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DOUBLE CONSCIOUSNESS IN HEALTH.

By Alfred Binet.

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I.

I have published lately, in different serials,[1] the result of my researches on a question, of great interest for psychology, which I have studied on hysterical 'subjects'. This question is that of the duplication of consciousness. It has seemed to me useful to try if I could obtain analogous results in 'subjects' that are normal—or nearly so, for, of course, the normal type has only an ideal existence. It is certain that, if we succeed in seizing in a healthy individual the least degree of the phenomena of duplication which are so developed in the hysterical, a solid basis will be given to the psychological study of double consciousness; each observer being put in a position to check all the facts advanced. I have made my investigations on five persons, who have been kind enough to submit themselves patiently to very long, very minute and very monotonous experiments. Before setting forth the results obtained, I will give a summary of the experiments I first made on hysterical 'subjects'.

These experiments bear on the movements that can be provoked in the insensible limb of a hysterical 'subject' without the 'subject's' knowledge. If, at the risk of making hypotheses, I offer, in brief outline, a theory of these phenomena, I shall be clearer than if I began with a summary of the facts. In my opinion, things pass in the anæsthetic hysterical 'subject' as if there existed a particular group of states of consciousness in special relation with the insensible regions of the body. This particular mental synthesis is quite distinct from the general synthesis that forms the personality of the subject; it forms as it were a smaller personality beside the greater, which is ignorant of it,—a second Ego beside the first. This smaller personality in the first place receives tactile, muscular and other

[1] "Recherches sur la Physiologie des Mouvements chez les Hystériques," en collaboration avec M. Féré, *Archives de Physiologie*, Oct., 1887; "Recherches sur les Altérations de la Conscience chez les Hystériques," *Revue Philosophique*, Février, 1889; "Note sur l'Anesthésie hystérique," *Comptes Rendus de l'Académie des Sciences*, Janv., 1889; also in the *Bulletins de la Société de Biologie*, and in *The Open Court* (*passim*).

impressions, painless and painful, proceeding from the insensible regions ; it can apprehend these impressions, and execute in consequence adaptive movements ; it can likewise respond by adaptive movements to ideas belonging to the first or main personality, and thus serve for the involuntary expression of these ideas ; finally, it can in its turn excite ideas in the field of the main personality. In all these circumstances, so different among themselves, the smaller synthesis remains distinct and independent, and the principal Ego of the 'subject' in no wise has consciousness of it. There is a double consciousness, or, if we prefer to put it in that way, a coexistence of two conscious thoughts that are ignorant of each other.[1]

I will now summarise the facts that form the support of the theory that has just been indicated. These facts have all been observed under the same conditions, namely :— the 'subject' of the experiment was always a hysterical patient, presenting complete insensibility in some part of the body, for example, the arm or the hand ; and further, the insensible part was withdrawn from sight by the interposition of a screen, in such a manner that, during the experiment, the 'subject' was aware of neither the sensations nor the movements. When a hysterical 'subject' presents such insensibility, it is observed in many cases— not in all—that the reflex actions and movements provoked in the insensible limb are exaggerated in comparison with those in the limbs that retain their sensibility. If a known object, such as a pair of scissors or a pencil, is placed between the fingers of the insensible hand, the fingers and the hand perform an act of adaptation in relation with the nature of the object ; for example, if the pencil has been placed between the thumb and the index finger, these two fingers approach the pencil, the others bend, and the hand assumes the attitude necessary for writing. If we fix the insensible limb in any position, sustaining it a little, it happens not rarely that the limb keeps this position, and sometimes for a very long time, without the 'subject's' feeling fatigue, and further, the limb does not sink when charged with light weights. If a passive movement be communicated to the limb, it may repeat it, even when it is a very delicate and complex movement,—a graphic movement, for example ; and the repetition of the written word

[1] Without giving the history of this question, I may remind the reader that it has been studied in France by M. Pierre Janet, and in England by Gurney and Mr. F. W. H. Myers.

may even take place with signs of intelligence: thus when, by guiding the insensible hand, we have made the 'subject' write a word, it sometimes happens that the hand corrects an error in spelling, or finishes the word of which we have traced only the first letters. If letters and any kind of signs be traced on the insensible skin, while the hand holds a pencil, the hand may reproduce all these signs which the 'subject' does not perceive. If the 'subject' be made to listen attentively to the sound of a metronome while the insensible hand holds the pencil, we see the pencil follow the rhythm of the metronome; but this registering of the rhythm ceases or becomes much less marked when the 'subject' is requested not to listen to the sound of the instrument. When the insensible hand is made to undergo a very strong excitation, it may come to pass that the hand makes movements of defence, as if a pain was felt, although the 'subject' experiences nothing; for example, if the fingers of this hand be made to hold a lighted match, we sometimes see the fingers recoil and fly from the flame. When the 'subject' thinks intently of something, for example, of a figure, and when the insensible hand holds a pencil, the pencil traces the figure, and thus occasionally reveals to us the intimate thought of the 'subject,' without his knowledge; inversely, it may often happen that if we produce a determinate number of excitations on the insensible hand, for example, by pricking it or moving one of its fingers to and fro, and at the same time request the 'subject' to think of a number, the number he voluntarily, and in appearance freely, chooses is that of the unfelt excitations. Finally,—the last, perhaps the most interesting, and without doubt the rarest, observation,—it happens sometimes that, when the insensible hand holds a pencil, it begins spontaneously to write connected sentences, without the 'subject's' being able to account for it.

These are the principal facts which I have had occasion to observe in researches lasting through several years. They give evidence, as I have said, of the existence in the hysterical 'subject' of two centres of activity, which may remain absolutely distinct. Many experimental details, notably the last observation which we have just summarised, prove that these two activities may be conscious, and that consequently there may be in hysterical 'subjects' two simultaneous and distinct consciousnesses.

Is it the same in non-hysterical 'subjects'? That is the question which the present paper will try to answer.

II.

The persons on whom I have experimented are two ladies of fifty, a lady of thirty and two of twenty-five years of age. One lady of fifty is ataxical; the lady of thirty is decidedly anæmic; otherwise, all of them enjoy good health. They have little intellectual culture, are completely ignorant of the aim of the experiments, and know, of course, nothing of researches on double consciousness or the like. I sat with each of them, on an average, six times, for three-quarters of an hour. The phenomena became gradually more marked, and without doubt would become still more so if the treatment were pushed farther. Lately, I have attended to the question whether suggestible persons present a narrowing of the field of consciousness, that is to say, a difficulty in occupying themselves with several things at a time.[1] I think I may answer that it is not so with those of my 'subjects' who present the most developed automatic phenomena; in fact, they can do at the same time very complicated things, for example, perform a mental addition, and squeeze, in series of five or six pressures, an indiarubber tube connected with a registering apparatus. I shall return to this question later on.

A word, first of all, on the experimental conditions selected. When experiments are made on a hysterical 'subject' with an insensitive limb, it is relatively easy to submit that limb to excitations of which the 'subject' has no consciousness. If, for example, it is the arm of the subject that is insensible, this is placed behind a screen, the skin is excited without the 'subject's' perceiving the excitation, and the movements—often very intelligent—which the hand and the forearm execute in response to that excitation are produced outside the consciousness of the 'subject,' and prove consequently that there exists in the 'subject' a second consciousness.

But when the 'subject' of the experiments has not the least insensibility, it is necessary to change the method. If his hand, placed behind the screen, is touched, he feels that it is touched, and the movement by which he responds to this sensation is equally conscious; there is no double consciousness there. To evoke double consciousness, it is therefore necessary to render the 'subject' insensible to the excitations brought to bear upon his limb, and, for that

[1] Pierre Janet, *L'Automatisme psychologique*, p. 456.

purpose, to distract him by occupying him otherwise; distraction, as M. Pierre Janet has well shown, being a transitory anæsthesia.

I therefore requested my subjects—to whom, of course, no explanation was given of what was going to be done—to seat themselves before a table and leave their right hands to me, while I gave them something interesting to read. In these conditions one fact first showed itself which is worthy of remark. If the hand of one of my 'subjects' was pricked while she was reading attentively, the sensation was less well perceived than when the 'subject,' without looking at her hand, was told that she was going to be pricked and was prepared to receive the sensation; for example, the separation necessary for the two points of a compass to be felt as double was greater in the first case. This, then, is anæsthesia by distraction; it is fugitive, passing, deceptive,—but it exists.

I could render it stronger by means of an artifice. Provoking different movements in the limb experimented on, I requested the 'subject' to execute no movement, to leave her hand, for example, completely motionless and relaxed, and at the same time made her believe that it was I who, by slight pushes on the pencil or on the hand, made the latter move. Thanks to this little deception, the subject would pay no attention to those slight movements of her hand, but attribute them to the experimenter. Evidently these (very delicate) psychological conditions will vary from one 'subject' to another; but for the moment we need take no account of the variations.

III.

One of the experiments it appeared to me easiest to effect was that of the repetition of passive movements. A pencil being placed in the hand of the 'subject,' who was attentively reading a journal, I made the hand trace a uniform movement, choosing that which it executes with most facility, for example, shadings or curls or little dots. Having communicated these movements for some minutes, I left the hand to itself quite gently; the hand continued the movement a little. After three or four experiments the repetition of the movement became more perfect, and, with Mlle. G——, for example, at the fourth sitting the repetition was so distinct that the hand traced as many as 80 curls without stopping.

It is for the experimenter to choose with each 'subject' the easiest kind of movement. I find that in general those

movements are easiest that can be executed with a continuous stroke.

In the first experiments, when the hand had been successfully habituated to repeating a certain kind of movement—for example, curls—it was to this kind of movement that it had a tendency to return. If it was made to trace the figure 1 a hundred times and was afterwards left to itself, the stroke of the figure became rapidly modified, and turned into a curl. This shows well how rudimentary, as yet, was the motor memory that was being developed.

When any kind of movement had been well repeated, it could be reproduced without solicitation every time a pen was put in the 'subject's' hand and she fixed her attention on reading. But if the 'subject' thought attentively of her hand, the movement stopped.

I have selected graphic movements because they are sufficiently delicate to be produced without awakening the attention of the 'subject,' whereas movements of flexion and extension impressed upon the fingers or the wrist would with difficulty pass unperceived at the beginning of the experiments.

Movements of flexion and extension can nevertheless be developed, and I have ascertained that it is easier to get a total movement of the wrist repeated automatically than an isolated movement of flexion of one of the fingers.

When these movements of repetition become very distinct, they may come to be generalised and to appear in the other limb.

A second observation relates to the influence which the contact of the experimenter exercises on the hand experimented on. With a slight pressure I was able to make the hand go obediently in all directions, carrying the pen with it. This is not a simple mechanical compulsion, for a very feeble and very short contact is sufficient to bring on a very long movement of the hand. The phenomenon, I believe, can be approximated to a rudimentary suggestion by the sense of touch. Nothing is more curious than to see the hand of a person who is awake and thinks she is in full possession of herself implicitly obey the experimenter's orders. In these conditions there appears to me to be a partial hypnotisation.

It sometimes happens that the 'subject' perceives these movements; but the perception is much less distinct than in the normal state. You can assure yourself of this by requesting the 'subject' to describe exactly the movement she has been made to execute.

IV.

The necessary condition for the preceding reactions is that attention should not be fixed on the hand and what is taking place there. So far, I have realised this condition by making the 'subject' attend to something else, *viz.*, reading, which is an intellectual operation having nothing in common with the excitations that produce manual movements. Thanks to this artifice, the excitations,—for example, the contact of the experimenter or the passive movement impressed,—produced their full and entire effect on the psycho-motor centres of the arm, without the attention and will of the 'subject' interfering to modify the reactions.

Curiously, this result can be attained by quite opposite means. Instead of the attention of the 'subject' being attracted elsewhere, it may be fixed on the particular excitations that are to set going the psycho-motor mechanism of the hand.

The following is the clearest example that I have been able to establish. Place a metronome before the 'subject' and set it in motion. Let the 'subject' be requested to listen with the greatest attention to the hard sharp sound of the metronome, while the hand holds a pen. Pretty rapidly you can habituate the hand of the 'subject' to trace with the pen little strokes that follow the rhythm of the metronome. Some persons even attain to doing it spontaneously.

In this experiment it is sufficient for the 'subject' to listen with attention to the sound in order to cease to perceive the movements produced in the hand by the acoustic excitation. The excitation and the movement are nevertheless cause and effect. They are two elements of the same psycho-motor process; and *a priori* it might have been thought that the attention fixed on one of these elements should naturally extend to those associated with it.

Excitation of the movements of the hand may be produced not only by external sensations, but by ideas that strongly occupy the mind of the 'subject'. If the 'subject' thinks forcibly of a name or of a figure while holding a pen in the hand, and if the experimenter himself holds the hand of the 'subject,' it happens pretty often that the hand executes movements distinct enough for the experimenter to be able to divine his 'subject's' thought. This is the phenomenon of automatic writing, which has been studied at length within the last years. I have nothing new to add, unless it be the remark that concentration of thought on a figure is sufficient to produce a state of distraction from the movements of the hand that is writing the figure.

The experiment with the metronome gives occasion for a remark as to the effect of attention on the intensity of sensations. As long as the subject listens to the beats of the metronome, the rhythmical movements of the hand go on. They become much feebler and may even cease completely if the subject is requested not to listen any longer, but to think of something else. This observation I had made on hysterical 'subjects,' and in much better conditions; for the rhythmic movements of the hysterical 'subject's' insensible limb are so considerable that they translate themselves, when the 'subject' holds an indiarubber tube, into pressures on the tube. I have therefore been able to register these movements by the graphic method; and the tracings obtained show that there is a great difference in the extent of the contractions, according as the 'subject' listens with attention to the sound of the metronome or tries not to hear it.

This experiment on the hysterical, taken along with that which has just been described on healthy subjects, proves, in my opinion, that there is in us a power of augmenting the intensity of an excitation whenever we attend to it. Attention is comparable to will; it is, in fact, nothing else than will directed towards the organs of the senses and the processes of ideation. Just as by the will we can stop a movement or augment its energy, so by attention we can weaken or augment the effect of a peripheral excitation. I reserve the study of attention for another time.

V.

My aim here was simply to show that the rudiment of those states of double consciousness which I have studied first in the hysterical, may with a little attention be found in normal 'subjects'. This result might have been inferred from the numerous observations on automatic writing which have been made on 'subjects' free from hysteria. Automatic writing is the best known of these facts of double consciousness; but we have seen that it is not isolated. It is only one in a large class of phenomena, others being the repetition of communicated movements, suggestion by contact, insensibility by distraction, &c. All these phenomena, when brought together, throw light on one another and attest the formation of a centre of consciousness functioning independently of the common centre. My experiments appear to me to demonstrate that many normal 'subjects,' if not all, are apt to have their psycho-motor centres thus disaggregated.

Of course my experiments were not complicated enough to prove that the psycho-motor centres of the hand and arm, which I have caused to act independently, are accompanied by states of consciousness. I have therefore not succeeded in demonstrating double consciousness in healthy as in hysterical ' subjects '. I have only established the existence of the first degree of the phenomenon.

Of the five ' subjects ' specially studied, I have only found one — a lady of fifty — who, in spite of repeated experiments, displayed neither automatic writing, nor suggestion of the hand by contact, nor automatic repetition of movements. The only fact observed with this lady is that, when she reads while holding a pen in the position necessary for writing, her right hand insensibly traces with the pen a straight line from left to right. I must add that she declares herself almost incapable of attentively following her reading while experiments are being made on her hand; her attention, in spite of every effort, goes with curiosity to her hand and spies out all that is taking place there.

The four other persons who submitted themselves to my researches displayed the phenomena of double consciousness. In two these phenomena were rudimentary; in the two others they were very developed. According to their own evidence, these four ' subjects ' can fix their attention on their reading with sufficient force not to feel anything that is taking place in their hand.

It seemed to me then that attention was an important condition of the success of my researches. Accordingly, I made the following experiment on my two best ' subjects '.

I studied first the repetition of passive movements whilst reading was occupying their attention otherwise. The repetition was very distinct and developed. It might continue more than a minute without the knowledge of the ' subject '. If, for example, the pencil held in the hand had been made to trace a series of curls, the hand went on of itself to trace as many as a hundred more.

I now requested the ' subject ' to leave off her reading, to close her eyes, and to think with all possible attention of what was taking place in her hand. In these new conditions the repetition of passive movements appeared to diminish. When I asked the ' subject ' to look attentively at her hand while it was being made to trace curls, the movement stopped before it had well begun. The stoppage was here caused by the attention of the ' subject,' by her will; in short, by all the elements of her personality.

This is not all. I requested the same ' subject ' to resume

her reading, and began again to impress movements on her hand. Under the influence of this mental distraction, the repetition of the movement reappeared ; but it was much less distinct than before. The experiments had somehow instructed the ' subject,' and it is probable that, in spite of the attention she gave to her reading, she watched her hand and prevented the movements from taking place.

At this point I thought of an experiment which has thrown light on the very delicate mechanism of these psycho-motor reactions. Instead of occupying the ' subject ' with easy reading, I put before her a long addition-sum, and required her to do it without the smallest mistake. What I had foreseen happened ; repetition of the movements communicated to the hand began again, with a distinctness and a persistency which it did not possess during the reading.

This experiment gave me the key to the problem I was trying to solve. I think I may sum up my last result thus : the state of voluntary distraction produced in the ' subject ' by the more exacting operation of addition prevents the consciousness, the attention and the will from inhibiting the movements of the hand.

A conclusion like this will perhaps, for a superficial reader, have the appearance of a truism, and I should be very glad if it appeared absolutely commonplace. But, when examined with care, the facts are seen to be very curious and significant. The experiments just described consist essentially in evoking two psycho-physiological processes which have nothing in common, such as reading on one side and repetition of a manual movement on the other. In the persons experimented on, the second of these processes was accomplished better when accompanied by the first. The automatic movements of the hand were only distinct when the ' subject ' was at the same time reading or adding up figures.

This is not like our common experience. In most cases the mind cannot do two different pieces of work at once without one of them suffering, and sometimes both. I have been able to establish this as it were *de visu* in experiments I have been following out for some time on the conflict of states of consciousness. The procedure I have employed—which I shall describe at greater length elsewhere—consists in making a person squeeze an india-rubber tube rhythmically, while reading, or adding up mentally, or the like. The indiarubber tube is connected with a registering apparatus, and the pressures of the hand translate themselves into a tracing of which the slightest

irregularities can be detected. Now this tracing is frequently irregular in the parts that coincide with the reading or addition; and the irregularities are the more marked the more difficult and complicated the mental labour which the 'subject' is asked to perform.

This result, compared with that which I obtained in my experiments on automatic movements, is soon shown to be its inverse, and apparently its contradictory. The more the 'subject' is distracted (by reading, mental calculation, &c.) the more irregular become the *voluntary* movements of the hand transmitted to the indiarubber tube; and, if the distraction is very intense, these movements may cease completely. On the contrary, the more distracted the 'subject' is, the more regular and considerable become the *automatic* movements of the hand. The contrast is quite striking.

I am in no haste to generalise these results. I only state what took place in my 'subjects'.

The explanation of the difference observed between the conditions of voluntary movement and those of automatic movement, however, appears to me a comparatively easy matter. When a person is asked to do two things at a time—to read a book, for example, and to execute some manual task—two motor impulses are evoked which start from the same personality, from the same focus of consciousness. For it is the same person that is charged to do the two things at once,—to divide his attention and will between the two things. This coexistence of the two operations must evidently make each separately less perfect. The more attention each exacts because of its complexity, the more both will have to suffer from being carried on together.

On the contrary, when an automatic action is evoked in one of the limbs by a stratagem—when the hand is forced, for example, to execute certain movements without consciousness—it is not the conscious personality of the 'subject' that is appealed to. His conscious personality would only interfere in the experiment to inhibit the movement. This inhibition we avoid by turning away his attention; and, if there is no inhibition when the person is distracted, it is for the same reason that makes him unable to voluntarily squeeze the tube with regularity when he is distracted.

Schematising these complex relations of states of consciousness, I arrive at the following result. In the case where a person performs at once a mental addition and a muscular act, let the first operation be called a and the

second *b*. Observation shows that each of them is prejudicial to the other, tends to inhibit it. Let the automatic activity of the hand be called *c*. There is in each 'subject' a power to perceive this activity and to suppress it by holding the hand motionless. Let this operation be called *b*. The operation *b* then can inhibit *c*. But occupation of the 'subject' with reading, by provoking the operation *a*, prevents him from inhibiting the movements of his hand; that is to say, *a* is permitted to inhibit *b*, and this prevents *b* from inhibiting *c*. There is here, to use a happy expression of M. Brown-Séquard, *inhibition of a cause of inhibition*.

I wait for a future opportunity of following up this interesting line of study. If I make known my first results, it is because they bear on almost normal 'subjects,' and because, consequently, every one can, with a little attention and patience, check all that I advance. Perhaps the results will be different for different persons.

However that may be, the observations I have just related may contribute to show the rather embarrassing complexity of those inhibitory actions which psychologists have only begun to study within the last years.