In all instances where this anti-social behavior is evidenced, whether in epilepsy or in other neurotic conditions, we may consider it as being so many instances of negative active thrill manifestation, directly attributable to the marked lowered bodily tone present.

Much that figures in the way of acts of vice, criminality, and the like, may be readily interpreted as being instances of negative active thrills of individuals suffering from a condition of markedly lowered bodily tone. In fact, these negative active thrills may be considered as being attributable to this condition of lowered bodily tone more often than as being due to any inherent vicious traits of character. In recent years this fact is coming to receive more and more recognition as a causative factor.

We note in negative active thrills a predominant "motor" character of reaction. In contrast to positive active thrills, they are an activity away from a stimulus instead of towards one. This is in harmony with the ideal of physiological well-being, towards which all activities, both internally and externally, are directed.

Negative passive thrills, which we will now consider, may

be said to differ from negative active thrills only in the lack of a manifested activity. This lack of activity may be brought about in two ways. It may be the result of a mental inhibition, or it may be attributed to lack of sufficient general bodily tone. Again, it may be a combination of these two that brings about negative passive thrills. When it is confined to certain forms of activity, either of a mental or a physical nature, the negative passive thrill may be attributed to a localized lowered bodily tone in those parts. Mental inhibition may be looked upon as being a lowered tone of certain involved cells of the brain; just as we know that certain physical inhibitions, such as occur in writer's cramp, are due to the lowered tone of the nerve cells involved in producing movements of certain muscles. Whether it occurs in the physical or the psychic realms, this inhibition may be looked upon as being the effects of a similar affection of nerve cells.

This condition of lowered bodily tone, whether general or local in nature, varies from time to time. Moreover, there may exist different degrees of lowered tone in different portions of the body at the same time.

In normal individuals we may find negative passive thrills occurring in the form of acts of embarrassment, bashfulness, timidity, etc., when they are in the presence of a stimulus producing an overly intense effect upon them. In abnormal conditions they may be brought about by ordinary stimuli acting upon a hypersensitive organism, the hypersensitive condition of the organism being due to a lowered bodily tone. It is in this way that the occurrence of certain hysterical phenomena, such as contractures, paralyses, etc., may be accounted for. They are analogous, in a physical way, to the psychic phenomena which we observe in certain forms of behavior, such as obstinacy, apathy, reticence, etc., all depending upon the effects of stimuli upon a hypersensitive nervous system. The lamentations of individuals suffering from melancholia, the hypochondriacal attitudes of mind noted in neurasthenia, and the petulance that is found to be so commonly present in diabetes, may be looked upon as forms of behavior indicative of negative passive thrills. Often times the sexual frigidity occurring in women may be looked upon as being a negative passive thrill manifestation. This last-mentioned phenomenon bears a close resemblance in its nature to hysterical anaesthesia.

In defining thrills in a previous portion of this paper it was mentioned that they were momentary heightened states of bodily excitement, etc. Under certain conditions, thrills may be observed to manifest themselves over a long period of time.

We may consider what is ordinarily spoken of as "delirium" as being a manifestation of a thrill extended over a long period of time. The phenomenon of delirium is always found associated with a markedly defective systemic oxidation which especially affects the brain. The reasons for this defective systemic oxidation having a selective effect here, I will not attempt to offer any explanation of in the present paper. Usually the type of thrill which the delirium manifests is a negative active, as in mania or in dementia praecox. Occasionally, a positive active or a positive passive thrill is evidenced, as in hysteria.

Sometimes a stimulus, when it is of great intensity, will produce a shock or syncope before it can be recognized in the consciousness. However, in those instances where a stimulus is recognized before unconsciousness occurs, it is felt as an intense negative passive thrill of horror.

In order to understand the relation of thrills to emotions it is necessary that we first discuss the relation of thrills to instincts. Just as Havelock Ellis considers that touch is the "sense which is the most ancient and fundamental of all—the mother of the other senses," in an analogous way thrills may be considered as being the most ancient and fundamental of all instincts—the mother of the other instincts. Thrills are closely bound up with the sense of irritability, on the one side, and with the sense of movement on the other; it is an intermediate process occurring between these two phenomena, a sort of nascent activity. Given a certain stimulus by way of an irritability, we may look upon the thrill as being the heightened state of excitement that follows; and here no reference is intended to movements of voluntary musculature but to the internal changes that occur prior to observable movement in the form of instinctive activity. In other words, the particular forms of instinctive activities are all merely expressions of this state of preceding excitement, an excitement of the involuntary nervous system. The instincts may be looked upon as being acquired modes of expression of this excitement. Again, Ribot has expressed the opinion that this excitement of the involuntary nervous system depends "not only on physiological conditions, but still more intimately on the chemical action going on in the tissues and fluids of the organism." McDougall states: "It is probable that every organ in the body exerts in this indirect way some influences upon the mental life, and that temperament is in a large measure the balance or resultant of all these many contributory chemical influences." Freud, in discussing nervous diseases, mentions: "We can hardly avoid perceiving these processes as being, in

the last analysis, chemical in their nature." The researches of Crile and of Cannon have, in recent years, tended to confirm this theory of chemical influences. In fact it is to this chemical influence that the sense of physiological well-being with its associated phenomena of thrill-craving and of thrill-expression may be attributed. Any alteration of the chemical status of the body has an immediate effect upon the sense of physiological well-being. This leads to the creation of thrill-cravings, which in turn bring about states of excitement that are the forerunners of thrill-expression.

Having shown that thrill force is a common component of all instinctive reactions, we will now proceed with the discussion of instincts. McDougall, describing instincts, says: "We may say, then, that directly or indirectly the instincts are the prime movers of all human activity; by the conative or impulsive force of some instinct (or of some habit derived from an instinct) every train of thought, however cold and passionless it may seem, is borne along towards its end, and every bodily activity is initiated and sustained. The instinctive impulses determine the end of all activities and supply the driving power by which all mental activities are sustained, and all complex intellectual apparatus of the most highly developed mind is but a means towards these ends, is but the instrument by which these impulses seek their satisfaction while pleasure and pain do but serve to guide them in their choice of means." While admitting that pleasure and pain serve as guides to instinctive activity, their rôle in the instinctive activities is not limited to this function alone. Not only do pleasure and pain serve to guide the instinctive activities but they accompany them throughout their course of action. As McDougall further remarks: "We seem justified in believing that the continued obstruction of instinctive striving is always accompanied by painful feeling, its successful progress towards its end by pleasurable feeling, and the achievement of its end by a pleasurable sense of satisfaction." We may presume, here, that McDougall has reference to the expression of instinctive striving being inhibited by a process of mental repression. In accordance with the thrill theory, however, these instinctive activities may have an accompanying feeling of pleasure or of pain the origin of which is due to the condition of the general bodily tone. As have been shown, if an individual's general bodily tone is sufficient, he may respond to a stimulus by a positive passive thrill; if his general bodily tone is low, this same stimulus, by the stress it causes in the system, will cause the individual to respond with a negative active or a negative passive thrill. Here we have the pleas-

urable or the painful feeling depending upon the initial strength of the individual's system and not due to an obstruction of any sort. As Marshall has said, "The activity of an organ of any content if efficient is pleasureable; if inefficient is painful."

If we take our theory a step further we will find that thrills are not only component parts of all instinctive activities but that they are the chief component parts; the parts that constitute the force, of which the instincts are but various forms of manifestation in a motor way. In addition to these instincts, or motor manifestations of this force, we have certain sensory manifestations, these sensory manifestations arising from the feelings of stress produced in the various internal organs in response to a particular stimulus.

What have been termed the "emotions" may be considered as being these sensory components of thrills. Therefore, we may say that the instincts do not cause the emotions nor do the emotions cause the instincts, but that both are merely concurrent phenomena which are manifestations of a common origin, the thrill force. As Marshall says: "We should not speak of the expression of the emotions, nor of emotions as caused by the expressive activities, but of the emotions as the psychic side of these expressions, using this last term broadly." The emotions are merely the psychic translation of the sensory component of the thrill, the awareness of this component in the psychic realms, as distinguished from the physiological realms in which it arises.

Leaving the discussion of the relation of emotions to psychic activities for a few moments, let us take up the consideration of emotions in their relation to organic activities, returning to the former consideration later. Professor Angelo Mosso says: "We are sometimes surprised by a sad or a joyful piece of news. We all know what happens in a state of fear and distress. Physiological phenomena occur that cannot be described. But when we learn suddenly that the news which has troubled us is false, that our fear and distress had no foundation, the internal disturbance does not cease, the physiological phenomena continue in the organism in spite of all efforts of the will to suppress them.

"The investigation of these processes has shown that the seat of the emotions lies in the sympathetic nervous system.

"Before we were born, and for a long time after birth, our life was entrusted to the activity of the sympathetic system and the reflex movements derived from the spinal cord.

"In decisive moments of life, when emotions are most violent, it is just the sympathetic nervous system that comes into

action. The intestines and the smooth muscular fibers contract in order to raise the pressure of the blood and to utilize the blood better for the brain and the muscles.

"The organs of the abdomen and the pelvic cavity are just as sensitive to the emotions as the heart. I have studied the movements of the abdominal organs, the stomach, and the rectum. In the smallest emotions movements of the intestines and stomach always occur.

"The preponderating activity of the sympathetic system in the emotions is so great that the brain effort is not able to suppress it. Many men feel a contraction of the abdomen when they look down from a tower or other high place. These troublesome sensations which are connected with the idea of a possible fall are simply caused by the contraction of the bladder and the intestines.

"We understand now that the constant and fundamental movements taking place in emotions are the movements of the internal organs of vegetative life.

"In order to increase the circulation of the blood in the brain and muscles our bodily machine has to work under a higher blood pressure. This end could be attained only through the sympathetic system, which sends its fibers everywhere to the smooth musculature. During blushing a paling of the skin can be noticed before the blood-vessels expand and the blush proper takes place.

"Whatever the emotions may be, we always see that in these states the blood pressure increases, the heart beats become stronger, and the respiration deeper. These advantageous effects are the same in man as in animals, when they fix the attention, are passionately excited, curious or jealous, or when they run at play or in pursuit of prey."

As we note from the above, Mosso's description of the emotions bears a great resemblance to what has been described as constituting thrill factors. However, in the present paper, emotions are not considered as being the result of these excitations of the sympathetic nervous system, these last being considered as thrill causing factors. It is the sensory feelings associated with these excitations, the feeling of stress set up in the organism, in response to a stimulus, that constitutes the emotion. The actual force that is elaborated in response to a given stimulus we may consider as being used in the muscular activities which we term the "instincts" and in the mental activities of the moment. Further, we may say that all thrills are the same in nature, differing only as to the intensity of the thrill force and the stress created in the nervous system in providing it. If the force is of sufficient intensity it will

cause one form of instinctive behavior; if of another intensity, it will cause a different form of instinctive behavior to occur. An individual may run away from an assailant in the case of the first instance; he may remain and strike in the case of the second instance. Again, if the thrill force is produced without much stress, it will cause one form of emotion to be felt; if it is produced only as the result of much stress, it will cause a different form of emotion to be felt. In the case of the first, a certain stimulus may cause an individual to feel joyous; in the case of the second, it might cause the individual to feel angry. Besides these extremes of manifestations of thrill activities there are a vast number of intermediate forms of instincts and of emotions that may be evidenced in response to a given stimulus.

Various observers have noticed the similarity of organic activities that produce what I have termed the "thrill," and which includes both instinctive as well as emotional factors. As Mosso remarks, "Even a practiced observer is often unable to decide from the gestures and facial expression of an individual whether he is enraged or in a state of greatest joy. . . . Indeed, in great pain and great pleasure we have the same phenomena—trembling of the muscles, secretion of tears, expansion of the pupils, decrease of visual acuity, buzzing in the ears, oppression of the breathing, palpitation of the heart, inability to speak, exclamations, convulsive movements of the diaphragm, etc." He also calls to our notice that attention and muscular exercise produce the same chemical effects and the same fatigue, which shows this sameness of mental and of physical activity in another way, both of which we may look upon as being forms of thrill manifestation. Woodworth mentions that "Cannon calls attention to the fact that the bodily changes in fear and anger are the same, though the emotions are different, and infers that the emotion cannot be wholly a reflection of the bodily state. The bodily state which he has discovered might, indeed, be better correlated with the more generic conscious state of *excitement*, which Wundt has put forward as one of the elementary feelings. Probably this bodily state occurs when the emotion is not strictly either fear or anger. Cannon finds evidence of it in athletes before and during a contest, and in students during an examination, though the conscious state in these cases is probably not exactly either fear or rage; it would be better named zeal, determination, or excitement. Yet it is not at all improbable that minor differences in the bodily condition exist corresponding to these differences in the emotional state, so that the body is

not quite the same in fear as in anger." Woodworth also calls our attention to the similarity of physical phenomena occurring in willing and in anger. In his discussion of "Love and Pain," Havelock Ellis remarks, "Moreover we have to bear in mind the fact—a very significant fact from more than one point of view—that the normal manifestations of a woman's sexual pleasure are exceedingly like those of pain." "The outward expressions of pain," as a lady very truly writes,— "tears, cries, etc.,—which are laid stress on to prove the cruelty of the person who inflicts it, are not so different from those of a woman in the ecstasy of passion, when she implores the man to desist, though that is really the last thing she desires." Ellis also reminds us that, "De Sade has already made the same remark, while Duchenne, of Boulogne, pointed out that the facial expressions of sexual passion and of cruelty are similar." . . . As Krafft-Ebbing remarks, both love and anger "seek their object, try to possess themselves of it, and naturally exhaust themselves in a physical effect on it; both throw the psychomotor sphere into the most intense excitement, and by means of this excitement reach their normal expression." Marshall, discussing the emotions of joy, sorrow, dread and relief, says that they "appear to be coincidents of increase or decrease of general systemic activities; in a very broad sense, therefore, they may be looked upon as different phases of one emotion." He remarks, in discussing the physical basis of emotions in general, that he does not think "it is at all possible to limit the physical activities involved with the emotions to such effects of voluntary innervation or alteration of size of blood-vessels or spasm of organic muscle as Lange seems to think determine them; nor to increase and decrease of muscle power as Fere's results might suggest; nor to such changes, in relation of size and capillaries, in voluntary innervation, in respiratory and heart functioning as Lehmann has observed. . . . For these emotions seem to me to be coincidents of reactions of the whole organism tending to certain results." Marshall's views here are in thorough accord with what has been described regarding thrill phenomena in the present paper—thrills, as have been shown, being responses of the whole organism to a stimulus, and the different emotions merely sensory phenomena of the thrill, and, as has been shown, indicate different degrees of stress of the organism in adjustment or the production of the thrill force.

Having investigated the relation that organic processes have to emotional phenomena, our next consideration will be the

discussion of the James-Lange theory of the emotions in regard to our findings.

In defining emotions, James has written: "The bodily changes follow directly the perception of the exciting fact, and our feeling of the same changes as they occur in the emotion. Common sense says, we lose our fortune, are sorry and weep; we meet a bear, are frightened and run; we are insulted by a rival, are angry and strike. The hypothesis here to be defended says that this order of sequence is incorrect, that the one mental state is not immediately induced by the other, that the bodily manifestations must first be interposed between, and that the more rational statement is that we feel sorry because we cry, angry because we strike, afraid because we tremble, and not that we cry, strike, or tremble, because we are sorry, angry or fearful, as the case may be." While agreeing with James that the bodily manifestations must first be interposed between the perception, or stimulus, and the final reaction or manifestation, at the same time it is difficult to accept this hypothesis that we feel sorry *because* we cry; angry *because* we strike; and afraid *because* we tremble. According to the thrill hypothesis we may say that we feel sorry *and* cry or we cry *and* feel sorry; are angry *and* strike or strike *and* are angry; are afraid *and* tremble or tremble *and* are afraid. It makes no difference as to which way we express the phenomena here, because neither the sorrow, anger or fear cause the crying, striking or trembling; nor does the crying, striking or trembling cause the sorrow, anger or fear, as the case may be. In no instance does the one factor cause the other; they are merely coincidently occurring manifestations and are both associated with a common cause, the thrill. As has been shown, the emotions are the sensory component of thrills, while the instincts are the motor component of them. The emotions are related to the varying degrees of stress caused in the organism when it initiates the thrill force, while the instincts are the expression of this thrill force in a motor way. In all events we have but one type of general organic activity occurring, regardless of the emotion or of the instinct manifested. Also, the instinct is not in any way directly related to the emotion. This last may be clearly illustrated in the following four examples: (1) If we have a thrill of a marked degree of intensity, readily produced in the organism without a stress, we will have a certain form of instinct manifested and a certain emotion, each depending upon their respective causative factors. (2) If the thrill is not of a marked degree of intensity but readily produced without stress, we will have a different instinct manifested,

while we may have the same emotion produced as in example one. (3) If the thrill is of a marked degree of intensity, but only produced as the result of much stress, we may have a similar instinct occurring here as in one, while we would have a different emotion manifested. (4) If the thrill was of a low degree of intensity and produced only by much stress, we would have an instinct and an emotion occurring that were different from any in the three previously mentioned examples. If the degree of stress produced in the organism is not too great we may find manifested merely a difference in degree of the same type of emotion: as from joy to elation to ecstasy; irritation to anger to rage; dread to anxiety to fear; or, surprise to astonishment to amazement. Here we have a variation of the same type of emotion, the difference being only one of degree of intensity. However, if the degree of stress is very marked, we will more likely have a complete change in the type of emotion to occur, as a change from love to anger; fear to grief; sorrow to love, etc. What has been said here in regard to the emotions may be applied likewise to the instincts, in regard to variations in the degree of intensity or volume of the thrill force, in its relation to motor and intellectual manifestations.

Passing now from the more elementary forms of mental activity to those higher forms which we recognize under the general term of "intellectual processes," we find that the change is not marked by any abrupt differences, but on the contrary is one that is gradual in its nature, that it is an evolutionary progression in mental development. In fact, we note these lower forms of mental activity being constantly present and forming the essential parts of all these higher forms of mental activity.

As a process which forms a connecting psychic link between those external factors, in the way of various stimuli, and the various internal factors, in the way of emotions and instincts, we have the process of "attention." It is to this process of attention that we must attribute the development of all the higher forms of intellectual activity as we know them. Hence it is necessary that we consider in detail the nature of this process and the various forms of manifestation which it exhibits.

In its most elementary form we may say that attention is merely the awareness of certain external or internal stimuli without any necessary cognition on the part of the organism as to its exact nature. Further, we may say that it is at first purely a passive factor, a process secondary to an exciting stimulus of some sort and of a reflex-action nature. Its asso-

ciation with a certain degree of motor response in the form of muscular tension has been noted by many investigators. As James says, "Movement is the natural immediate effect of feeling, irrespective of what the quality of the feeling may be. It is so in reflex action, it is so in emotion, it is so in voluntary life." Again, G. Stanley Hall remarks, "Truly spontaneous attention is conditioned by spontaneous muscle tension." Mosso states, "Attention produces not only the same chemical effects and the same fatigue as muscular exertion does, but we feel also, when we are attentive to anything, the characteristic muscular strain on the occiput, the forehead, and other parts of the body." He also mentions, "the intelligence, the sensitiveness, and the movement are phenomena which cannot be separated from each other, that their fusion and their connection belong to the same conditions which permit us to comprehend the nature of the mind." It is attention of this passive variety that Ribot has termed "spontaneous," James "passive," "reflex," "involuntary," or "effortless," Arnold "primitive," or "instinctive," etc. In order to obtain a clearer order of description of the several varieties of attention for the purpose of our discussion, we might term this first variety that we are considering, "passive objective attention;" "passive" here referring to the secondary nature that the individual has to the particular stimulus, and objective, to the external source of stimulus involved.

In this form or variety of attention we are considering it as being a reaction to some sort of intense stimulus—a bright color, loud sound, strong odor, or the awareness of an intense feeling of heat, cold, etc. It is the earliest variety of attention that an individual experiences and is in no way associated with any sense of interest but is merely felt as either a pleasurable or a painful experience. It in no way is associated with cognitive factors and is transitory or vague in this earliest form. In fact, it is only after repeated experiences of a particular stimulus that it finally becomes a definitely recognized factor. When this is beginning to take place, we may say that the individual is experiencing that second variety of attention which we will call "passive subjective attention" or attention in which the individual, while aware of the objective nature of the particular stimulus, has an internal or subjective sense of recognition. Again, although this variety of attention is associated with the development of a definite recognition of objective stimuli, this process of recognition is one that is very gradual in its nature. It is intimately associated with two other factors, that of memory, and, later, an association

of ideas. For this reason we will take up the discussion of this last-mentioned two before proceeding to discuss it further.

In discussing memory, Meumann writes, "Every mental process must have a certain minimal duration in consciousness if it is to establish a disposition to revival." . . . "Every mental process must recur to consciousness a certain number of times if security of attention is to be retained." . . . "The rhythmic recurrence of impressions and ideas tends to reinforce their retention." Also, "Every experience which was attended by more or less intensive feeling or emotion . . ." becomes endowed with a greater tendency to revival.

We can see here that, in time, after an individual has acquired a store of experiences, he will gradually learn to discriminate between the various ones and that, likewise, those experiences which were unusually intense in their nature or those which were experienced more often than others will have a tendency to revival more readily. It is this acquired power of discrimination that makes possible what we term the "association of ideas."

We can readily note here that an individual's particular manner of association of ideas is directly related to his peculiar physical conditions and his environment. An individual whose general bodily tone is of high order would naturally associate a given experience in a different way from one whose general bodily tone is less pronouncedly strong. Again, social differences, age, sex, etc., may serve to account for a difference here. As Meumann says, "What particular idea shall appear in consciousness in any particular case is a matter which is not determined solely by the associative connections possessed by the ideas which are present at the moment; quite as much influence is exerted by the general condition of the individual, his freshness or fatigue, the fact that he is well-disposed or ill-disposed, the total group of impressions and ideas which are clearly or obscurely present to his consciousness, his feelings, and everything else that may be designated as his conscious constellation." These, as we shall now see, determine the choice of an individual's interests. As Arnold reminds us, "In the more advanced stages of development, interest and attention run together, but as first attention is somewhat in the lead. Conditions other than interest are able to impel attention. Thus, intensity of impression and feelings of pleasure-pain can excite primary or instinctive attention. Interest is not then in evidence. But if such instinctive attention results in pleasure, ease, satisfaction, and the like, it lays a basis of interest in such a situation.

"When the situation is again present there will be felt a

tendency to go through the process which resulted in the former feelings of pleasure or satisfaction. In more advanced stages, the interest and the attention are concomitant. Interest is then the impelling aspect, and attention the controlling."

It is to these passive objective, and, later, passive subjective varieties of attention, to the various experiences that an individual has felt as being either pleasureable or painful that we must look for the reasons of his individual interests, with their subsequent influence upon his later active forms or varieties of attention. It is to these that we must look for the understanding of why certain stimuli, both subjective and objective, cause an individual to express his thrills in a particular way; why a given stimulus causes an individual to have one type of thrill while the same stimulus has an altogether different effect upon another individual, and why two individuals express the same type of thrills in different modes of activity or behavior. The relation of interest to thrills here is: It is not so much a matter of stimulation, solely, but the combined effects of stimulation plus certain internal factors in the way of general bodily tone, physically, and the association of ideas, mentally, that determine the interest, attention, and the thrill. As James says, "The natural way of conceiving all this is under the symbolic form of a brain-cell played upon from two directions. Whilst the object excites it from without, the other brain-cells arouse it from within. The plenary energy of the brain-cell demands the co-operation of both factors; not when merely present, but when both present and inwardly imagined is the object fully attended to and perceived." Finally, in regard to passive subjective attention, we must bear in mind that it may be brought about by the spontaneous revival in the mind of certain memory images, without any direct relation to an objective stimulus. We note an example of this in what we call "day dreams" and in those fleeting thoughts that come to our mind from time to time.

When we come to consider the difference between the two passive varieties of attention, which we have been discussing, and those two active varieties, which we are about to discuss, we find that it is due largely to the added factor of interest in the latter. Whereas in the passive varieties an individual attends in more or less of a reflex way to certain stimuli, in the active varieties he purposely, or consciously, makes an effort to attend; that is, he is impelled by particular interests to attend. This variety of attention has been termed "voluntary," "secondary," "active," "sustained," etc. In the present paper we shall divide it into two varieties, which corre-

spond to the two general ways in which it is observed—"active objective" and "active subjective" attention. Since active objective is the first of the two varieties of attention to appear, we will discuss it first.

As Compayre remarks, "Charm, interest, is the great source of attention." It is this charm or interest that not only determines the particular choice of what we shall attend, but it likewise serves to sustain our attention after the choice has been made. Remove the interest and an individual ceases to be actively attentive. Ostermann says that it is the interest that causes the maintenance of voluntary attention and that all interests depend entirely on the feelings of like and dislike, of pleasure and displeasure. Arnold, expressing the same opinion but in other words, says, "Interest impels effort. In that an individual is before a situation which will, when properly controlled, lead to a state of pleasure, ease, and the like, effort will be put forth. There need be no immediate pleasure or satisfaction, in such control so long as the final realization is more or less pleasureable and satisfying. If the terminus is more painful than the present situation, effort will likewise be shown, so long as such effort leads from the repelling situation. . . . Effort is nothing more than the subjective and felt aspect of motor control in the process of attention." Again Munsterberg remarks, "Effort is truly nothing but the working of auto-suggestion" and "The chief motive of human actions lies in feelings and emotions." In all the remarks cited we note that what impels an individual to actively attend to a given situation is the interest that this situation has for him; it is the interest that causes him to put forth the necessary effort required. It is not true that this interest is unvarying in its constancy toward a given stimulus. On the contrary, it varies with the individual's feelings, with his general bodily tone, and is seldom of the same degree of intensity for a given stimulus, tending to lose its force with the passing of time. It is not so much any single factor that maintains interest in a given situation as it is the presence of several factors which are associated; we can readily note this in the fatigue that readily ensues upon attention to monotonous excitation of any sort. We may attribute this last-mentioned fact to an exhaustion of certain groups of nerve-cells involved. So long as a different series of nerve-cells are aroused from time to time in relation to a given situation, so long as a given situation serves to stimulate in different ways, we may have present a sustained interest with its associated process of attention.

All that we have been discussing in relation to active ob-

jective attention have been instances where the individual was actively attending, because of some interest, some objective stimulus. In discussing this variety of attention we must bear in mind that it is supposed here to represent an activity that occurs only in response to an immediately present stimulus and is not related in any way to purely abstract concepts or subjective ideas in general.

We might, for example, say that it is the kind of attention that we will find present where one is interested in some game, such as golf, tennis, etc., which loses its intensity upon the cessation of the particular activity.

As the last and the highest form of attention we find developing in an individual, we have "active subjective" attention. In this variety we find an individual whose interest impels his attention not to external or objective stimuli but to inner, subjective ones. The form of stimuli here may be abstract conceptions in a way of solving mathematical problems, the composition of music or of poetry, etc., the invention of devices of various sorts, or the study of problems in science. Again, the various phenomena which we group generally under the title of "unconscious cerebration," those activities which go on in the lower levels of consciousness in the form of attitudes of behavior, personal convictions, etc., may be included here as being matters of active subjective attention of a less intense degree than those which have been previously mentioned.

It must be remembered here that while we have divided attention into four fairly distinct varieties this has been solely for the purposes of description. Just as was said when discussing thrills, that they are all forms of manifestation of a single phenomenon, the same may be said in regard to attention; it is of one character only but it manifests itself in various ways, as has been shown. Again, just as we noticed in regard to thrills that certain types of them are found associated with one condition of general bodily tone, while other types are always found associated with another condition—a lower degree of general bodily tone, for example—we likewise have a similar condition of affairs occurring in regard to the variety of attention that an individual manifests. We may say here, in a general way, that an individual is inclined to manifest a tendency towards a subjective form of attention in illness, in the form of introspection, for example; while in health he is inclined to manifest a tendency to the objective forms, less so to the subjective. As to which variety of attention he manifests most often, this depends partly upon his environmental demands and partly on his general bodily tone;

both of these must be taken into consideration from the standpoint of the particular individual since no two persons can be judged from a general standard. We may postulate it as a general law that as the general bodily tone becomes lessened, the interest becomes lessened in proportion. Hence, we find a certain parallel between certain degrees in the intensity of interest and certain types of thrills. For example, we find interest and attention most pronounced in positive active thrills and least pronounced in negative passive thrills, the other types of thrills showing intermediate degrees of attention and interest. This is because both interest and thrills depend upon the condition of the general bodily tone. We might say here that the interest directs the expression of the thrill when it passes from the physiological into the psychic realms; it determines what form of activity the thrill shall be expressed in, and since it varies from moment to moment with the general bodily tone, the expression of the thrill likewise varies. By the word "directs," I mean that it determines in a passive way, since interest is merely a term which may be said to indicate the viability of the nerve tracts involved in certain situations. If the passage of impulses is inhibited for any reason, whether this is due to fatigue, previous unpleasant experiences with a given stimulus, lack of intensity, etc., we shall have a lack of interest present. As Clàparede remarks in regard to interest, "Suitable choice ('choix adapte' i. e. a decision that harmonises with the wellbeing of the organism) is a process of the reflex-action type. It is not some mysterious power that chooses, but it is the want and the object combined which together effect the selection of the reaction most appropriate to the organism." In conclusion we may say that "the immediate effects of attention" (and interest) "are to make us: (a) perceive; (b) conceive; (c) distinguish; (d) remember; and that attention "shortens reaction-time." (James.)

After attention, habit! In fact, we may say that one may acquire habits of attention. However, in this case, as in all others, we may consider the habit as being the result; the attention, the cause. While at first, during the period when attention is most in evidence, the acquirement of the details of a mode of action are difficult, later these factors become easier of conception. As Dr. Carpenter says, "Our nervous system grows to the modes in which it has been exercised." In discussing the immediate effects of attention a moment ago, we noted that it shortened the reaction-time of an individual to a given stimulus. The relation that this shortened reaction-time has to habit-formation will be readily

perceived in what James has mentioned as being the effects of habit. He mentions that, "Habit simplifies the movements required to achieve a given result, makes them more accurate and diminishes fatigue" and that, "Habit diminishes the conscious attention with which our acts are performed." It is a question whether we should say here that "habit simplifies the movement, etc.," and "habit diminishes the conscious attention, etc.," unless we conceive habit to be the actions with which we are concerned here. If we consider the actions to be one thing and the habit another, it seems better to say that the habit is the result of these repeated activities and, therefore, that these last do these things which James mentions habit as doing. In this case we may more properly attribute the results as being due to repeated movements performed during an intense state of attention and say that it is the combined result of these two which accounts for these changes. We would then say that habit was the final result of this process; that these changes mark the presence of a formed habit, and not that habit itself is responsible for these changes in any way. In this way we may say that habit is not only an acquired phenomenon but that it is a passive or end product, the completed mode of action. As James remarks of the Duke of Wellington having said, "Habit is second nature! Habit is ten times second nature," we may, accordingly, say that habit is second nature, and that it is not a habit unless it is second nature. Therefore it does not do anything but merely marks the completion of something that has been done. If it seems that undue stress has been placed here in distinguishing the exact conception of habit as a passive rather than an active phenomenon, it is because it is necessary that we have a very clear idea of what habit is in order to properly understand its relation to thrills. Perhaps the most characteristic feature of thrills is the fact that they readily lead to a habit formation. For this reason it is advisable that we consider the formation of habits in a more exact way than we have in the foregoing.

In order to obtain an exact conception of what takes place in the formation of habits, it is necessary that we consider what are the organic activities that occur during the process of their formation.

As Munsterberg says, "What else can be the brain's function in the midst of nature than the transforming of impressions into expressions, stimuli into actions? It is the great apparatus by which the organism steadily adjusts itself to the surroundings. There would be no use whatever biologically in a brain which had connections with the sense organs, but which had no connections with the muscular system; and on

the other hand, a brain which had motor nerves and muscular adjustment would be entirely useless if it had not sensory nerves and sense organs connected with it. In the one case the world would be experienced but no response would be possible; in the other case, the means of response would be given but no adjustment could set in because no experience of the surroundings would be possible. Adjustment every moment demands the relation of the brain in both directions. Through the sensory nerves the brain receives; through the motor nerves the brain directs, and this whole arc from the sense organs through the sensory nerves, through the brain, through the motor nerves and finally to the muscles, is one unified apparatus of which no part can be thought away. The brain in itself would be just as useless for the organism as the heart would be without the arteries and veins. We must keep this intimate and necessary relation between the sensory and motor parts constantly in view, and must understand that there cannot be any sensory process which does not go over into motor response."

Again, as James remarks, "The currents, once in, must find a way out. In getting out they leave their traces in the paths which they take. The only thing they can do, in short, is to deepen old paths or to make new ones; and the whole plasticity of the brain sums itself up in two words when we call it an organ in which currents pouring in from the sense-organs make with extreme facility paths which do not easily disappear." In the foregoing we note that there is always involved, in every mental activity, both a sensory and a motor part. The question that naturally arises here is: what happens when we receive a given stimulus and do not act? In answering this we might say that the lack of response is due to the fact that the stimulus was too feeble to arouse our attention. Again, we might say that the lack of response is due to an act of deliberation on our part; that instead of the sensory impulse received passing over into a concrete act, it was dissipated or utilized in arousing other brain-cells in the way of establishing an extended association of ideas, and that part of the impulse was used to inhibit muscular activity; this last being manifested in a tension of the muscles affected. However well such an answer may serve to explain the question, it lacks much in the way of being exact. So, in order to obtain a more exact conception of what is involved here, let us consider the problem from the standpoint of recent discoveries that have been made in regard to habit formation and its allied factors.

We noted, when quoting Munsterberg and James, that

every nervous activity, whether it be a simple physical reflex action or a conscious mental process, involved the use of both sensory and motor nerves. We speak of this intimately associated relationship of these nerves as a "sensori-motor arc," and in addition we have learned that all impulses pass through this arc but in one direction, from the sensory to the motor nerve. This has been termed the "law of forward motion." In the simple reflex actions, where the process is not under conscious control, we can note the presence of these sensori-motor arc very readily. Given a sensory stimulus, we observe an immediate motor response. However, when we come to the consideration of what we term "consciously willed acts," we note that the immediacy of response between a sensory stimulus and a motor reaction is oftentimes delayed or lacking. Therefore, we know that there must be a process of some sort that serves to block, to control, the passage of impulses from a sensory nerve to a motor nerve and that this process comes into action in varying degrees from time to time. As Elliott Park Frost remarks, "now this exquisite function appears to be performed in human nervous systems by a microscopic mechanism found in every sensori-motor arc. Its discovery has been only recent. The name given it is "synapse."

Further, "It has been proved that in the nerve proper an impulse can pass in either direction, while on the contrary just as soon as a synapse is crossed the nervous process becomes irreversible. Synapses act like trap-doors, allowing nerve currents to pass in one direction only. Still again, experiment has established the fact that these "trap-doors" will not open when a weak impulse presents itself, but will dam back the energy in such an impulse, resisting it until several such feeble currents have been summed together. This resistance is then broken down by the collective energies, thereby accomplishing what one or two impulses alone could not do; that is, move the muscle." This last is what James has termed the "law of the summation of stimuli." We now see why a given sensory stimulus may, within limits, not pass over into an immediate motor response. As Ribot remarks, "We can classify ideals roughly into three groups, according as their tendency to transform themselves into action is strong, moderate, or weak and even, in a certain sense, null.

1) The first group includes extremely intense intellectual states, of which fixed ideas may serve as a type. They pass into action with a fatality and rapidity almost equal to those of reflexes. These are the ideas which "take hold of us."

2) The second group is the most important for us. It rep-

resents the rational activity, the will in the usual sense of the word. The conception is followed by an act after a short or long deliberation.

3) In abstract ideas, the tendency to movement is at its minimum. Their motor tendency is reduced to that interior utterance, slight as it may be, which accompanies them, or to the awakening of some other state of consciousness. For just as in physiology the centrifugal period of a reflex does not always end in a movement but as likely in the secretion of a gland or a trophic action; in the same way, in psychology, a state of consciousness ends not always in a movement but in the resurrection of other states of consciousness according to the well-known mechanism of association."

In regard to habit formation and habit reformation this phenomenon of synaptic action has a twofold importance. In order to establish the formation of a habit it is necessary that the sensory impulse be reacted in a motor way before we can have any effects produced. As James says, "It is not in the moment of their forming, but in the moment of their producing motor effects, that resolves and aspirations communicate the new 'set' to the brain." Also that we must take care to "launch ourselves with as strong and decided an initiative as possible;" the importance of this being due to overcoming the resistance of the synapses, which we have previously mentioned.

Finally, in overcoming the bad habits we must bear in mind the fact that once a habit is formed, a given stimulus tends to go over immediately into a motor reaction. As Elliott Park Frost remarks, "We know that consciousness is motor, that the things of which we think are bound to get into action unless prevented by some other action. . . . All acts are the direct result of ideas that, for the moment at least, are free and unchecked by contrary ideas." Just what decides what set of ideas shall go over into motor activities under given circumstances is a matter of great importance for us to know, and since this is commonly attributed to what we speak of as the "will," we will discuss it next.

As Ribot has remarked, "Man is led by his feelings alone," and, "It is in the natural tendency of feelings and images to express themselves in movements that the secret of acts should be sought." Spencer, expressing his opinions of what constitutes the "will," says, "We speak of Will as something apart from the feeling or feelings which, for a moment, prevails over others; whereas it is nothing but the general name given to the special feeling that gains supremacy and determines action. Take away all sensations and emotions, and

there remains no Will. Excite some of these, and Will, becoming possible, becomes actual only when one of them, or a group of them, gains predominance. Until there is a motive (mark the word) there is no Will. That is to say, Will is no more an existence separate from the predominant feeling, than a King is an existence separate from the man occupying the throne." As James remarks, "The self-same person, according to the line of thought he may be in, or to his emotional mood, will apperceive the same impression quite differently on different occasions;" also, "Every one knows only too well how the mind flinches from looking at considerations hostile to the reigning mood of feeling." "Will is not an absolute power, an authority scorning help of any sort," says Compayre. "To state it exactly, it reigns but does not govern. What does govern is the ideas, the feelings."

Having seen that the will is nothing more than the supremacy of one state of feeling over that of another in producing certain motor effects, we will now proceed to obtain a more exact nature of this process. As Munsterberg says, "Perhaps we shall most quickly bring the most essential facts together, if we say that full vividness belongs only to those sensations for which the channels of motor discharge are open, while those are inhibited for which the channels of discharge are closed, and any channel of discharge is closed if action is proceeding in the opposite channel. If I open my hand, the motor paths which lead to closing my fist are blocked; and if I close my fist, the channels which lead to the opening of the hand are closed. Now if only those ideas are vivid which find the channels open, it is clear that all the ideas which would lead to the opposite action have no chance for development; they remain inhibited." This description accords with Nicholl's description of interest; interest, as we know, being a component part of all acts of will. Nicholl says, "We may criticize a man on two counts. One is for some kind of excess; a too great vanity, or talkativeness, or avariciousness, or sensuality, or diligence, or piety. The other is for some deficiency; he is stupid, or mean, or narrow, or shy, or lazy. If these qualities be turned into terms of interest, we can say that in a general sense we criticize a man either for an over-expression of interest in some form, or for an under-expression." Again, if these same qualities be turned into terms of will, we can say that the former manifests an excess of will, and the latter a deficiency. Munsterberg's description serves, in a general way, to likewise account for the phenomena of obstructed and of explosive types of will. The obstructed type of will is attributed by James to be due to either an

excess of inhibition or to a deficiency of impulsion, while the explosive type is due to either an excess of impulsion or a deficiency of inhibition. However, James fails to explain which of the two factors are most likely to be involved in either of these two types of will; nor does he offer any means of differentiating between whether, in a given instance, we may say that it is an excess of inhibition or a deficiency of impulsion, an excess of impulsion or a deficiency of inhibition, that is at fault. It would seem that such a distinction is of great importance to us in a psychological way. We can hardly fail to appreciate that, under given circumstances, a condition due to an excess of inhibition would not have exactly the causes involved as would a condition due to a deficiency of impulsion, nor would a condition due to an excess of impulsion have the same causes involved as one in which there was a deficiency of inhibition.

In order to acquire a clear definition of what is involved in each circumstance, whether it be an excess of inhibition or a deficiency of impulsion, an excess of impulsion or a deficiency of inhibition, we must bear in mind the following three factors: (1) that when one motor tract is open, its opposite tract is closed. (2) that all impulses are subject to the laws of synaptic conduction. (3) that the lowered tone of nerve cells may be localized to certain portions of the brain or it may be a general physical condition.

It is a generally recognized fact that the first symptom of a fatigue of the nervous system is a tendency towards impulsive action. This tendency has been described as an "irritable weakness," and manifests itself in a quickness of response to stimuli. Again, if this process of fatigue develops in a more pronounced degree, we note a lessening of this rapidity with which an individual responds to stimuli, and, in its stead we notice a successive decrease in the degree of response as the fatigue increases. The former is due to a hypersensitiveness of the nerve-cells; the latter, to a decrease in the sensitiveness of the nerve-cells.

In those instances where we have an insufficient inhibition we may attribute it as being a symptom of irritable weakness of the nervous system, either local or general in its nature. As Ribot remarks, "The impulse may be sudden, unconscious, followed by an immediate execution, without the understanding having even had time to take cognizance of it. . . . The act has then all the characteristics of a purely reflex phenomenon which takes place inevitably, without any connivance of the will. It is a true convulsion which differs from the ordinary convulsion only because it consists of movements

associated and combined in view of a determined result." It may manifest itself in acts of sudden anger, depression, etc. Again, as Ribot mentions, "Among epileptics, impulses of this kind are so frequent that pages might be filled with them. Hysterical patients would also furnish innumerable examples; they have a frantic tendency to the immediate satisfaction of their caprices or of their wants." Whether we observe insufficient inhibition in normal individuals of neurotic tendency or in the more aggravated forms of neurotic disorders we must look upon it as being a symptom of fatigue of the nerve-cells in its milder degrees. When the fatigue increases, this insufficient inhibition is no longer evident; we then have either a condition of complete inhibition or of insufficient impulsion existing. We shall discuss these presently.

Passing now to the study of conditions where there exists an excess of impulsion, we find that the causative factors are very different from those which we find associated with insufficient inhibition. Whereas in insufficient inhibition we find that "the acts are unconscious (at any rate not deliberate), immediate, irresistible, with an adaptation invariable and of little complexity," in conditions of excessive impulsion "the patient has full consciousness of the situation; he feels that he is no more master of himself, that he is dominated by an interior force, irresistibly impelled to commit acts that he reprobates. The intellect remains sufficiently healthy, the madness exists only in acts." As Ribot further remarks, "The most simple form is that of fixed ideas with obsession;" that "every fixed idea is at the bottom a sentiment or a fixed passion. Some desire, love, hatred, or interest supports the idea, and imparts to it its intensity, stability, tenacity. Ideas, whatever we may plead to the contrary, are always at the behest of the passions; but they resemble masters who obey in imagining they rule." The types of excessive impulsion may be intellectual in their origin; that is, arising in intellectual states, pure ideas (not wants or feelings), or they may be of affective origin arising from needs and instincts. Arithmomania, onomatomania, dipsomania, kleptomania, pyromania, etc., are some of the forms of manifestation of excessive impulsion. "It is sufficient to note," says Ribot, "that all these creatures of impulse have the same characteristics; they are conscious, incoordinated, incapable of struggle."

In some respects, fixed ideas bear a resemblance to what we ordinarily speak of as "habits." In fact we may say that fixed ideas are certain forms of habits, of an unusually intense nature. We are all acquainted with instances in which a certain tune of music continues recurring in our mind or the

thought of a certain person continues to haunt our mind; these are but milder forms, differing from the types of fixed ideas which have been mentioned in being of relatively brief duration. Recent researches in psychological phenomena have established the fact that habits, fixed ideas, and similar actions are the effects of a single type of cause and differ only in degree. The cause of these similar modes of reaction is what has been termed a "complex."

Dr. Bernard Hart has described "complexes" so clearly that I shall quote his description of them at length. He says, "The ascertaining of the causes determining the flow of our consciousness is the ultimate aim of psychology. We shall expect, of course, that the laws discovered will be identical in the sane and insane; just as the physiological laws determining the processes of the diseased body are the same as those determining the processes of the healthy body—the difference is merely one of degree and combination in the causes concerned.

Now we may get an idea of the direction in which we would search for these determinative causes by the consideration of some simple examples. Let us suppose that I am an enthusiastic photographer. It is obvious that the existence of this hobby will continually affect the flow of my consciousness.

Scenes which would otherwise be indifferent to me will frequently arouse interest as possible material for a picture; if I peruse a newspaper an article upon photography will at once arrest my attention, and when I meet my friends, I shall seize every opportunity to turn the conversation to my favorite pursuit. We see, in fact, that the hobby is one of the causes determining the direction of my thinking. Now, if we endeavor to ascertain the exact nature of a hobby, we find that it is a system of connected ideas, with a strong emotional tone, and a tendency to produce actions of a certain definite character. Such a system of emotionally toned ideas is termed in technical language a "complex" and a hobby is to be regarded as a particular variety of complex. In the simple case just described we should say that one of the causes determining the flow of my consciousness was a strong "photography complex."

Complexes may be of all sorts and kinds, the component ideas may be of every variety, the accompanying emotional tones pleasant or painful, very intense or comparatively weak.

When the emotional tone of a complex is very intense, the action which it exerts upon consciousness becomes correspondingly great. . . . Complexes, then, are causes which determine the behavior of the conscious stream, and the action

which they exert upon consciousness may be regarded as the psychological analogue of the conception of "force" in physics. They are not, of course, constantly active, but only become so under certain conditions. These conditions consist in the presence of a "stimulus," occurring whenever one or more of the ideas belonging to a complex is aroused to activity, either by some external event, or by processes of association occurring within the mind itself." While the subjective awareness of the existence and action of a complex may be present, Dr. Hart reminds us that, "A complex may exert a pronounced effect upon consciousness, although the individual himself may be unaware of its action; that is to say, he may be altogether ignorant of the causes which are really determining his own mental processes."

We see from the foregoing description of complexes by Dr. Bernard Hart that all psychic states, either intellectual or affective, are aroused by feelings of pleasure or of pain. Also, that what we ordinarily speak of as "habits," as well as those morbid conditions which we term "fixed ideas," are the result of a common factor, the complex, which is aroused under varying degrees of intensity and duration. We shall have occasion to discuss complexes again, when considering consciousness as a general process.

Returning now to our discussion of states of the will, we have that condition which we speak of as "insufficient impulsion" to consider next.

The condition which we are describing as being "insufficient impulsion" is technically termed "abulia." In what further discussion we shall make of this condition we will use this last-mentioned term.

Just as we saw, when discussing excess of impulsion, that the condition may vary from a transitory state in individuals who are ordinarily of healthy constitution and mind to those conditions which are chronic and of marked development, so we may witness this to be equally evident in regard to abulia. As Ribot remarks, "Each one of us can, moreover, picture to himself this state of abulia; for there is no one who has not been through hours of dejection in which all excitements, exterior and interior, sensations and ideas, remain inoperant, leave us cold. It is a touch of abulia. There is only the difference between a less and a greater, between a transient condition and a chronic state."

In describing individuals affected with abulia, Ribot quotes Guislain as saying, "The patients know how to will interiorly, mentally, according to the dictates of reason. They may experience the desire to do something, but they are powerless to

act accordingly. There is at the bottom of their understanding an incapacity. They would wish to work and they cannot. . . . Their will cannot go beyond certain limits; one would say that this power of action undergoes an inhibition; the 'I will' does not transform itself into impelling volition, into active determination. Some patients are themselves astonished at the impotence with which their will is stricken. When they are left to themselves they pass entire days in their bed or on a chair. When any one addresses and arouses them they express themselves suitably, although in a short manner; and they judge of things fairly well." One notices here that we are considering individuals whose general bodily tone is low. What Guislain describes as being "the desire to do something" may be considered to be analogous with what has been described in a previous portion of this paper as a "thrill craving." "The muscular system and the organs of movement are intact. From this side there is no impediment. The automatic activity, that which constitutes the ordinary routine of life, persists." "The intelligence is perfect; at least nothing authorizes one to say that it has suffered the least impairment. The end is clearly perceived, the means likewise, but the transition to act is impossible." Although this condition of the will is one that is relatively the same from day to day, Ribot reminds us that, "On the contrary, when an excitation is very violent, sudden and unexpected, that is to say, unites all the conditions of intensity, it most frequently acts." Again, we might say here that it is only when the individual is "thrilled," using this term in the sense in which I defined it in a previous part of the present paper, that he reacts and that ordinary stimuli are insufficient to produce this thrill. In fact, we find in insufficiency of impulsion that the conditions existing are the same as those which were described when discussing negative passive thrills. To quote from Ribot once more in regard to this condition, he says, "If these patients cannot will, it is because all the projects which they conceive awaken in them but feeble desires, insufficient to impel them to action. I express myself thus in order to conform to the current phraseology; for it is not the weakness of the desires, considered as simple psychic states, which induces the inaction. That would be to reason from appearances only. As we have shown above, every state of the nervous system, corresponding to a sensation or an idea, expresses itself so much the better in movement as it is accompanied by those other neural states, whatever they may be, which corresponds to feelings. It is from the weakness of these states that abulia results, not from the weakness of the desires, which is only a sign.

The cause is then a relative insensibility, a general impairment of sensibility; what is attacked is the emotional life, the possibility of being moved. Whence does this morbid state itself come? The problem is chiefly of a physiological order. Beyond doubt there is in patients of this class a notable depression of the vital activities. It may reach such a point that all the faculties are affected and the individual becomes an inert being. This is the state that the physicians designate by the names of melancholia, lypemania, and stupor, whose physical symptoms are a slackening of the circulation, a lowering of the temperature of the body, and an almost complete immobility. These extreme cases go beyond our subject; but they reveal to us the ultimate causes of the impotences of the will. Every depression in the vital tone, slight or profound, fugitive or lasting, has its effect. The will so little resembles a faculty reigning as a mistress that it depends at each instant upon the most trivial and hidden causes; it is at their mercy."

In those conditions of impairment of the will which we will now consider under the descriptive title of "excess of inhibition," we are dealing with conditions "which arise from a sentiment of fear, without a reasonable motive, which varies from a simple anxiety to anguish and stupefying terror. The intellect appears intact in certain cases, impaired in others." They differ from the type of will which we last discussed in the way "that the incitation to act is not extinct. . . . The inhibition results from an antagonism." Ribot, in describing this condition of impairment of will, cites "agoraphobia" as an example and describes it as being "a fantastic anxiety which paralyses the will, and against which the individual is powerless to react, or succeeds in doing so only by indirect means." As Hollander remarks, "There are a large number of other forms, such as fear of lightning, fear of precipices, fear of blood, etc. Others manifest a dread of cancer, or other special disease. . . . The patient recognises the absurdity of his dreads, and in a feeble way strives against them; but the lassitude of will is too great to be overcome, and he returns to his fears and anxieties." Like the conditions of mania which we noted when discussing "excessive impulsion," these various forms of phobia which we observe here, are conditions where the disorder is one that is primarily in the psychic realms; that is, it is due to a lowered tone of certain groups of brain-cells, to a disorder that is more or less localized in the brain, and one where the condition of the general system may be fairly normal in tone.

Finally we may observe conditions where there is an extinction of the will, conditions in which there is neither choice nor action. As Ribot remarks, "When all the psychic ac-

tivity is or seems to be completely suspended, as in deep sleep, artificial anaesthesia, coma, and analogous states, it is a return to the vegetative life; we have nothing to say of this; the will disappears, because everything disappears. Here we have to do with cases where a form of mental activity persists, although there is no possibility of choice followed by action. This annihilation of the will is met with in ecstasy and in somnambulism." Describing ecstasy, he says, "When this state is attained, the ecstatic presents certain physical characteristics; sometimes motionless and mute, sometimes expressing the vision that possesses him by words, songs and attitudes. He rarely moves from his position. His physiognomy is expressive; but his eyes, even though open, do not see. Sounds no longer affect him, save, in some cases, the voice of a particular person. General sensibility is extinct; neither pricking nor burning cause pain. . . . We have here a curious case of psychological correlation or antagonism; all that one function gains is lost by another; all that is gained by thought is lost by movement. In this respect, ecstasy is the opposite of the states in which motility triumphs, such as epilepsy, chorea and convulsions. Here we see a maximum of movement with a minimum of consciousness; there, intensity of consciousness, with minimum of movement. There is at any moment only a certain nervous and psychic capital disponible; if it be absorbed by one function, it is to the detriment of the others. Its employment in one direction or the other depends on the nature of the individual." In regard to this last statement of Ribot's, it seems more justifiable to say that this use of nervous force in either one way or the other is not so much a matter of the quantity of this force but that it is a phenomenon which accords with the laws of nervous functions, as Munsterberg has postulated them; that when certain nerve-tracts are open and discharging nervous force, those tracts which would permit the display of opposite actions, are closed. We are to suppose here that not only is this opposition of action a factor which is observed in certain physical motor activities but that there exists an opposition between purely intellectual activities and those of a purely physical kind. Further, we have already noticed that a given stimulus may serve to produce an immediate motor response, or it may receive a response of a non-motor character; that is, it may bring about an extended process of an association of ideas; the force may be used "in an intellectual way."

Whether we are considering one of these forms of will manifestation or another; whether it be, on the one hand, those extremes of activity which we note in excessive impulsion; the almost complete absence of activity, which we note

in extinction of the will, or any of the intermediate forms that have been described, in all instances we are merely observing particular forms of manifestation of a single phenomenon acting under different internal or external circumstances. In some instances we note a predominating physical weakness, a general lowered bodily tone, as being a fault. This was especially noticeable in those forms which we considered as "insufficient inhibition" and "insufficient impulsion." In other instances we noted that the fault was more localized; that it was not so much due to a general lowered bodily tone but was primarily a disturbance in the cerebrum, a lowered tone occurring in certain groups of brain-cells. This condition was found to be present in what we described as "excessive inhibition" and "excessive impulsion." Again, in all instances, we note that the will is guided and affected by feelings of pleasure and of pain. Finally, we may note that certain forms of will manifestation, which we have been considering, show, in a general way, a tendency to exhibit the predominance of certain types of thrills: the forms of wills described as "insufficient inhibition" and "excessive impulsion" showing negative active thrills, and the forms of will described as "insufficient impulsion" and "excessive inhibition" showing negative passive thrills.

In considering the various factors of which all psychic activities are constituted, it has been very difficult at times to make a separate description of each factor, since all are so intimately related. This was especially true when we attempted to subdivide each phenomenon described. Not only did we note that each factor was intimately related to every other motor factor, and dependent upon it for its presence, but we likewise noted that all the phenomena, in turn, were directed by the feelings of pleasure and of pain; that is, these two factors determine what form of activity is needed from moment to moment in order that the individual be in relation to his environment. However seemingly absurd some of the factors, which we have been considering, may appear as attempts at this adjustment, we must nevertheless bear in mind that in all instances, without exception, an individual acts in that way which it feels, either consciously or unconsciously, is best under given circumstances. Sometimes it is the relief of pain; at other times it is the seeking of pleasure that appears most prominent in an individual's particular conduct of the moment. In either event we must consider that it is the pursuit of happiness, the seeking to attain a sense of "physiological well-being," that is the guiding ideal. Whether we are considering this factor of the "ideal of physiological well-being," in terms of attention, interest, habit, will, emo-

tion or instinct, all of these phenomena are but factors whose activity is motivated towards the attaining of happiness and the freedom from pain; and since it is the combined effects of all phenomena which we have been considering that go to make up "consciousness" in all the varying degrees of its existence, we may in truth say that the ideal of well-being is the ultimate aim of our existence and that thrill-cravings and expressed thrills are the means whereby this ideal state of being is most effectively and immediately attained. We may then say that the emotions, instincts, attention, interest, will, and the other factors are but means whereby thrills are sought and are experienced; and which, in being experienced, afford to us a temporary relief from the feelings of stress that are brought about by the repression that civilization has placed upon our more primitive desires and actions.

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