AN EXPERIMENT IN MENTAL TESTING DURING HYPNOSIS.

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THIS paper describes the case of a girl to whom certain mental tests were given while she was under hypnosis. The results of these tests are compared with the results obtained when she was in her normal state.

Case History.

The patient was a girl, aged 17, admitted to the Maudsley Hospital on April 1, 1938. The informant with the patient (her employer) reported attacks of sleep-walking occurring spontaneously between eleven and twelve at night. During these attacks the patient would get up from bed, put on a dressing-gown and wander about the house, her eyes open, her movements perfectly co-ordinated and her behaviour quite purposeful. She would imagine that she was back at school, and address those who spoke to her as her teachers. The total situation would be fraught with some anxiety; she would look for her gym. shoes, her attaché case, or an exercise book in which to write her detention lines. On two occasions she had done the household ironing and done it very well. When roused, which took some time, she would look bewildered and ask where she was. On waking in the morning she seemed almost completely amnesic for the episode. The extent to which her memory functioned is doubtful, since it is possible she built up some knowledge of what she had done from the questions put to her by her employers.

From the social worker's report the following history was elicited: The patient was the first and illegitimate child of a feeble-minded servant girl of 15, who was forced to leave her first job owing to this pregnancy. Of the father, nothing is known; he is thought to have been a coloured seaman, as the patient's appearance was strongly suggestive of coloured blood. She was deserted by her mother at the age of six months, and was subsequently brought up in two orphanages, leaving the first at the age of six years and continuing in the second until, at the age of sixteen years, she obtained employment as a domestic servant.

Sleepwalking began within a month of going out to this job, which she had to quit for this reason at the end of five months. She obtained another domestic post, but the attacks increased in frequency, until they were occurring as often as three times a week. At this point, after ten months' service in this house, her employer referred her for treatment.

The social history showed no evidence of previous mental or nervous illness, the health of the patient having been good save for a mastoidectomy at seven years, which had resulted in a left facial palsy.

On the personality of the patient varying judgments were passed. The school report said she was capable and interested in her work, but the ringleader in various misdeeds. For this reason she had not been permitted to sit for a trade scholarship at the age of thirteen years. This had been a great blow to her, since she was very ambitious and wanted to be a journalist.

In her first post she was "uncertain in her work, careless and given to moods," and was given notice within the first few weeks. Her work improved so much, however, that she was kept on, being subsequently discharged for the sleepwalking. She was very happy in her second post, where her employer described her as pleasant, although sometimes dreamy, careless and irresponsible. She was, however, very kind and careful with the children. She had no boy friends, and only a few girl friends from her school, but with these she got on well. Her employer stated that

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she was not of a worrying or anxious disposition, but that she did appear to worry over the circumstances of her birth, fearing that she might be illegitimate, and had sometimes discussed the position with her mistress.

The employer had no desire to lose her, but the inconvenience and possible danger of these frequent attacks, as well as a wish to help the girl, made her feel treatment was essential. She was therefore admitted to the Maudsley Hospital, where she remained for three months.

Behaviour in Hospital.

There were no attacks of sleepwalking while she was in hospital. On one night only did she call out in her sleep, addressing the nurse by the name of her school teacher. She retained no recollection of this the next morning. She was pleasant, co-operative, and on good terms with staff and other patients. She was under the care of Drs. W. Sargant and A. Sinclair, who could find no serious abnormalities of thought, mood or behaviour, though she was clearly a hysterical personality. Her insight was good. She realized her worry over the circumstances of her birth and the nature of her employment and discussed them in a reasonable way. She was easily hypnotized, and during these periods she would fancy herself to be a schoolgirl of thirteen years, back at school and talking to a teacher. No stereotyped behaviour, as in sleepwalking, took place on these occasions, her underlying anxiety apparently being satisfied through the medium of speech. After such conversations, during which her fears and ambitions were discussed, she would, when in her normal state, report that she felt herself easier in her mind about such matters, although she retained no recollection of her conversations while under hypnosis.

A month after her admittance to hospital she was given a routine psychological examination, using the Binet test (Terman Merrill), the Rorschach and a Word Association Test. It was then decided, as a matter of interest, to test her under hypnosis. The three tests were therefore repeated some three weeks later. A few questions of general knowledge were also given her.

While under hypnosis there were slight but definite alterations in attitude and manner. In her normal state she was " Miss Brown " and her manner was definitely grown-up. Under hypnosis she gave her name as " Barbara," and treated it as a joke if she were called Miss Brown. She seemed less independent, more desirous of praise, and spoke with the slight deference of a school girl towards her teacher. At the same time her flow of conversation was easier, and her mood less settled. On one occasion she became irritable and the test had to be stopped. As " Miss Brown " her mood throughout was friendly, co-operative and interested. Under hypnosis she appeared to retain no memory of the tests which had been administered to her in a normal state.

Results of Psychological Tests.

It is not proposed to give here the substance of the many conversations held with her when under hypnosis. The tenor of her speech showed the constellation of knowledge relevant for a girl of thirteen years in the year 1934. Of all events, both in her private life and in public affairs, which had taken place since 1934 she seemed, when under hypnosis, to be totally unaware, e.g. her periods did not start until she was sixteen. When hypnotized she appeared to have no real knowledge of the fact of menstruation, although she said that girls at school had dropped hints about it. Unfortunately, lack of time prevented the administration of educational tests, which might have brought out differences in attainment, due to two years' extra schooling.

She was given some few simple general knowledge questions. The answers she gave when under hypnosis show the differences mentioned. She was asked to give her name, the date, her age, the place she was in, the person she was addressing, the name of the King, Queen, and Prime Minister. To all these questions she returned correct answers when in her normal state. Under hypnosis, however, her name was always Barbara Brown, as contrasted with Miss Brown at other times ; the date was invariably October 15, 1934 ; place, the school. It is interesting to note here the facility with which she fitted the hospital surroundings into the pattern. When discrepancies in type of room and furnishing were pointed out to her, she

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would look round thoughtfully and suggest variously that we were in the staff room, the clinic, the sick bay and so on, without, however, linking these suggestions up to any general situation which might account for her presence in such places.

The name of the King, Queen, and Prime Minister were always given as George V, Mary, and Baldwin. Her talk was all of school friends and school events. At no time did she give a response which was inconsistent with what was presumably her state when she was actually thirteen.

The Binet Test.

In her normal state she was given both Form L and Form M. Under hypnosis she was given Form M first, and about ten days later Form L was administered. Unfortunately she was then in a restless and unsettled mood, with poor concentration and indifferent co-operation, and the results are of poor value for this reason. It was hoped to give her Form L at some further date, but owing to pressure of work on the part of the examiner this was not done. The comparison between the two sets of answers, in the normal and the hypnotized states, will therefore be made on the results of Form M.

It is now generally conceded that the concepts of Mental Age and Intelligence Quotient are beset with difficulties, particularly in respect to adults, and that their place should be taken by estimates of percentile ranking or S.D. Nevertheless, they are so generally known that it would be absurd not to give them here.

On " Miss Brown's " test the Mental Age was 16 years 5 months, I.Q. 109, " Barbara's " Mental Age being 14 years 5 months, I.Q. 96. There is, therefore, evidence of loss of efficiency in intellectual functioning during hypnosis in the case of this subject. It is a somewhat curious coincidence that this lowering in intellectual functioning should correspond so closely to the imagined difference in chronological age at the time of the second test. Had " Barbara " in reality been 13 years 10 months (her age in October, 1934), her M.A. of 14 years 5 months would have yielded an I.Q. of 106, very similar to that of " Miss Brown."

The scatter in " Barbara's " results was of the sort often given by emotionally disturbed patients, extending over eight years (10 years, S.A.11—a single success at the latter level). With this is contrasted the more stable performance of " Miss Brown " with a range of five years (13 years, S.A. 11).

The type of tests on which success and failure occurred show a definite consistency.

(a) *Verbal Tests.*

Both sets of answers show success in tests of a more purely verbal nature. The vocabulary and abstract word scores do not differ. This is not surprising, as verbal facility is least likely to be affected by interference, except in cases of specific verbal disfunctioning.

(b) *The So-called "Social" Tests.*

There is little difference in the results on these tests, both passing on the Absurdities and Problems of Fact on the same level, " Barbara " however failing on the Ball and Field.

(c) *Memory Tests.*

Slight, but probably not significant, differences emerge here. Repetition of digits backwards was constant for both at six digits. " Barbara " could not repeat more than six forward, while " Miss Brown " scored a success at the level of eight. On meaningful material " Barbara " failed to pass the story at the 13-year level, on which " Miss Brown " succeeded. This slight disparity was not followed up by other tests of auditory memory, both formal and meaningful, owing to lack of time.

(d) *Tests of Reasoning.*

The most noticeable difference occurred in " Tests of Reasoning " with abstract thinking. The scores are as follows :

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Test.		"Miss Brown."	"Barbara."
Similarities	(11 year)	Not given.	Failed.
Reasoning	(14 year)	Passed.	Passed.
Orientation	(14 year)	,,	Failed.
	(A.A.)	,,	,,
Ingenuity	(14 year)	,,	Passed.
	(A.A.)	,,	Failed.
	(S.A. 11)	,,	Not given.
Reconciliation of Opposites	(14 year)	Failed.	Failed.
	(S.A. 11)	,,	,,
Differences	(A.A.)	Passed.	,,
	(S.A. 11)	Failed.	,,
Proverbs	(A.A.)	Passed.	,,
	(S.A. 11)	Failed.	,,
Codes	(A.A.)	Passed.	Passed.
	(S. A. 11)	,,	,,

" Miss Brown " succeeded on ten out of fourteen tests administered, " Barbara " passed on four out of fourteen. The disparity is striking. Although " Barbara " scored successes on this type of test at A.A. and S.A. 11 level, these were solitary successes against a background of failure ; the type of successes found where there is unevenness of functioning. Contrasted with this is the more stable picture of success and failure given by " Miss Brown."

When hypnotized, therefore, this subject experienced difficulty in abstract thinking, and in the working out of general principles, the whole level of thought being reduced to a more concrete and childish level.

The organization and control of thought being less effective, the possibility of the emergence of emotional and conative elements suppressed in ordinary circumstances was considered. It was with a view to finding out whether such elements did emerge to alter the balance of personality that the Rorschach test was given.

Result of the Rorschach.

The records for this test were taken by the psychologist. They were then sent for analysis to a psychiatrist, Dr. Earl, who knew nothing of the history save that both came from the same subject. His report reads as follows :

" There is no essential difference in personality brought out by hypnosis. Both sets of answers show traces of neurotic shock, anxiety and emotional construction. In neither is there any indication of good intelligence, organizing ability being low."

(This indicates the extent to which emotional factors can interfere with the picture of intelligence obtained through the Rorschach, since the intelligence of the patient was undoubtedly normal.)

The main difference brings out " the rather painful conscious control of ' Miss Brown ' as contrasted with the less inhibited, but more unhealthy, approach of ' Barbara.' In ' Miss Brown's ' record there was evidence of much repressed affect, showing a person who was adjusting, or trying to adjust, by rigid conscious control of her mental processes and avoiding anxiety by the undue affective constriction."

How deep this affective constriction goes is brought out more clearly when we look at the results of the Word Association Test. We should expect to find certain differences present between the two sets of results, due to the differing degrees of control exerted by the subject. This is what we do find. Let us examine the ways in which these differences are manifest.

(1) *Reaction Time.*

To the Kent-Rosanoff list of 100 words were added six extra words, thought likely to possess special significance for this subject : marriage, unlawful, work, colour, dark, mother.

These were given at intervals throughout the original list. The reaction times are therefore given for 106 words.

The difference between the two sets of reaction times brings out clearly the

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extent of the control exercised by " Miss Brown " in her everyday life. The first comparison is for responses actually given. " Miss Brown " failed to reply to ten stimulus words, " Barbara " to three. For the 96 and the 103 replies given the times were as follows :

	" Miss Brown."	" Barbara."
Total reaction time	591·7 secs.	382·4 secs.
Mean reaction time	6·2 ,,	3·7 ,,
Medium reaction time	4·2 ,,	3·1 ,,

It will be seen that repression of painfully toned ideas is very great in " Miss Brown," both her mean reaction times and medium reaction times being two to three times as long as in a normal subject. Hypnosis is able to effect the loosening of this repression to a considerable extent, although in " Barbara " we still find that both mean and medium reaction times are one second over normal.

The second analysis of reaction times shows this even more strikingly. Here the times taken over the whole list are compared, failures included, 106 in each case. Thirty seconds was allowed for a reply to a stimulus. If none was forthcoming at the end of that time, the word was repeated and a further 10 seconds allowed. Thus a failure was said to occur at the end of 40 seconds. The table below shows the time taken by both over the whole list :

	" Miss Brown."	" Barabara."
Total reaction time	991·7 secs.	500·4 secs.
Mean reaction time	9·3 ,,	4·7 ,,
Medium reaction time	5·0 ,,	3·1 ,,

Here the control is seen to go so deep that even under hypnosis it is exerted to a pathological degree.

Over 10 per cent. of " Miss Brown's " replies took longer than 10 seconds, as contrasted with 3 per cent. for " Barbara." The range in variation is extreme for " Miss Brown," " comfort " being responded to only at 40 seconds, while " black " elicited a reply at ·4 sec. The range is still great for " Barbara " but more of it within normal limits, " citizen " being responded to at 16·3 secs. and " long " at ·4 sec.

(2) *Failure of Response.*

While " Barbara " fails to reply on 2·9 per cent. of the stimuli, " Miss Brown " gives no reply for 9·4 per cent. Jung gives the norms for failure as 1·9 per cent. for educated, and 1·2 per cent. for half-educated women. It is seen how gross is the proportion of " Miss Brown's " failure. The following table shows the failure in the two sets of responses :

Word.	" Miss Brown."	" Barbara."
profound	No reply.	Deeply—4·0 secs.
wish	,,	Well—9·1 secs.
trouble	,,	No reply.
dream	,,	Thought—8·2 secs.
dark	,,	Light—2·3 secs.
quiet	,,	No reply.
religion	,,	,,
light	,,	Shade—2·3 secs.
foot	,,	Hand—3·2 secs.
girl	,,	Boy—0·4 sec.

Certain constellations of ideas and emotions are seen to be still active even under hypnosis. The inclusion of " marriage " and " unlawful " in the list was justified by the delay in "Miss Brown's " responses, the first word evoking " bride " at 21 seconds, the second " wrong " at 16 seconds respectively.

So far we have had a picture of a very profound emotional repression, operative to some extent even under hypnosis. Are there any changes in the type of responses which would enable us to pass any judgment on variations in personality, as revealed

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under hypnosis? If the amount of repression exercised under hypnosis becomes less and in consequence the repressed elements are allowed to emerge more freely than in the patient's normal state, does this variation affect the balance of personality—taking personality in the Jungian sense of introvert-extravert types? Should alteration in the balance of personality take place we might expect that this would affect the types of responses given in the two sets of answers. This is, on analysis, shown not to be the case, substantiating on this point the evidence of the Rorschach test.

(3) *Types of Responses.*

Thirty-three answers were identical in both. The responses which differed have been analysed in accordance with Jung's classification of responses. The percentage of each type has been taken from the number of differing responses in each set of answers (63 responses for " Miss Brown," 70 for " Barbara ").

	"Miss Brown."	"Barbara."
1. *Inner Association.*		
Co-ordination	11·1%	28·8%
Prediction	17·5 ,,	8·6 ,,
Causal relation	9·5 ,,	2·8 ,,
	38·1%	40·2%
2. *Outer Association.*		
Co-existence	12·7%	5·6%
Identity	11·1 ,,	17·1 ,,
Verbal motor	9·5 ,,	18·5 ,,
	33·3%	41·2%
Word completion	7·9%	10·0%
Clang	0·0 ,,	0·0 ,,
Rhyme	0·0 ,,	0·0 ,,
Indirect	12·7 ,,	8·6 ,,
Meaningless	4·8 ,,	0·0 ,,
Repetition	3·2 ,,	0·0 ,,

In both sets we see that there is no very significant difference in the relationship between the inner and the outer types of associations. The relative proportion of inner to outer is somewhat unusual, but is found in both sets of answers. Within these two main categories we find certain differences between " Miss Brown " and " Barbara " in the frequency with which subclasses of responses occur, but these differences do not affect the picture as a whole.

In one way, however, the two sets of answers differ strikingly. Those of " Miss Brown " contain twice as many indirect and meaningless associations as those of " Barbara." Since these types of responses denote active egotism, it might be assumed that the control commonly exercised by " Miss Brown " is responsible for this increase.

We may say that the Word Association Test brings out the extent of the control exerted in the repression of emotional factors when this patient is in a state of normal consciousness, and shows, too, the extent to which this control is loosened under hypnosis.

Summary and Conclusions.

This paper describes the case of a female, aged 17, referred to the Maudsley Hospital for persistent sleepwalking, during which stereotyped behaviour patterns occurred. She presented no general serious abnormalities of thought, mood or behaviour, although she was clearly a hysterical type of personality.

While in hospital she was tested, both in her normal state and while under hypnosis, with three different types of test—the Binet, the Rorschach, and the Word Association Tests.

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The results showed that under hypnosis there was a lowering of intellectual functioning, the whole level of thought being reduced to a more concrete and childish type. Generalizations on the basis of this particular case would, however, be unreliable, since its integral feature is the regression to the patient's 13-year-old existence.

Under hypnosis it was possible to verify by an experimental approach the working of generally accepted psychological mechanisms, and to make estimations of the extent to which these were operative. The repression exerted by this patient in normal life was experimentally assessed by means of the Word Association Test, and was shown to be highly abnormal. Under hypnosis the degree to which this repression altered was found to be still abnormal, although considerably nearer the norm. In view of the fact that repression was still present to a significant degree, it is perhaps not surprising to find that, although the patient made a certain amount of progress, sleepwalking again occurred in 1940. While so-called " reason " allowed her to discuss her difficulties in a sensible and quite intelligent way, her main emotional and conative drives were centred around ideational constellations so powerfully toned that even under hypnosis they had still to undergo repression.

As psycho-therapy is being more and more practised on patients in a quasi-hypnotic state, might it not be possible, by the administration of Word Association Tests during such states, to determine the degree to which repression is still being exerted ? By carrying out a series of such tests at intervals during treatment, it might be possible to make an assessment of how far the therapy is likely to be ultimately successful.

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