

vitro, the bacilli become granular, lose their staining properties, and dissolve. But this bacteriolysis sets free the toxins of the microbe of tuberculosis; these are fixed by the nervous substances, and, instead of being neutralised as other toxins, they are, on the contrary, made more active to the point of almost certainly killing the organism; hence the thundering progress of certain cerebral and spinal tuberculoses.

Another remarkable property of the cerebral lipoids, at least of the non-saturated phosphorus compounds, is that of disengaging in burning a great number of calorics; hence much energy is developed at little expense. It has been remarked that during a prolonged fast, when all the other organs and tissues are considerably reduced in weight and volume, that the brain is little changed. The explanation appears to be that in the brain, which contains substances endowed with great thermogenic value, the combustion of very small quantities of these substances is sufficient to produce the energy necessary for the working of the mind. It is not astonishing, in these conditions, that the respiratory exchanges of the brain, either in excitement or repose, are less than those of other organs; between the states of waking and sleeping the differences are almost insensible; after intense mental work the exchanges remain the same. Paul Bert compared the quantities of oxygen absorbed and of carbonic acid set free per 100 gm. of various tissues, and found the figures less for the nervous tissues. Batelli and Stern have repeated the experiment with modern technique, and have entirely confirmed the results. It is, however, interesting to note that though it respire feebly, the brain shows itself very little able to resist asphyxia.

The author then proceeds to examine the various theories relative to narcosis and sleep. But up till now chemical explanations of these phenomena have been unsatisfactory, and this is said to be the most feeble part of Dr. Pighini's book.

In conclusion the reviewer observes that in spite of the rather one-sided manner in which Dr. Pighini has treated his subject, the perusal of his lectures may be profitable to both psychologists and philosophers.

J. BARFIELD ADAMS.

2. Physiological Psychology.

Suggestion as a Fact and as a Hypothesis [*La suggestion comme fait et comme hypothèse*]. (*Revue Philosophique*, September, 1916.) E. Boirac.

The labours of the School of Nancy, says the writer of this article, have definitively established the important rôle played by suggestion in the greater part of parapsychic phenomena. That suggestion is a fact is no longer to be disputed, but it is perhaps necessary to understand more clearly the nature and conditions of this fact; to determine in what cases suggestion manifestly intervenes without any possible doubt of its presence, and in what cases its presence is merely supposed as a more or less likely explanation or interpretation of phenomena: that is to say, in what cases suggestion is a proved fact, and in what cases it is simply a hypothesis of which the proof remains to be established.

The word suggestion is capable of being understood in various senses. According to its ordinary acceptation, there is suggestion each time a

person evokes—generally by a word—in the mind of another person an idea which would not have occurred to the latter in the ordinary course of thought, and which is an idea capable of exercising some influence on the sentiments or conduct of the thinker. But in its special acceptation, the word suggestion implies the notion of an involuntary or automatic obedience of the person to the idea which has been suggested to him.

The term hypnotic suggestion is often applied to the special acceptation of the word to distinguish it from the ordinary meaning. The ordinary condition of suggestion, that is to say, in which the person (subject) may normally resist, or in which he obeys either in virtue of consent, more or less the result of reflection, or as the effect of credulity or natural docility, is produced in the state of waking, when the person is fully conscious and has complete use of all his faculties. The special condition, on the contrary, in which a person cannot resist, even when he has the desire to do so, is produced during a state of hypnosis, or during a state of apparent waking more or less analogous to hypnosis. Hence, suggestion, so understood, is a function of hypnotism, which may be defined, at least partially, as “a state which develops a special suggestibility absolutely automatic and irresistible.” The name hypnotism shows that we conceive the condition as “a state of torpor or cerebral stupor in which the greater part of the superior functions are suspended, or struck with inhibition,” whilst there is produced an exceptional activity of the cerebro-spinal axis.

However, there is another conception of hypnotic suggestion, that of the School of Nancy, which is altogether different from the above. This is the formula of the School: “Suggestion is the act by which an idea is introduced into the brain and accepted by it.” From a strictly physiological point of view there are no ideas in the brain, but only cells, fibres, etc. The word brain has been used improperly in place of the word mind; and the definition, given above, is purely psychological.

The analyses of suggestion made by the School of Nancy are always confined to the sphere of psychology. They are concerned with belief, persuasion, expectant attention, imagination, etc., all terms belonging exclusively to states of consciousness.

The methods habitually employed by the School of Nancy to produce suggestion are, or pretend to be, purely mental. No doubt they tell us that they look more or less fixedly at the patient, that they make light touches on his forehead, eyelids, etc., but all these gestures have, they believe, no importance; they have simply the object of fixing the attention and striking the imagination of the patient. The true agent, the only one which is really efficacious, is the word of the operator which insinuates or imposes the idea, and suggestion is finally realised when the mind believes.

One must remember that the masters of the School of Nancy are not savants making disinterested experiments in a laboratory; they are doctors operating in clinics with the intention of curing patients. The patients come to them knowing that they are going to be treated by suggestion, and are already convinced, or nearly so, of the efficacy of the treatment, and are impressed by the mysterious power which they

attribute to the person who is about to apply it. One understands that under these conditions, employing, or believing that they employ, only the force of persuasion, the School of Nancy honestly believes that no other force exists; but it is wise to look elsewhere, and in doing so one may find perhaps that the formula of the School is too narrow to enclose all the observed facts.

Many operators maintain that they obtain the hypnotic state, generally accompanied by an abnormal suggestibility, by methods purely physical, without the intervention of any idea. Thus Braid provoked hypnosis by prolonged gazing at a brilliant point, independently of all suggestion. Other men have employed the same method with success. Further, the hypnotising of animals is very difficult to explain by the theory of suggestion. When one hypnotises a cock by holding its beak fixed for some minutes on a white line, it is playing with words to say that that is suggestion, that is to say, the effect produced by an idea, as though the cock understood that one wished it to sleep, and persuaded itself, *ipso facto*, that it was impossible for it not to sleep.

It appears to us more probable that hypnotism is a particular state of the nervous system, narrowly related, no doubt, to suggestion, but which cannot be entirely ascribed to it. This state resembles sleep, and the School of Nancy maintains that hypnotic sleep does not differ from ordinary sleep, but is sleep produced by suggestion. However, in ordinary sleep, the sleeper does not hear anyone who speaks to him, or if he hears, he awakes; his tactile sensibility may be a little attenuated, but it exists, and if he be roughly touched, he awakes. How does it happen then that in hypnotic sleep the subject hears his hypnotiser, answers him, obeys all his suggestions, and yet continues to sleep? How is it that the subject often presents a complete insensibility, so that one can touch, pinch or prick him without his appearing to feel anything? And how does it come about that he awakes only at the command of his hypnotiser, and that being awake he has, as a general rule, no recollection of what happened during his sleep?

It may, of course, be said that the difference between hypnotic sleep and ordinary sleep is in reality the effect of suggestion. If the hypnotised subject continues to hear his hypnotiser, to reply to him, to obey him, it is because the latter has suggested it to the former before putting him to sleep, or that the subject has suggested it to himself. If he remembers nothing when he awakes, it is because this amnesia has been suggested to him. Unfortunately these assertions are contradicted by facts. The operators of the School of Nancy may, indeed, suggest to their subjects that they must continue to hear and to reply while they are asleep, and that they must remember nothing when they awake. But the great majority of operators make no suggestion of any sort to their subjects, not even, at least not verbally or explicitly, that of going to sleep. They look fixedly into the eyes of the subject, make some passes, and wait for the result. It is true that the fixed gaze and the passes may be considered as suggesting sleep, but the sleep thus suggested can only be that of which the subject has already the idea, namely, ordinary sleep. Hence, it is necessary to conclude that all the modifications and additions made to ordinary sleep result from suggestions altogether independent of the action of the operator. Is it the

subject who suggests them to himself? That means that there exists a traditional type of hypnotic sleep known beforehand to the subject, who sends himself to sleep under the suggestion of this type, and not under that of ordinary sleep.

To explain how this type was formed, and how it imposed itself on all the subjects, it would be necessary to search for its origin in the first experiments of animal magnetism, for the somnambulists of the disciples of Mesmer. De Puységur and others presented already—before the hypnotised subjects of Charcot—all the characteristics of general anæsthesia, consecutive amnesia, etc. The first authentic case of somnambulism described by the magnetisers, was, it appears, that of Victor Vilet, who went to sleep spontaneously under the influence of the passes made by De Puységur, and who from the beginning, to the great surprise of the operator, presented all the symptoms of hypnotic sleep.

The writer says that it has frequently happened that he has operated on subjects who were ignorant of everything about hypnotism, and who under the influence of passes, hands placed upon the shoulder-blades, etc., went off at once into a profound sleep with anæsthesia, amnesia, etc. On the other hand, he has frequently operated on subjects who knew all about hypnotism, and were very anxious to be hypnotised, but who were refractory to all attempts at hypnotism or suggestion. How can one explain this difference between different individuals in the manner in which they react to hypnotic or suggestive manœuvres? Some would find the explanation in auto-suggestion. If such a subject, they would say, in spite of his desire to be sent to sleep, and in spite of the complaisance with which he lends himself to the attempts of the hypnotiser, remains rebellious to all suggestions, it is, no doubt, because he has suggested to himself that he will not go to sleep. But by such a method of reasoning one can explain or prove all that one wishes without the expense of observation or experiment.

Suggestion, we are told, owes its power to the natural suggestibility of the brain, or rather of the human mind; it is the normal consequence of the natural credulity and docility of the entire human species. To go more deeply into the subject, it is a consequence of that psychological law, by virtue of which every idea tends to affirm itself and to realise itself, unless it be prevented from doing so by the equal tendency of another and contradictory idea. This law appears to have been first enunciated by Spinoza, and to have been repeated by Herbart, Dugald Stewart, Taine, Fouillée, and others.

However, this law, which renders suggestions possible, renders auto-suggestions equally possible, and these must in many circumstances be in opposition to those. Every human being is under the influence of auto-suggestions on many points, such as habits, education, experiences made during past life, etc., which may constitute counter-suggestions to a suggestion coming from a stranger. Among these auto-suggestions may be included faith in the evidence of our own senses and memory, and in the constancy of the order of nature.

If a suggestion coming from without does not contradict or offend any of these fundamental auto-suggestions, it has a chance of being accepted by us, and of obtaining our belief, consent, and even

obédience. So we may call such a suggestion by the name of plausible suggestion.

There are suggestions which may be called paradoxical, as, for example, when a person wishes to make us believe that it is night when it is midday, or that we cannot move our legs and arms simply because he says so. Such a suggestion would arouse in us an immediate and energetic counter-suggestion resulting from our fundamental auto-suggestions. In the case of a hypnotised subject, the spring of the normal counter-suggestions does not work, the fundamental auto-suggestions seem to be paralysed, and the subject believes blindly the most unlikely and impossible things.

The problem of hypnotic suggestion is to know precisely why this suggestion does not meet with the natural opposition, and it is very clear that the reason is not in the suggestion itself. All happens as though an unknown influence created a momentary void in the mind in such a way as to allow the suggested idea free play to develop itself without impediment. This unknown influence, without which suggestion cannot succeed, is what Durand de Gros called *hypotaxia*, and which is more generally designated by the name of hypnotism.

It appears to the writer that the mistake that the School of Nancy and others make is to explain concrete facts by abstract terms, such as suggestion and suggestibility. Here is a man, whom I can cause to have the most unlikely hallucinations, whose limbs I can paralyse by the mere exercise of my will. What is the cause of these extraordinary effects? Oh! it is very simple. It is all caused by suggestion. But this suggestion, how do you explain it? Whence comes its power? Oh! that also is very simple. It is the consequence of suggestibility, which is a natural property of the human brain. So the Schoolmen believed that they explained the reason why opium caused sleep by saying that opium had a sleep-producing virtue.

Suggestibility is not a fact subsisting by itself, an absolute fact; it is an effect depending on causes yet unknown. We are sufficiently acquainted with the laws of psychological life to know that this life has, at least in part, its conditions in the organism, especially in the nervous system. The cause of any modification of psychological life must be sought for in some modification of the nervous system. The hypnotic state, it has been shown above, is not universal, that is to say, it is not the normal condition of the human mind, and its cause must be sought for in some modification of the nervous system.

There is *a priori* no reason to suppose that this modification, which is of a physical or physiological nature, can be produced by suggestion, which is psychological. On the other hand, it has been abundantly proved that by manœuvres purely physical, such as prolonged fixation, passes, etc., the hypnotic state can be produced in a great many subjects, and may prepare them to submit to the effects of suggestion.

It is then false that hypnotism can be brought about by suggestion, because the success of suggestion, in the great majority of cases, requires the preliminary condition of hypnotism.

A hypothesis may be used in two different ways, theoretical or experimental, according as one employs it to explain facts already known, or to experiment in order to discover new facts or to prove a

new law. Suggestion may play this double *rôle* in parapsychical sciences, and we ought to consider it turn by turn as a theoretical hypothesis and as an experimental hypothesis.

It is especially as a theoretical hypothesis that suggestion has been used by the School of Nancy. There it is employed to explain the various hypnotic phenomena and their different particularities. The partisans of this School make constant use of suggestion in their practice. But this practical use is simply an operative proceeding and not an experimental hypothesis. Knowing that suggestion produces certain effects, it is quite natural to employ it when one wishes to produce them; but there is no experimental hypothesis in the matter unless one tries to obtain by suggestion some effects, with respect to which one is ignorant as to whether it is really capable of producing them.

What is the value of suggestion as a principle of explanation of the phenomena of hypnotism? The exclusive partisans of suggestion tell us that it is the key to all these phenomena. To such an assertion there are three objections.

(1) In researches so difficult and so little advanced, the pretention of explaining all by a single principle is not very scientific. The most urgent need is to observe the growing number of facts under the most rigorous conditions of certainty and exactitude, and by submitting them to every possible scientific method of examination to try to discover their laws. It is true that a hypothesis is necessary in such a research, but it must be an experimental hypothesis, which has for its object not the explaining of facts and connections already known, but the discovering of new facts and new connections, and which besides, far from being sufficient in itself, has its only *raison d'être* in the experiments which it gives rise to and controls. On the contrary, a theoretical hypothesis, that which has for its object the coordination and explanation of acquired results, is placed in the last term of the operations of the method, not in the course of a science which is in process of making, but only when it is at the end of its researches. And surely no one can assert that the science of parapsychic phenomena has arrived yet at that stage!

(2) Every attempt to account for an assemblage of facts as numerous and varied as these with which we are dealing, meets with the difficulty of the plurality or interchangeability of causes. The exclusive partisans of suggestion reason in fact as though the same phenomenon were always produced by the same cause. Stuart Mill says: "It is not true that the same phenomenon is always produced by the same cause; the effect sometimes comes from A, sometimes from B. . . . Many causes may produce a mechanical movement, many causes may produce certain kinds of sensations, many causes may produce death. A given effect may really be produced by a certain cause, but it may be perfectly capable of being produced without it." So, although suggestion does in fact produce certain parapsychic phenomena, as somnambulism, for example, yet it does not follow *ipso facto* that these phenomena cannot be produced by another cause altogether.

(3) A principle of explanation is the most satisfactory when it is the most clear, that is to say, when it contains the least part possible of the

unknown. Now the analysis of suggestion which has been made above, either as a fact or as an operative proceeding, has shown us that there are few facts more obscure and where the part played by the unknown is more considerable. To explain such or such a parapsychical fact by suggestion is in many cases to explain *obscurum per obscurum*, if not *per obscurius*.

All these objections, which appear to us to be very strong if they are applied to suggestion as a theoretical hypothesis, would singularly lose their strength if they were applied to suggestion as an experimental hypothesis, for in the latter case it concerns no longer an explanation which is given as complete and definitive of a whole order of phenomena, but as a simple provisional interpretation of a particular phenomenon or of a particular group of phenomena, an interpretation which, even if erroneous, carries with it its own corrective, since it envelops in itself the project and the plan of an experiment by which it may be immediately confirmed or contradicted.

J. BARFIELD ADAMS.

The Three Laws of Psychical Activity [Las Tres Leyes de la Actividad Psíquica]. (Revista de Filosofía, July, 1916.) Bunge, C. O., Professor in the University of Buenos Aires.

We know the existence of the world and we discern the qualities of things by applying our senses to the exterior, and the exterior produces sensations in our interior by the functions of our nervous system. Our mind, coordinating the experiences of memory, transforms the sensations into perceptions.

If in a lonely road we see a man in the distance, our visual organs rapidly reflect his image, and this image causes in our optic nerves an instantaneous and involuntary sensation; the optic nerves transmit the sensation to the cerebral centres by an operation likewise instantaneous and involuntary, and these centres correlate the sensation of the man whom we see with our latent memories of other men whom we have seen; then we possess his perception. When we look at this man, who is an unknown, we link his image by a mental operation equally spontaneous with that of many other men whose generic qualities we know, and we estimate his differential marks, his face, his conditions, his classification; these elements constitute ideas.

We all know what is a sensation, a perception, an idea; but in common and even in scientific language these words are too vague to signify a series of psycho-physiological phenomena, more or less alike more or less different, as are emotions, desires, sentiments, passions, etc. This is because the mechanism of the mind is unconscious in the beginning of its movements, and hence it appears subtle, fugitive, and complicated. Each primary sensation is accompanied by its perception and its idea; but this idea subdivides itself into a series of new perceptions and images, and these in their turn give rise to new ideas.

Passions, sentiments, desires, emotions, can always decompose themselves into a vast assembly of sensations, perceptions, and ideas. So, when we recognise as a mortal enemy the man who comes towards us