CULTIVATED MOTOR AUTOMATISM; A STUDY OF CHARACTER IN ITS RELATION TO ATTENTION.[1]

BY GERTRUDE STEIN.

In the PSYCHOLOGICAL REVIEW for September, 1896, Mr. Solomons and I reported on the work done that year on the tendency to motor automatism in normal subjects. The only subjects we had were ourselves. This year it has been my aim to continue this work by using a large number of subjects.

I have attempted to examine the phenomena of normal automatism by a study of normal individuals, both in regard to the variations in this capacity found in a large number of subjects, and also in regard to the types of character that accompany a greater or less tendency to automatic action. Incidental to this main question have arisen the further questions of comparison between male and female subjects, and the variations of the female subjects in fatigue.

For these experiments the most convenient instrument I found to be a planchette suggested by Mr. Delabarre. We suspended from a high ceiling a board just large enough to support the forearm, the hand hanging over and holding a pencil.

This planchette responded to very slight movements, could be readily adjusted, and allowed the operator to move it, and guide the subject without his knowledge. By lightly resting my hand on the board after starting a movement I could deceive the subject, who sat with closed eyes, as to whether he or I was making the movement, and I could judge also how readily he yielded to a newly suggested movement, or if he resisted it strongly.

My method was as follows: My subject, after adjusting his arm and getting perfectly comfortable, would close his eyes and I would then direct him to keep his mind off the experiment and off his arm. Sometimes I would talk to him, sometimes get

[1] From the Harvard Psychological Laboratory. Communicated by Professor E. B. Delabarre.

him to talk to me, or to think of a definite object, or to lose himself in a day-dream.

The movements taught, with the exception of one or two of my best subjects, had to be of a decidedly rhythmic character, such as circles, the figure eight, a long curve, or an m-figure. The majority of the subjects were either readily taught some rhythmic movement or had some spontaneous movement of their own; either a rhythmical one or indefinite lines and curves. With some few subjects it took several sittings before any movement could be induced.

The method of teaching a new movement was as follows: When the subject's attention was fully distracted I would gently, at first slowly, then more rapidly, guide the planchette into the movement I wished to teach; then after a while I would release the board. The subject the first few times would either come to a standstill or return to the old movement. I would guide again, and then release, keeping this up till the new movement was learned. At first there was a continued return to the old movement or to no movement, but gradually came an aimless indefinite movement, then again the old, then the new, and then again an uncertain movement, then a more decided revision of the new, then a slight return to the old, like the struggle between two themes in a musical composition, until at last the new movement conquered and was freely continued.

In many cases it was hard to get the subject started. Often I succeeded in doing so by giving deceptive suggestions as to my guidance by letting my hand rest lightly on the edge of the board. Sometimes I would let the board hit my hand to give the same effect, or suggest the movement by following the curve with a pencil on another piece of paper, or let my sleeve brush the table to suggest my movement and so get the desired response from the subject.

The subjects used in this experiment were members of Harvard University and Radcliffe College. The large majority were taught some form of automatic movement. Out of 41 male subjects I found only 5 from whom in two sittings I was not able to get any kind of automatic response, and out of 50 female subjects only 4. There was a great deal of variation in

the ability to learn movements and write spontaneously. The subjects who did the best writing fall into two large groups very different both in characteristics and method of response. Let us call them Type I. and Type II.

Type I. This consists mostly of girls who are found naturally in literature courses and men who are going in for law. The type is nervous, high-strung, very imaginative, has the capacity to be easily roused and intensely interested. Their attention is strongly and easily held by something that interests them, even to the extent quite commonly expressed of being oblivious to everything else. But, on the other hand, they find it hard to concentrate on anything that does not catch the attention and hold the interest. The nature and fashion of their automatic responses accord with these characteristics. I could never get them to write well unless I got them distracted by talking to them or making them talk to me. The more interested and excited they got the more their hands would write. Their results in writing were of two kinds: either they would be taught a movement and then hold it *firmly* until the next one was taught, or else, being taught one movement, they would stick to that resolutely, and it was not possible to draw them away from it. As soon as they stopped talking, or their interest flagged, there was a strong tendency for the movement to slow up and soon stop. This type, although in some cases suggestible, is on the whole auto-suggestible rather than responsive to influences from without, unless the appeal is directed completely to the automatic personality. The subjects usually expressed themselves at first as having an impersonal feeling toward their arm and then becoming oblivious of it. Their arm started, kept going when they were forgetful of it, and when they thought of it, it stopped.

Type II. is very different from Type I., is more varied, and gives more interesting results. In general, the individuals, often blonde and pale, are distinctly phlegmatic. If emotional, decidedly of a weakish sentimental order. They may be either large, healthy, rather heavy and lacking in vigor, or they may be what we call anæmic and phlegmatic. Their power of concentrated attention is very small. They describe themselves as

never being held by their work; they say that their minds wander easily; that they work on after they are tired and just keep pegging away. They are very apt to have premonitory conversations, they anticipate the words of their friends, they imagine whole conversations that afterward come true. The feeling of having been there before is very common with them; that is, they feel under given circumstances that they have had that identical experience before in all its details. They are often fatalistic in their ideas. They indulge in day-dreams, but not those of a very stirring nature. As a rule they don't seem to have *bad* tempers—are rather sullen. Many of them are hopelessly self-conscious and rather morbid.

They write best as a class when they are quiet. The effort to explain something usually stops the hand. They get rather sleepy, the arm and hand get cold and occasionally go to sleep. As a rule they are highly suggestible and learn movements readily, but instead of getting a new movement and sticking to it, they often show great vacillation, a constant tendency to return to other movements taught some time before. And even when a new movement gets fixed, there is a constant tendency to outcroppings of an old movement in most unexpected places.

It will readily be seen that this last type is much nearer the common one described in books on hysteria. The automatic personality here comes much nearer being the real personality constantly, in the ordinary affairs of life, the automatic personality obtrudes itself, giving a sense of doubleness, of otherness, to which the feeling of having been there before, of premonitory conversations, and all the phenomena that go with this type of character are to be referred. This was well illustrated by one of my subjects who every now and then would ask me if he might try and stop his hand. I said yes. He would stop, and then he would say that he wanted to stop because he did not know whether he could do so or not and he wanted to be sure. He repeated this at intervals all through the experiment, and never seemed quite sure that his arm was not going of its own accord to such an extent that it could not be stopped. This subject was a very typical case of Type II. In one form or another this was frequently mentioned by subjects

of this type. The sense of otherness, of something else pulling or setting the arm going, was a very common experience.

In these descriptions it will be readily observed that habits of attention are reflexes of the complete character of the individual, and again on habits of attention are dependent the different forms and degrees of automatic writing.

In this statement of the two types I have given a composite picture. In both cases the variations are many and the cases where the characteristics are found in any kind of completeness comparatively rare, and there is an intermediate place where the characteristics lap over. I will now give a few typical cases of each group.

But first a word as to an interesting fact shown in this study. A large number of my subjects were New Englanders, and the habit of self-repression, the intense self-consciousness, the morbid fear of 'letting one's self go,' that is so prominent an element in the New England character, was a constant stumbling-block. It usually took a New Englander a sitting longer to give a response than the other subjects. I could usually tell them as soon as I began the experiment by their resistance to my guidance. Afterwards I found that Stanley Hall, in his article on Fears, notes the fact that self-consciousness was dreaded by twenty-four boys in Cambridge, Mass., a thing unknown in Trenton or St. Paul.

TYPE I., CASE I. A female subject with no tendency to somnambulism or automatic sleep habits. She was not absent-minded and had no morbid fears. She was of an irritable, nervous nature and not suggestible.

RESPONSE. At the first sitting I got very little response, only a very slight tendency to movement. She said her arm was slightly numb. The movement increased toward the end. At the next sitting she gave very good movement. She got excited thinking and the result was a decided movement. I guided the pencil a number of times, but with few exceptions she was wholly unconscious of it. She did not follow suggestions much, but stuck to her own movement, which was very much like real writing.

CASE II. A male subject. Not particularly dreamy, has

automatic sleep habits to a slight degree, answers questions in sleep. He concentrates his attention readily, is impetuous and apt to be carried away by things.

RESPONSE. He writes very readily and learns the movements easily, but any pause in his talk or mine always stopped him. When thoroughly interested in something he wrote well, and passed from one movement to another readily in answer to my suggestions.

CASE III. Male subject. When interested his attention does not wander; if not interested he becomes dreamy. He frequently takes automatic notes in lectures. He has a vivid visual imagination.

RESPONSE. Learned a new movement easily to a certain extent, that is he could be taught, but drifted back to his own spontaneous movement. When thoroughly interested in talking he learnt a new movement and retained it. He would keep it up even after he stopped talking, his movement would grow more vehement, then would slow down and the newly taught movement would be forgotten and he would return to his old one. He learnt best when his attention was strongly attracted, he was then unconscious of his hand and wrote rapidly.

CASE IV. Female subject. Decidedly objective in character. An excellent English student and has a vivid imagination, very little power of self-analysis, and does not care for abstract thought. The mystic side of art does not appeal to her.

RESPONSE. At the first could get no response. Second sitting she learned one movement readily, but learned it to the exclusion of everything else. When interested talking she wrote readily. At the next sitting she learned a movement readily and gave it with greater and greater rapidity. The movement became hurried and incessant and it was impossible to guide it at all. Even when the board was held still her hand kept up this movement. She then went from one movement to the other, giving them all with great rapidity.

The tendency here noted to movement much more rapid and incessant than is executed under normal conditions is a very marked characteristic of automatic writing. I have found a number of instances of it which reminded me of the rapid and in-

cessant movement seen in revival meetings, where people under the domination of religious frenzy swing their arms and beat their breasts in rhythmic time. I will cite an example of this type of movement in one of my subjects. He had a spontaneous movement of a circle made with the swing of the whole arm. He began these circles, gradually increasing in speed, not breaking into any other movement; just a continued rush of circles. Gradually the circles elongated to forward and back and the movement slowed down. It took him three minutes to reach his highest speed, at which rate he kept on for five minutes, and then settled down to a uniform speed which he kept up as long as the sitting lasted. The whole movement was purely spontaneous. He described the movement as if it were started not only by him, but by his forearm and hand.

TYPE II., CASE I. Female subject. No automatic sleep habit, good natured, phlegmatic. She has premonitory conversations that come true. Falls readily under personal influences, not a determined character nor imaginative. Strongly dominated by impressions of childhood and superstitions. She does not concentrate her attention easily, and finds it very fatiguing when she does. When tired she relaxes by giggling. She says she keeps on working long after she has ceased to work vigorously.

RESPONSE. Her arm felt impersonal very quickly, even at the first sitting. She was readily taught a movement, although she did not adhere to it strongly. She was conscious of the movement, but did not feel as if she could stop it. Her hand became cold and stiff. At the second sitting there was a slight tendency to return to the movement first taught, but it did not continue long and had to be retaught. After four sittings the first movement was readily remembered. At one sitting the subject's mind seemed more active and wide awake than usual and the response was poor; finally she became quiet and sleepy and then the movement was readily adopted and adhered to.

CASE II. Male subject. Pale and physically rather weak. Feared the dark very much as a child. Concentrates his attention fairly well when interested. Not imaginative.

RESPONSE. He stopped writing when he began to talk or

think out something. His hand yielded quite readily to suggestion, but the movement was never carried on long. He wrote best when silent and a little dreamy.

CASE III. Male, pale type. No automatic sleep habits, rather nervous and absent-minded. He has a tendency to forget his ideas just as he is expressing them. He has a worrying nature, gets very much interested in his work. He has difficulty in formulating his ideas and has to work them out with an effort, and is always uncertain as to exactly what is wanted of him. He is very conscientious and has had a nervous breakdown. During his writing he frequently got a nervous shiver.

RESPONSE. He wrote vigorously in rather a nervous fashion and was never conscious of any change in his movements. He commented upon his being uncertain as to whether he could stop his hand. He spoke of an indescribable impulse to go on, the effect of an outside dragging. He had a good deal of spontaneous movement that went on constantly and rapidly. When he thought hard of a word it had no effect on his movement except to increase its rapidity.

CASE IV. Male subject, not particularly imaginative and no morbid fears. Thinks he is introspective, but is not quite sure. Is very self-conscious, and gets easily worn out. Pale and weak physically, morbidly sensitive and uncertain of himself. Small power of concentration.

RESPONSE. He said his arm seemed to be going as if he could hardly help it, but it was very hard for him to keep his mind off of it. He felt as if the arm were going by itself even when he thought of it, but he thought he could stop it if he wanted to. After some training he went readily from one movement to the other. He spontaneously made indeterminate curves and lines. He did not think I was moving his arm, but he did not think that he was doing it either. He never stuck to any one movement any length of time. When he thought of a word at first there was no tendency to write it, but the curves gradually became more and more determinate till finally the word was written. He felt that he had gotten very near it, but he never knew whether he had really written it. He wished that he could stop thinking of his hand, but was unable to.

Afterwards he thought possibly that he had written the word cat, but he was sure that he had not written rat, to which he had changed in thought. In reality the word rat had been clearly written.

The few cases where no response was obtained show no particularly interesting characteristics. The subjects are usually indifferent, without the accompanying characteristics of Type II. They were not morbid and usually had fairly good power of concentration, without much imagination.

To study the effect of fatigue, I took the Radcliffe students just in the midst of the examinations. I was, therefore, not able to examine a very large number of students.

I found Type I., as a rule, showed a tendency to become highly irritable, more auto-suggestible than before, and that the tendency to rapid and spontaneous movement increased. Type II., on the contrary, got worn out, lost all spontaneity, became if possible more suggestible, and showed a tendency to nervous jerks and great inequality, also extreme fatigue and depression.

TYPE I., CASE I. In the normal state the subject had given considerable response and had been fairly suggestible. In the fatigued condition there was a good deal of movement with increasing rapidity. The subject is irritable, and feels a distinct shock when her pencil slips from the paper. The subject was wholly unconscious of her movements, but did not respond to guidance as readily as before. She began to write things resembling words, her face tense. The hand was tense and the breathing heavy. The movement is very strained, and the hand jerked a good deal. She described herself as being all upset by the examination.

CASE II. Had in normal condition learned to give a few movements very vigorously when distracted by talking.

Fatigued, she fell readily and spontaneously into movements. The examination had interested and aroused her. This was shown in the rapidity and spontaneity of her movement and her inability to yield to suggestion. The movement increased and became more and more violent.

She said it seemed to her to be wholly in the forearm and that for the most part she had forgotten all about it.

INTERMEDIATE TYPE. In normal condition there was considerable suggestibility, but also a certain amount of spontaneity and vigor in response.

FATIGUE. Gave an easy spontaneous movement at first. Was very lethargic and complained of backache. Followed guidance readily, but without energy. Finally I got her to respond better by rousing her and getting her to talk.

TYPE II., CASE I. Normal, rather a negative case with a leaning toward Type I.

FATIGUE. Tired in back of neck, not excited. There was some spontaneous movement, but much less response than was ever gotten before. Lethargy had markedly increased.

CASE II. In normal condition not very good in response and only fairly suggestible.

FATIGUE. Tired out. Very little spontaneous movement, sluggish response with many stops. Hand jerks a good deal and whole movement is very uneven. Finds writing makes her back ache. After the strain of examinations are over she feels tired a long time and often gets more tired and then gives out.

There were also a couple of cases where there had been no response before, and the subject had comparatively little fear of the examinations and did not worry. There was no noticeable change in the reactions.

The difference in response between the male and female subjects was not very pronounced. The types in the girls were perhaps a little more determinate in the case of Type I. In the case of Type II. this was not so, nor in the indifferent cases. There was also very little difference apparent in nervous condition as between the sexes. I did not have the men during the examination period, so I was unable to judge of the relative effects of fatigue.

In the subjects that I had think steadily of a word I was surprised to find that the motor reaction was very slow and in some cases did not come at all. The move was made more rapidly or more slowly, but that was all. Several times the subjects wrote the word after some time. The subjects also were unable to judge of their performance. One case repeated meaningless

curves over and over again, convinced that he was writing a word, and another when fatigued started in on certain curves and repeated them again and again, finally convinced that they meant something, although she could give no explanation of them.

In one case, where the subject had been at one time left-handed but where now the right hand was habitually used, the left was more responsive automatically.

In conclusion I wish to recall to the reader a paragraph in the article printed in the PSYCHOLOGICAL REVIEW (page 502) for September, 1896, by Mr. Solomons and myself. We there state the fact that in order to become automatic "our training was purely a training of the attention. Our trouble never came from a *failure* of reaction, but from a *functioning* of the attention. It was our inability to take our minds off the experiment that interfered. From that start whenever by good luck this did happen, the reaction went on automatically. The hysterique has no trouble here, for he is unable to attend to the sensation, attention to which bothered us. It is his anæsthesia which makes automatism possible. What in his case is done for him by his disease we had to do by acquiring a control over our attention."

Now, in the two types as I have described them this is exemplified. In Type I. we have subjects who had to have their attention distracted in order to have the experiment succeed. In Type II. we have the cases of subjects very much nearer the true hysterique, where powers of attention, or rather lack of power of attention, induced an extreme suggestibility and a great tendency to automatic movement. In the cases of fatigue we find this consistently carried out. In Type I. fatigue took the form of nervous excitement, which meant a greater distraction and therefore better automatism. In Type II. we find exhaustion, less power of concentration, and resultantly increased suggestibility, but less vigor in response.

We also find, both in the normal condition and in fatigue, a distinct relation between these two types and the physical condition and blood supply. In Type I. circulation seems good, and the nerve centers are freely stimulated, attention is active, and

the subject rarely complains of the hand being numbed in going to sleep. After an examination this type is roused, the nervous system is still more highly stimulated, and the attention even more easily concentrated, and, therefore, distracted. Unfortunately, I did not have a chance to examine these subjects after the stimulation had lost its effect, since they usually came to me immediately after the examination.

In Type II. we have just the reverse. Sluggishness is a pronounced characteristic, whether the subject is healthy or delicate. The nervous system lacks stimulation, the hand gets numbed and falls asleep, which seems to indicate a sluggish circulation, the subject gets drowsy and is docile. In fatigue these symptoms are all exaggerated. Examinations do not stimulate but rather exhaust. Backaches are common, lethargy increases, repose becomes feeble, the subject is, in short, worn out, and the nervous system is incapable of stimulation. The attention is even more diffused and less capable of concentration than before.