

UNIV. MICHIGAN
L. M. 44

NOTE ON CERTAIN FACTS OF CEREBRAL AUTOMATISM OBSERVED IN HYSTERIA DURING THE CATALEPTIC PERIOD OF HYPNOTISM.*

SUGGESTION BY THE MUSCULAR SENSE.

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IT is our intention in this note to study the facts of automatism produced in hysteria during the cataleptic period of hypnotism, through the influence of suggestion by the muscular sense. It will, however, first be necessary to explain briefly the principal characteristics of the cataleptic state here referred to, as well as the tests which establish the reality of its existence, and which eliminate every suspicion of cheating or simulation on the part of the subjects experimented upon.

I.

Hypnotism, as observed in subjects attacked with hysteria major (and it is on such subjects that our experiments have been made), might be termed hypnotism major. It is in

* Contributed to THE JOURNAL OF NERVOUS AND MENTAL DISEASE, in the original, and translated by the Editor.

Reprinted from the JOURNAL OF NERVOUS AND MENTAL DISEASE, Vol. x, No. 1, January, 1883.

2-138705

Acq. 21 2023

patients of this class that the different nervous states, artificially produced by hypnotism, attain their highest development, and are endowed with their most characteristic attributes. And in the same manner that the study of hysteria major (hystero-epilepsy *à crises mixtes*) can be of great assistance in the comprehension and clearing up of hysteria minor or common hysteria, so the study of facts as precise and as characteristic as are presented by hypnotism major, is destined at a future day to make clear all that totality of facts, more or less vague, and more or less incoherent, ordinarily ranged since the time of Braid, under the denomination of hypnotism. This method of treating the subject is no more nor less than the special application of that great law (so fruitful in the study of the natural sciences in general), which requires that we should apply ourselves at first to the most complete types of disease, and should eliminate modifications which occur and which constitute more attenuated and rudimentary forms. It is in this manner only that the study of these forms, thus rendered simpler and more comprehensible, will be finally accomplished.

Numerous observations have led us to the conclusion that hypnotism thus viewed in subjects attacked with hysteria major, or otherwise speaking, hypnotism major, does not alone consist in a nervous condition, artificially provoked, always identical and consistent, but that it represents as well an entire group of diverse nervous states, differing the one from the other, each one of these states exhibiting a particular symptomatology. These different nervous states whose totality comprises the entire symptomatology of hypnotism should be reduced to three fundamental types, which are: the cataleptic state; the lethargic state; the somnambulatory state.

The cataleptic state, concerning which we here specially

treat,¹ may manifest itself primitively, under the influence of a loud and unexpected noise, a light placed before the face, or in certain subjects, in consequence of the more or less prolonged fixation of the eyes upon any object whatever. It is developed consecutively to the lethargic state when the closed eyes are exposed to the light by raising the eyelids. Immobility may be said to be the most pronounced characteristic of the cataleptic state.

The cataleptic, even though placed standing and in a forced attitude, preserves a perfect equilibrium and appears as if petrified. The eyes are open, the gaze fixed, the physiognomy impassive ; and, since the eyes wink but infrequently, the tears accumulate and soon trickle down the cheeks. The respiratory movements themselves partake of this immobility. The pneumographic tracings indicate long pauses, represented by horizontal lines which intervene at wide intervals between shallow depressions.

The members, and the same may be said of all the parts of the body, preserve without apparent fatigue during a relatively very long time, positions, even the most difficult ones, that may have been communicated to them. When they are raised or moved they seem to be very light, and even if they are flexed or extended the articulations offer no sensation of resistance. Contrary to the assertion of a great number of authors, the *flexibilitas cerea* does not belong to the cataleptic state of hypnotism.

The tendinous reflexes are abolished or very notably diminished. The phenomenon of neuro-muscular hyperexcitability, which characterizes the lethargic state and upon which we have insisted at length elsewhere,² is here completely absent.

¹ We have given elsewhere the detailed description of these three nervous states. Vid. *Charcot* : Note lue à l'Académie des Sciences, séance du 13 Février, 1882. Vid. *P. Richer* : "Études cliniques sur la grande hystérie," page 408 et suiv.

² Vide *Archives de neurologie*, Nos. 5, 6, 8.

The skin remains insensible to the most severe irritations ; but certain senses—sight, hearing in particular, the muscular sense even, preserve, at least in part, their activity.

This persistence of sensorial activity often allows us to create impressions upon the cataleptic subject, and to arouse automatic impulses in him by suggestion.

Then the fixed attitude, into which the members have been artificially placed, gives place to movements more or less complex, and perfectly coördinated to the nature of the impulse that has been provoked.

It is upon a category of automatic acts of this class, awakened only through the intermediation of the muscular sense, that we shall dwell here.

But in order that no doubt shall remain in the reader's mind regarding the reality of the cataleptic state which serves as a basis, so to speak, for the facts of automatism here brought forward, we will now briefly report the tests to which we have submitted the subjects upon which we have experimented.¹

It is generally believed that if in a cataleptic subject the arm is extended horizontally, it will maintain this position during a time in itself sufficiently long to preclude all suspicion of simulation. According to our observation, this is not exactly the case ; at the end of from ten to fifteen minutes the member begins to descend, and at the end of from twenty to twenty-five minutes, at the most, it resumes the vertical position.

Now these are the limits of endurance to which a vigorous man, endeavoring to preserve the same position, will attain. We must, then, look elsewhere for a distinctive characteristic, and to accomplish this object we have resorted to the plan of recording the phenomena by the graphic method.

In the case both of the simulator and of the cataleptic,

¹ Vide *Progrès médical*, No. 18, Année 1882.

the extremity of the extended member is attached to a tambour, whose object is to register the smallest oscillations of the member, while at the same time a pneumograph applied to the chest (fig. 1) gives the curve of the respiratory movements.

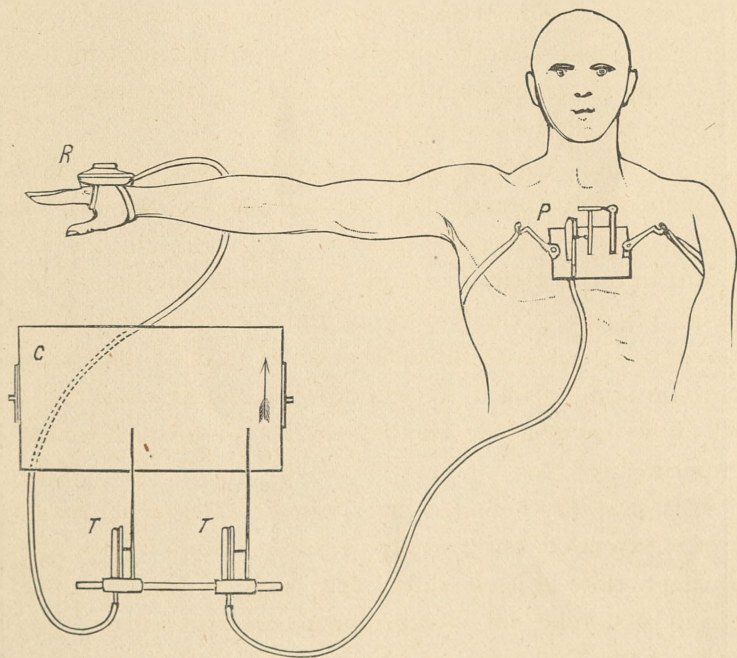


FIG. 1.—Diagrammatic representation of the arrangement of the apparatus in experiments upon cataleptic immobility. *R*, Marey's tambour. *P*, Pneumograph. *C*, Revolving cylinder. *TT*, Recording levers.

The following is a summarized statement of what may be observed by an examination of the tracings obtained by this arrangement.

In the case of the cataleptic, during the entire duration of the observation, the lever which corresponds to the extended member traces a straight and perfectly regular line (fig. 2, II).

During the same time, in the case of the simulator, the tracings at first resemble those of the cataleptic, but, at the

end of a few minutes, very considerable differences begin to make their appearance: the straight line changes into a line sharply broken and characterized by instants of large oscillations arranged in series (fig. 3, II).

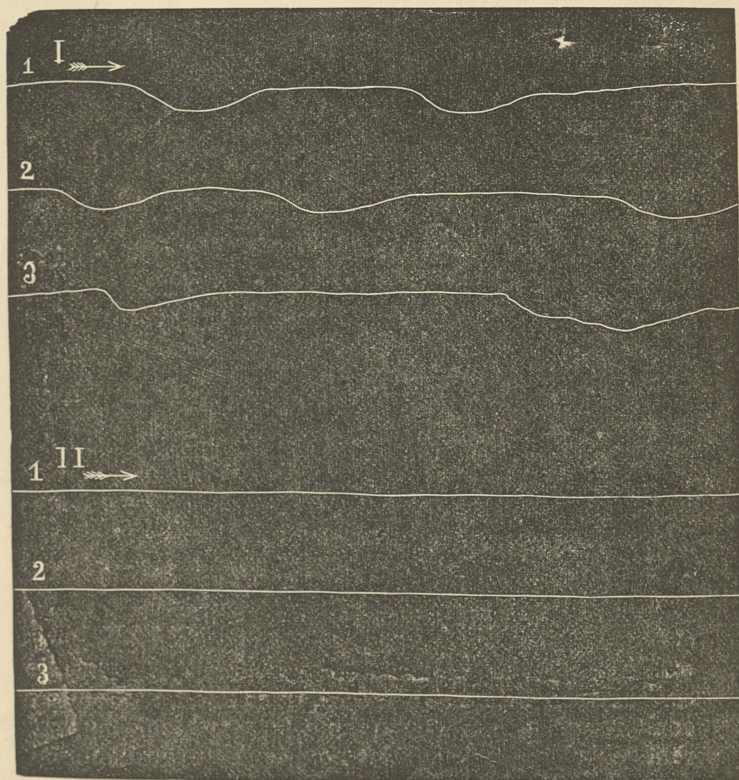


FIG. 2.—Diagrammatic representation of the tracings obtained in the case of a hystero-epileptic in the cataleptic state of hypnotism.

I.—Tracings of the pneumograph.

II.—Tracings of Marey's tambour.

The tracings furnished by the pneumograph are equally significant. In the case of the cataleptic, the respirations are infrequent and superficial, the end of the tracing resembling the beginning (fig. 2, I). In the case of the simulator, the tracings are composed of two distinct portions.

In the beginning the respiration is regular and normal. In the second phase, that which corresponds to the indications of muscular fatigue noticed in the tracings of the extended member, there may be observed irregularity in the rhythm and amplitude of the respiratory movements, deep and rapid depressions, indicative of the disturbance of respiration that accompanies the phenomena of effort (fig. 3, I).

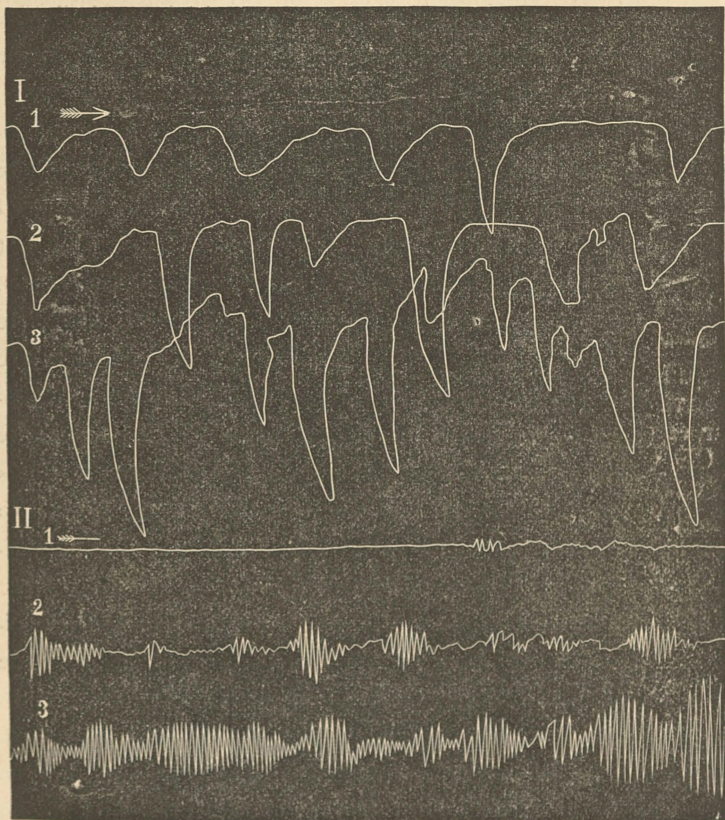


FIG. 3.—Diagrammatic representation of the tracings obtained in the case of a man who attempted to maintain the cataleptic attitude.

I.—Tracing of the respiration.

II.—Tracing of Marey's tambour.

In short, the cataleptic gives no evidence of fatigue, the muscles yield, but without effort, and without the concurrence

of the volition. The simulator, on the contrary, submitted to this double test, finds himself betrayed from two sides at the same moment: 1st, by the tracing of the member, which indicates muscular fatigue; 2d, by the tracings of the respiration, which express the effort devoted to masking the effects of this muscular fatigue.

II.

In the facts of cerebral automatism, which we shall now treat of, suggestion was obtained through the intermediary of the muscular sense.

The examples that we must first recall were those observed at the very outset of our investigations into the nature of hypnotism. They consisted in the influence of gesture upon the expression of the face. While the subject is plunged in the cataleptic state, the eyes remaining open, the face does not remain indifferent, whatever attitudes the body may be caused to assume. When these attitudes are expressive, the face acts in harmony with them, and is consistent with the expression. For instance, a tragic attitude imparts a severe air to the physiognomy, and the eyebrows contract; on the contrary, if the open hands are carried to the mouth, as in the act of throwing a kiss, a smile immediately appears upon the lips.

In these two examples, which are instances of two sentiments opposite and easy to characterize, the reaction of the gesture upon the physiognomy is very striking, and is produced with the greatest clearness. But perfectly expressive movements are difficult to impart to a mannikin, however docile it may be, and the number of communicable attitudes fully adequate to express a given sentiment or feeling is relatively restricted.

For these reasons we conceived the idea of proceeding in an inverse manner, and, in place of acting upon the atti-

tude to modify the physiognomy, we have sought for the influence of the physiognomy upon the attitude. For the purpose of imparting to the physiognomy a variety of expressions, the means were discovered, and the way opened by an expert experimenter. We resorted to localized faradization of the muscles of the face, according to the process employed by Duchenne (of Boulogne) in his excellent studies upon the mechanism of the physiognomy. (It should be remarked that electrization applied to the face of a hypnotized subject does not in the least modify the nervous state that exists. The cataleptic state is in no wise interrupted by the electric application, while on the contrary it is well known that a very slight breath against the face is sufficient to dissipate this state, on the instant.)

Beginning with our very first experiments, we saw the attitude and the appropriate gesture succeed to the expression imparted to the physiognomy by the electric excitation. In proportion as the movements of the features became marked, the entire body, spontaneously as it were, entered into action, and completed by its attitude the expression of the face; when by reason of uncertainty in the operative proceedings the physiognomy did not give clear indications, the attitude or gesture remained undecided.

Once produced, the change imparted to the features of the face did not become effaced, in spite of the cessation of the cause that had begotten it, and after the removal of the electrodes. The physiognomy remained immobile, in a state of catalepsy. The same is true of the attitude and the gesture that accompanied it. The subject is thus transformed into a sort of expressive statue, a motionless model, representing with striking accuracy most varied expressions, which artists, without doubt, might avail themselves of to a very great extent. The immobility of the attitudes thus provoked is eminently favorable to photographic reproduction.

We have obtained, with the aid of M. Londe, in charge of the photographic department at La Salpêtrière, a series of photographs, several of the most interesting of which we here reproduce, and concerning which we will remark that they were all taken during the first experiments attempted for this purpose on this patient.

Figure 1 represents the patient in the cataleptic state. She was placed in this inexpressive attitude at the beginning of each one of the experiments that follow.

1. If the two occipito-frontal muscles are excited by the faradic current, by placing an electrode at the level of each one of the two, the forehead at once wrinkles transversely, the eyelids are raised, the palpebral opening enlarges a little, the eye becomes fixed; in a word, the physiognomy assumes the expression of astonishment, according to the rule established by the remarkable researches of Duchenne (of Boulogne). But this is not all—the expression thus imparted to the face by the contraction of a single muscle goes on to complete itself. The mouth opens lightly, though the depressor muscles of the lower jaw are not touched, and the arms are raised in semiflexion—the palm of the hand directed forward, as represented in fig. 2.

Once produced, this attitude persists indefinitely, and the subject, continuously cataleptic, will not abandon the position, except for some other that may be imparted to her. For instance, if we lower the arms and place them vertically alongside the body, as in figure 1, the physiognomy again becomes expressionless. Thus, in this experiment the reciprocal influence of attitude and of the physiognomy is successively exercised in opposite ways. In the first place, it is the physiognomy which induces the gesture intended to complete the expression which the physiognomy indicates, and then it is the gesture or attitude which, having

been rendered inexpressive, reacts upon the physiognomy, which loses at the same moment its former expression.

We know that the contraction of the orbicularis palpebrarum superior is characterized by a transverse corrugation of the eyebrows expressive of anger. As soon as we have caused this to contract in our cataleptic subject, the physiognomy assumes the expression indicated, and at the same time the fists clench, and the arms assume a fixed position of aggression and defence. (*Vid.* fig. 3.)

If the corrugator supercilii is caused to contract, pain is depicted in the physiognomy and in the gesture of the subject.

The same holds true of the zygomaticus major, the muscle of laughing (*vid.* fig. 4); of the levator communis labii superioris alæque nasi, the muscle of disdain; and of the depressor anguli oris, the muscle of sadness.

The same is true of those expressions which, in order to be complete (according to Duchenne), demand the simultaneous contraction of two facial muscles. For instance, the expression of horror is obtained by the simultaneous contraction of the occipito-frontalis and of the platysma myoides. This expression was easily obtained in the case of our patient and it was observed that the attitude was in harmony with the expression. The body is thrown backward, and the hands assume a position of warding off the approach of the object which causes her fright.

But all the subjects upon which we have experimented have not presented an equal development of the phenomenon. We have been able to observe it very clearly upon four hysterical patients in our service, but in different degrees.

It must be added that these automatic acts, developed by the influence of excitation conveyed to nervous centres by means of the muscular sense, are up to a certain point sus-

ceptible of education. Like all the reflex acts in general, they are perfected by repetition, a fact which is commonly termed habit.

In cases little developed, the first appearance of the phenomenon offers special points of interest. The expression given to the physiognomy by the electric excitation must be prolonged during a considerable period in order to react upon the nervous centre. When the excitations are first applied, no movement of the body is produced. The eyebrow, for instance, contracts energetically, and the face appears to be in a state of excitation, but the rest of the body, by reason of its immobility, does not appear to belong to the same subject. The excitation is then maintained during a certain number of minutes,—a continuous electric action is at this moment essential,—and gradually the fists close, the body bends forward with extended neck, and finally the patient presents a picture of anger which, when the experiment is repeated a second time, will be reproduced more easily and with characteristics still more expressive. It seems, in these cases, that the impression, which takes its starting-point from the muscles of the face thrown into contraction, requires a certain amount of time to create its imprint upon the brain, and to awaken the activity of the automatic centres.

The main interest of the facts which we have described is not that they are singular and unexpected. It lies, on the contrary, in this, that they are intimately connected with the normal action of the nervous system, and their principal merit is to throw into relief, by reason of their isolation, facts whose trace is not difficult to find in the normal state.

The experiments in hypnotism here in question thus become a most beautiful demonstration of the automatic action of a part of the encephalon, an action already

described by the psychologists and the physiologists, and to which has been given the name of cerebral automatism or unconscious cerebration.

Concerning the influence which the expressive movements of the physiognomy or of the entire body may have upon the psychic activity, Dugald Stewart thus expresses himself: "As every motion of the mind produces a sensible effect on the bodily appearance, so, upon the other hand, when we assume any strongly expressive look, and accompany it with appropriate gestures, some degree of the correspondent emotion is apt to arise within us. Mr. Burke informs us that he has often been conscious of the passion of anger rising in his breast, in consequence of his counterfeiting its external signs; and I have little doubt that with most individuals, the result of a similar experiment will be the same. Campanella, too, the celebrated philosopher and physiognomist, (as Mr. Burke further observes,) when he wished to form a judgment of what was passing in the mind of another, is said to have mimicked, as accurately as possible, his appearance at the moment, and then to have directed his attention to the state of his own feelings. In general, I believe it will be found, that these two talents of mimicry and of physiognomy, have a very close connection."¹

¹ "Éléments de la philosophie de l'esprit humain," trad. par Peisse, t. iii, p. 141.

