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The Depatterning Treatment of Schizophrenia

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THE DEVELOPMENT of a successful method of treatment of schizophrenia has become imperative because of the ongoing revolution in psychiatric hospitalization. From this revolution, the psychiatric divisions of general hospitals are emerging as the primary places for the diagnosis and care of the mentally sick. Hence the necessity for a method of treatment of schizophrenia which can be effectively carried out within these short-stay hospitals.

Over the last thirty years a number of methods of treating schizophrenia have been introduced—insulin coma, chemotherapy and others—which have had a demonstrable measure of success, but their degree of effectiveness has left much to be desired. They fall far short of what must be a basic requirement, namely, that when the patient is discharged from the psychiatric division of a general hospital, he must either be well or, if not, then well enough to go on ambulant service for further follow-up treatment.

Extensive experience with the successes and failures of coma insulin treatment of schizophrenia—with various psychotherapeutic procedures and later with a number of forms of chemotherapy—led us at the Allan Memorial Institute to set up plans to seek for a more powerful and a more flexible method of treatment.

A survey of the existing literature showed that of the multiplicity of methods of treatment, massive electroshock seemed promising. It produced initial favorable results in a high percentage of cases but there was also, unfortunately, a considerable relapse rate. This method of treatment was apparently introduced by Bini[1] and by Milligan.[2] In both instances, it was at first used to treat chronic psychoneurotic patients. The method was transferred to the treatment of schizophrenia by Kennedy and Ancell[3] who appear to have been responsible for the misleading designation of "regressive shock therapy."

In its original form, the method consisted essentially of the administration of two to four electroshocks daily to the point where the patient developed an organic brain syndrome with acute confusion, disorientation and interference with his learned habits of eating and bladder and bowel control. While in this condition, his schizophrenic symptoms disappeared. On cessation of electroshock—usually after the patient had been given about thirty treatments—reorganization would set in. The organic symptoms would recede quite rapidly

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and, in favorable cases, the schizophrenic symptomatology would not reappear.

Glueck and his co-workers[4] reported on one hundred cases in which they had used three grand mal convulsions daily with the number of treatments varying from seventeen to sixty-five; the average being thirty-four. Ninety-three of the cases were sent home but twenty-two relapsed in three weeks to seven months after discharge.

Weil[5] administered seven electroshock treatments a day, but stated that the treatment had no lasting beneficial effect on the eighteen cases treated.

Rothschild and his co-workers[6] reported the treatment of fifty-two schizophrenic patients, twenty-two of whom were unimproved and thirteen of whom were out of the hospital for periods ranging from three to twelve months.

Seven years ago we decided to develop the potentialities of this procedure. At that time we already had extensive experience with two other therapeutic procedures—continuous sleep as introduced by Klaesi[7] and modified by Azima[8] and preventive shock therapy as described by Geohegan and Stevenson.[9] We had already found that prolonged sleep produces confusion; thus we decided to administer intensive electroshock therapy to our patients in continuous sleep in order to expedite the development of the required brain syndrome and also, as a means of controlling excitement and anxiety.

From the Geohegan and Stevenson technique we had learned a great deal about the prevention of relapse by monthly electroshock therapy carried on for several years. For this reason we decided to have our patients—on termination of the acute part of their treatment—put on a two-year follow-up plan during which they would receive one electroshock a month on an ambulant basis. From our experience with this technique, we had also learned the desirability of terminating electroshock slowly and not abruptly as did some of the earlier workers.

Since there was a considerable variation in the degree of disorientation which other investigators had attempted to achieve, we devoted attention to devising a scale which would determine when a satisfactory level of depatterning had appeared. Kennedy and Ancell described their patients as being brought to the level of 4-year-old children. Rothschild and his co-workers[10] referred to certain of their organically disorganized patients as being unable to swallow but able to suck fluid from a feeding bottle. Glueck[11] reported that his patients were like helpless infants. They were incontinent in bladder and bowel and required spoon feeding as well as tube feeding. There was a considerable increase in spastic rigidity and the abnormal reflexes of Babinski and Hoffman—and sometimes ankle clonus—were present as well. A grasp reflex occasionally suggested evidence of a frontal lobe syndrome.

Because of these descriptions of behavior reminiscent of early childhood, we decided to see whether the phenomena could be described in terms of the early development of stages of behavior as described by Gesell.[12]

We soon discovered that this was quite impossible. The disturbance of behavior is anything but orderly. The patient may show incontinence and yet be able to use quite an advanced vocabulary, and difficulties in motor movements go hand in hand with the preservation of a second language learned at the age of 12.

Hence we decided to abandon the whole concept of regression, convinced that here, as indeed elsewhere, it carries implications far beyond the facts.

Prolonged review of the data brought out the fact that disturbance of the memory is the central phenomenon, and we therefore attempted to set up a scale based on the degree of disturbance of the memorial function. The disturbance is so massive and pervasive that it cannot well be described in terms of existing tests and can only be measured in degree if one sets up large categories of disturbance as the basis of one's scale. For this reason, we decided upon a scale based on degrees of disturbance in the individual's space-time image. This we have found satisfactory for our purposes, namely, to ensure that each patient is brought approximately to the same desired level of disorganization.

In the first stage of disturbance of the space-time image, there are marked memory deficits but it is possible for the individual to maintain a space-time image. In other words, he knows where he is, how long he has been there and how he got there. In the second stage, the patient has lost his space-time image, but clearly feels that there should be one. He feels anxious and concerned because he cannot tell where he is and how he got there. In the third stage, there is not only a loss of the space-time image but loss of all feeling that should be present. During this stage the patient may show a variety of other phenomena, such as loss of a second language or all knowledge of his marital status. In more advanced forms, he may be unable to walk without support, to feed himself, and he may show double incontinence. At this stage all schizophrenic symptomatology is absent. His communications are brief and rarely spontaneous, his replies to questions are in no way conditioned by recollections of the past or by anticipations of the future. He is completely free from all emotional disturbance save for a customary mild euphoria. He lives, as it were, in a very narrow segment of time and space. All aspects of his memorial function are severely disturbed. He cannot well record what is going on around him. He cannot retrieve data from the past. Recognition or cue memory is seriously interfered with and his retention span is extremely limited.

These steps we have termed the three stages of "depatterning" (Cameron[13]).

As the patient emerges from the treatment, he passes through these three stages in reverse.

Procedure

The treatment is preceded by an extensive work-up in which not only are all the clinical data on his case assembled, but they also are collected through the Social Service Department regarding his home and work situations. The social worker has the responsibility—sometimes reinforced by the physician—of advising the family of the treatment procedure and of the fact that he will have a considerable memory blank when he recovers; that he should not be visited during the actual period of treatment. The work-up also includes psychological testing, electrophysiological examinations, biochemical, serological and routine hematological and urine checks.

Unless there are contra-indications, such as a pulmonary or a cardiovascular state, the patient is then started on continuous sleep with a three-times-a-day waking period. This method of treatment requires careful supervision. Three barbiturates, namely, Veronal, Seconal and Nembutal, are used together with Largactil as the basis of the therapy. The patient is awakened thrice daily for toilet and meals. The nursing care requires that particular attention should be given to the skin and to posturing and, where necessary, to respiratory exercise with carbogen. We have found that with sleep, restlessness and anxiety can be much better controlled and also have found it is usually necessary to give fewer electroshocks. Sleep is the initial step to ensure that the patient is drowsy and under control before intensive shock therapy is started. This is usually administered about three days after sleep is initiated.

The Page-Russell electroshock technique[14,15] is administered twice a day. This involves giving the patient on each occasion six electroshocks—the electrical impulses following each other with such rapidity that the clonic phase does not become established until the end of the sixth electrical impulse.

The patient passes into the first stage of depatterning about the fifth day of electroshock treatment and into the second stage somewhere between the tenth and twentieth day of treatment. Patients, however, vary considerably in the amount of electroshock and sleep necessary to bring them into the third stage—the average being between thirty and forty electroshock treatments, with some requiring fifty or sixty and a very few entirely failing to reach the third stage of depatterning.

Once the third stage is reached, the patient is kept at this level for about a week by reducing the frequency of electroshock to one a day and dropping from multiple to single shocks. We then begin to bring the patient out gradually by reducing electroshock to one shock three times a week—then to twice a week and so on as the case demands. At the time of his leaving the hospital, electroshock should be down to one per week.

It is most important not to stop electroshock treatment abruptly, otherwise relapse is very frequent. One should also grasp the essential fact that the period of reorganization is a period of considerable delicacy. The patient should be supported and reassured. He should constantly be given some incentive to reorganize himself and he should be protected against emotional disturbance, such as visits from relatives or tensions in the treatment room.

Earlier it was stated that the patient passes back through the same three stages of depatterning which have been described. During this reorganization period, while in the second stage and in particular when the patient is passing back from the second stage to the first stage on his way to recovery, there may be a period of turbulence. The patient becomes anxious, restless, antagonistic and may become delusional. Earlier in our experience, we described these occurrences almost uniformly as evidences of relapse and increased the frequency of electroshock—putting the patient back into the third stage again. Ultimately, however, we have come to realize that these phases which we have termed "periods of turbulence" are states of anxiety occasioned by the transition from a phase in which the patient feels no necessity to maintain a space-time image to the stage where he feels a strong urge to recreate his space-time image but is not yet able to do so. For the last several years we have controlled this anxiety by means of heavy doses of Largactil up to mg. 600–1000 per day and sodium amytal.

Still more recently, however, we have had an opportunity to work with a new monoamine oxidase inhibitor—RO4–1038—which has proved remarkably effective in quite small doses in curtailing this type of organic anxiety. It is necessary to curtail this, since otherwise the patient may become seriously disturbed and there may take place an actual return of his schizophrenic symptomatology.

In a certain proportion of cases (rather less than 30 per cent), one does see a recurrence of the schizophrenic symptomatology as the organic syndrome subsides. When this happens, we habitually return the patient to intensive electroshock treatment and pass him back to the third stage. On occasion, it has been necessary to repeat this several times—and we have done so up to six times before we were ultimately able to maintain the patient in a symptom-free state.

During this period of reorganization, we continue checking the patient most assiduously several times a day for any evidence of relapse. It cannot be too strongly stressed that if evidences of relapse are detected literally within a few hours, they can be got rid of with two or three days of intensive treatment.

At no time do we attempt to carry out depth psychotherapy or indeed any psychotherapy save in the measure which has been described, which is continuous preoccupation and concern with the details of the patient's treatment, helping him to reorient himself and encouraging him. Anything in the way of uncovering psychotherapy we have found to be positively calamitous.

We have also attempted during this period of reorganization to define the extent of his total amnesia and the extent of his differential amnesia. The term 'differential amnesia' is used to describe the fact that patients will have an amnesia for schizophrenic occurrences but will maintain recollection for other concurrent happenings. Thus, if a patient has had

a schizophrenic illness for three years and is treated by this method, he may very well have a total amnesia for two years but a differential amnesia extending over the whole period of his illness, i.e., three years.

With respect to total amnesia, we try to encourage his family to help him build a scaffolding of memories to bridge this. For instance, if a woman has moved into a new house during the two or three years lost to her, that fact is given her. If she has been on a trip, we tell her this. If she has new neighbours, she is so informed.

When the patient is discharged, arrangements are made for his or her return within a week for another electroshock, and very often the patient goes out on moderate doses of Largactil. Soon the patient goes on one electroshock a month and this rate is continued for two years. During this two-year period, we customarily find that the condition of the patient steadily progresses and a considerable proportion of patients show no schizophrenic symptomatology after the first year of follow-up therapy.

The family is warned of the possibility of a relapse and the earliest symptoms suggestive of this are described to them. They are asked to contact their doctor at the Institute within twenty-four hours at the latest after symptoms have begun to appear. The patient is immediately brought back to the ambulant services and intensified electroshock treatment is carried out on an ambulant basis for several days. On occasion, some of the sleep medication, such as Largactil, is reinstituted. The patient is rarely readmitted.

The treatment procedure has been described in some detail, but the description would be incomplete without emphasizing that the results of the therapy depend a great deal upon the skill with which it is carried out. There is some danger of falling into a belief that since treatment as here described is largely by means of physical and chemical agents, the perceptiveness, the zeal and the clinical wisdom of the psychiatrist play a relatively small part, that the process is mechanical.

Nothing could be further from the facts. The therapist has to be constantly alert to detect the various, rapid and often massive changes which take place in the patient during the course of this treatment. He should see the patient several times a day and be constantly on the alert to estimate the degree of depatterning which has been attained and to note the appearance of any drug idiosyncrasy. He must be well equipped with a variety of measures with which to counteract a proneness to relapse. He must keep himself constantly aware of his relationships with the patient and, in particular, the relationships between the patient and the family. There are no substitutes for the acumen and knowledge of the experienced clinician.

Results

The clinical material consisted of a total of 30 patients—21 females and 9 males. The mean age of the group was 36.1 years with the ages ranging from 20 to 61 years. All except one had on one or more occasions been admitted to the Allan Memorial Institute. The results will be described in terms of three grades of improvement. *Complete recovery* describes a patient who is restored to his best functioning self in the fullest meaning of the term. A patient who is *socially recovered* is one who is fully active socially and in his work but who may have residual subjective disturbances. An *improved* patient is one who is not in hospital and is able to meet some of his social and occupational requirements. These categories are essentially as outlined by Alexander[16] (table 1).

Our patients were maintained on follow-up for a mean time of 35.2 months, a range of 22 to 68 months. The mean number of electroshocks given during this time was 66.56, a range of 23 to 150. In one case (No. 2), readmission was necessary during follow-up treatment some six months after regular treatment had begun. This patient continued on follow-up ECT after discharge and went on to make an eventual improved adjustment. Two other cases (Nos. 6 and 17) were readmitted 5 months and 13 months respectively after they had broken off treatment. Case No. 17 is demonstrated in figure 1 as are

Table 1.—*Diagnostic and Treatment Summary*

No.	Name	Sex	Age	Diagnosis	Prev. Adm.	Prev. EST	Pre-ventive EST (mo.)	EST No.	Adm. Dur/After Preventive EST	Status January 1961
1	C. A.	F	24	Schiz.-Cat.	1	0	26	40	0	Social Recovery
2	O. A.	F	32	Schiz.-Und.	1	0	42	84	1	Improved
3	R. A.	M	30	Schiz.-Und.	1	0	48	87	0	Improved
4	M. B.	F	34	Schiz.-Aff.	0	0	48	118	0	Improved
5	G. B.	M	27	Schiz.-Und.	3	0	30	100	0	Improved
6	Y. B.	M	20	Schiz.-Par.	1	3	26	75	1	In Hospital
7	M. B.	F	29	Schiz.-Par.	2	1	22	53	0	Improved
8	M. C.	F	36	Schiz.-Par.	1	0	68	114	0	Improved
9	A. C.	M	35	Schiz.-Cat.	2	1	36	93	0	Improved
10	F. D.	F	36	Schiz.-Par.	2	0	42	101	0	Improved
11	R. E.	F	36	Schiz.-Cat.	2	1	58	78	0	Social Recovery
12	A. F.	F	32	Schiz.-Und.	1	0	24	38	0	Social Recovery
13	E. F.	M	36	Schiz.-Par.	1	1	26	23	0	Improved
14	H. G.	F	61	Schiz.-Par.	1	0	44	48	0	Improved
15	H. J.	M	47	Schiz.-Par.	1	0	24	60	0	Improved
16	W. L.	M	48	Schiz.-Par.	4	0	68	65	0	Social Recovery
17	M. M.	F	42	Schiz.-Par.	8	?	32	150	1	Social Recovery
18	V. M.	F	42	Schiz.-Par.	1	0	44	83	0	Social Recovery
19	I. M.	F	50	Schiz.-Aff.	2	1	37	68	0	Social Recovery
20	M. M.	F	23	Schiz. Simple	2	0	26	49	0	Improved
21	C. O.	F	33	Schiz.-Par.	1	0	24	48	0	Complete Re-covery
22	J. P.	F	27	Schiz.-Par.	1	0	25	52	0	Social Recovery
23	O. P.	F	25	Schiz.-Und.	1	0	24	53	0	Improved
24	T. R.	F	42	Schiz.-Par.	2	3	29	64	0	Improved
25	J. S.	M	54	Schiz.-Und.	3	3	42	51	0	Social Recovery
26	A. S.	F	29	Schiz.-Und.	1	0	24	30	0	Improved
27	R. T.	M	30	Par. State	1	0	24	44	0	Improved
28	M. T.	F	42	Schiz.-Par.	2	2	26	40	0	Improved
29	A. W.	F	23	Schiz.-Par.	1	0	25	25	0	Improved
30	V. W.	F	54	Schiz.-Par.	1	0	42	63	0	Improved

several other representative cases. The improvement grade distribution of cases at that time is seen in table 2 and, for a comparison of readmission rates, see table 3.

Of the cases shown, four patients are still on regular maintenance electroshock therapy and four out of the thirty failed to continue to keep their appointments for follow-up treatment.

We were interested to determine whether the duration of treatment or the intensity of treatment bore any relation to the diagnostic category. A comparison between the paranoid sub-group and all other categories is presented in table 4.

In treating patients with a high number of electroshocks over an extended period of time, the question of organic defect and/or deterioration presents itself. We suggest that it may be possible to evaluate this factor by employing psychological tests. As a preliminary trial, we have re-tested several of our cases after a period of follow-up ECT treatment and we have tabulated these findings in table 5. The material presented does not indicate that long-term ECT is associated with organic defect and/or deterioration to any demonstrable degree.

Discussion

Our treatment technique is discussed under three headings: 1) efficiency, 2) mechanism, 3) extension of knowledge.

Table 2.—*Distribution of Improvement*

Improvement Grade	No. Cases
Improved	19
Social Recovery	9
Complete Recovery	1
In Hospital	1
Total	30

Table 3.—*Comparison of Readmission Rates*

	Control Group (N = 314) 1956–1959	Preventive EST Group (N = 30) 1956–1960
Readmission Rates		
Schizophrenics, A.M.I.	31.5%	10%

Efficiency

With regard to efficiency, the first question to ask is, "Does it accomplish what is intended?" The answer is quite definitely "Yes." It has resulted in a considerable increase in efficiency over the method of multiple shock therapy as introduced by Bini and Milligan and modified by subsequent workers. It represents, moreover, a noteworthy advance over insulin treatment and over the chemical therapies. Above all things, the readmission rate is greatly reduced. At the same time, we must point to the fact that it calls for a most considerable expenditure in time and effort and it requires the development of a team of workers who are highly skilled.

With regard to the detrimental side effects, the most serious is of course the period of complete amnesia. We are working upon methods to reduce this and it is proper to say that while it is a source of trouble and annoyance to the patient during the first six months or so following discharge, a scaffolding of subsequent memories consisting in what he has been told of events which happened during the amnestic period gradually takes form.

Mechanism

With reference to the mechanism, our findings indicate that this method is most effective where amnesia is well established and, in particular, where there is a differential amnesia for the total period of illness. However, quite clearly, we have all seen many cases of schizophrenia where good results have been obtained and where there is full or considerable recollection by the individual of his previous schizophrenic behaviour. Hence we must say that while amnesia seems to be an important if not essential part of the recovery process as achieved by this method of treatment, it is by no means the only way in which recovery takes place.

Turning to the mechanism of the amnesia itself, we note first the existence of a complete and of a differential amnesia. As a working hypothesis to explain the curious phenomenon of the differential amnesia, we have considered that while recency undoubtedly plays an important part in the determination of the extent of complete amnesia, another hypothesis must be advanced to explain the differential amnesia.

In an earlier communication (Cameron[17]), we have suggested that recollections that are not congruous with the ongoing conceptual framework tend

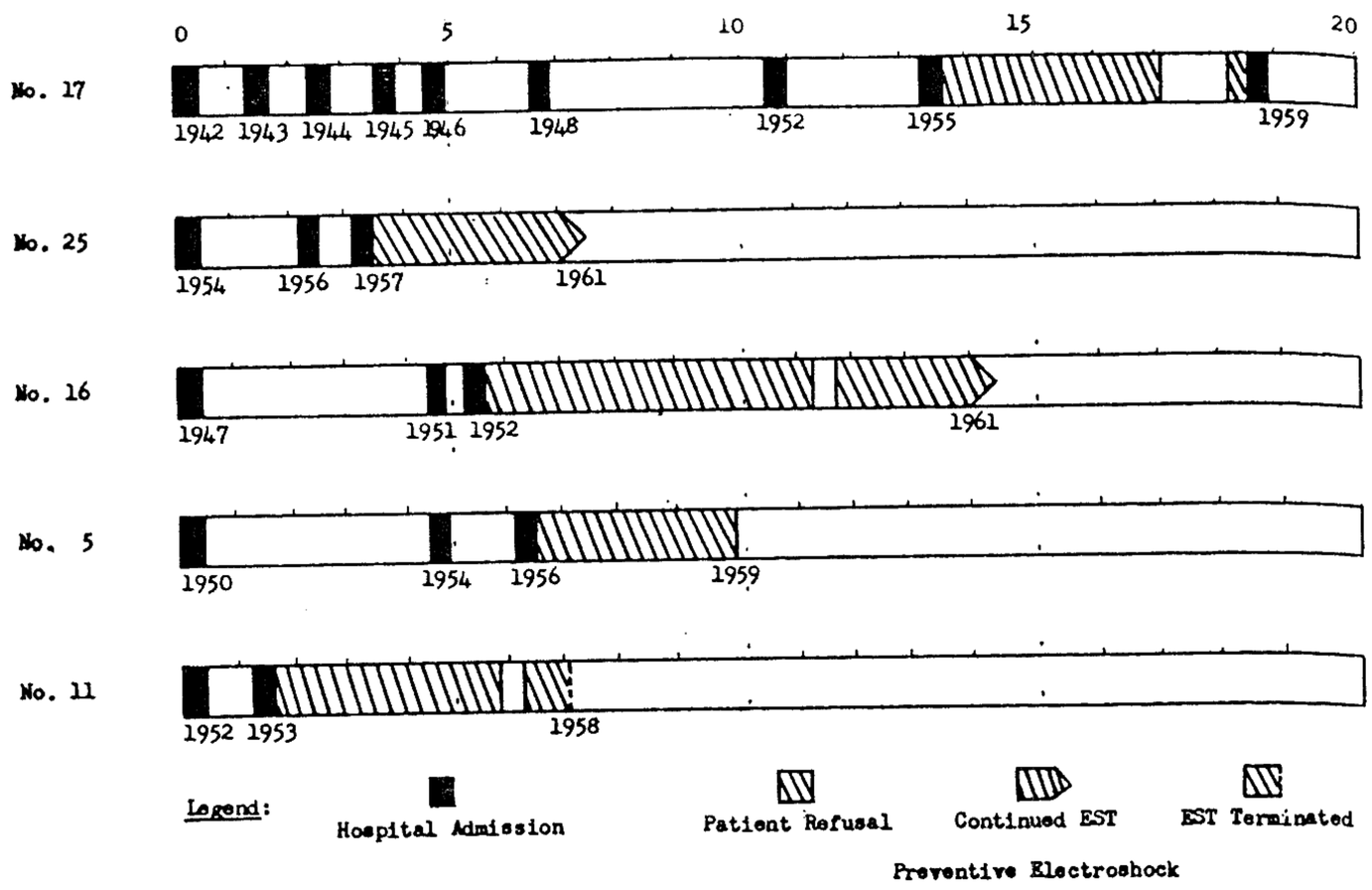

Figure 1

to be inhibited. This is in accord with what Bartlett[18] reported concerning his well known experiments in which he had Cambridge undergraduates memorize American indian legends. On being questioned months later, the students were able to produce the legends, but all those concepts which were incongruous with their English conceptual framework were omitted or reinterpreted in terms of how they ordinarily thought. A simple example is that the Great Spirit of the Indians was reproduced as the Holy Ghost.

Our hypothesis is also in accord with earlier experiments by those concerned with the Gestalt theory which showed that recollections are reorganized to bring them into conformity with the image that the individual maintains as appropriate. Schachtel,[19] in attempting to account for the child's loss of recollections of his earlier experience, postulated that the thinking of childhood is so different in its conceptual framework that it cannot be reproduced in terms of adult concepts. This is essentially what we suggest, namely, that schizophrenic thinking is not congruous with the new ongoing normal thinking which, in any case, tends to be preponderant in view of the fact that in all save the rarest cases, normal thinking has dominated the behavior of the individual for far longer periods than has schizophrenic thinking.

We have found that differential amnesia also appears, however, in patients who are not suffering from schizophrenia and who have been treated by this method. For instance, in patients with drug addiction, the whole period of drug addiction may be forgotten, whereas other concurrent events not connected with the drug addiction may be remembered. And the same is true of some extremely resistant psychoneurotic patients whom we have treated by a similar method.

Hence, to the hypothesis that non-congruent memories are not readily recalled, we probably have to add a second hypothesis to the effect that unpleasant matters are not so easily recalled.

Finally, under mechanisms, we should turn our attention to the curious phe-

Table 4.—*Comparison of Diagnostic Categories*

	Sex Distrib. M	Sex Distrib. F	Mean Age	Mean Duration Rx (mo.)	Mean EST No.
Total Sample (30)	9	21	36.1	35.2	66.9
Paranoid Sub-Type (16)	4	12	39.2	35.4	67.1
All Other Sub-Types (14)	5	9	32.9	34.9	66.6

Table 5.—*Summary of Psychological Findings*

Case No.	Time Interval Between Tests	EST Number Admin. Between Tests	Psych. Test Summary (Re-test)
28	26 mo.	40	"Little change from 1954. Notable poverty of recoverability from Schiz. preoccupations."
20	26 mo.	45	"Fairly good surface adjustment, same underlying problems, hysterical overlay" (Tat, Ros.).
16	36 mo.	50	"Organic signs present but no marked drop in functioning in relation to previous responses" (B. G., F. D., Ros.).
12	24 mo.	38	"No marked anxiety—little indication of an underlying Schiz. in present test" (Ros.).

nomenon of the value of the prolonged follow-up. One shock a month has no discernible effect upon memory, but we have frequently noted that after the shock patients will report that they feel better, that they are more relaxed, that they feel less moody, and their relatives will confirm this. To this observation we may add the fact that the periodic epileptic patient not infrequently says that he feels better after his seizure and sometimes wishes that one would come on so that he might feel himself again. Hence we may offer, at least as a tentative hypothesis, the idea that in some way monthly electroshock treatment relieves the tension and frustration of the patient who is still making an effort to adjust to his residual schizophrenic difficulties. How this fits in with the progressive disappearance of his schizophrenic behavior is entirely unclear.

Extension of knowledge

These procedures have resulted in a certain extension of our knowledge in three areas:

1. *Relapses.*—As relapses occur during the period in hospital or during the two-year follow-up, we have uniformly treated these by intensifying electroshock therapy and have discovered that relapses can quite easily be set aside in most instances by four or five electroshocks given over two or three days. If they occur during follow-up treatment, the patient does not need to be readmitted. We have also come to recognize that emotional disturbance of any kind seems to facilitate these breakdowns. Finally, we have advanced the hypothesis already reported[20] that most of these relapses are not so much reactivation of the schizophrenic illness as a breakdown in the organization of the individual.

Careful examination by psychological tests of schizophrenic patients who have been under treatment for a prolonged period of time and who have not shown any schizophrenic symptomatology for six months or a year will often reveal quite astonishing evidence of schizophrenic disorder. The clinician is then faced with the fact that the procedures reveal little or no evidence of schizophrenia, whereas the tests show schizophrenia to be present in almost as great a degree as previously. In order to reconcile these apparently incompatible findings, we have come to consider the possibility that the assets of the individual's personality are in surplus just as is the case with the liver or kidneys. We all know these organs to be more extensive in amount than actually required for everyday living so that an individual can get along without part of his liver or without one of his kidneys. His kidney function, for example, can be reorganized on the basis of one kidney. We have come to feel that the same may be true of his personality—that parts may be damaged and put out of circulation, as it were, and the surplus capacities which he has can then take over. However, this new organization can be disturbed and, in particular, can be disturbed by emotional stress.

This theory is in line with something which is a matter of common observation, namely, that individuals with hearing deficits, for which they have compensated, will show an apparent increase in hearing loss when emotionally disturbed, and the hearing loss then reduces again to its original level when the emotional disturbance has passed. This is also true of visual defects and others as well. Hence we are inclined to think that most of these relapses are actually a breakdown in organization and are not due to a lighting up of the schizophrenia. And it is for this reason that most of the relapses are quite easily stopped when sufficient electroshock is given to break up the emotional disturbance.

2. Another matter which this method of treatment brings into the foreground is the curious phenomenon of the *difference in duration between anterograde and posterograde amnesia.* Anterograde amnesia usually extends for about ten days to two weeks after the rate of electroshock has been diminished and the patients begin to record clearly the events of the day once more. Posterograde amnesia, however, may extend from six months to three or four years back from this time.

In trying to understand this phenomenon, it would appear that the essential element to grasp is the obvious fact that the acute and intense brain response to electroshock therapy which is the cause of the amnesia can only act upon events which are occurring contemporaneously. Therefore the first conclusion that one must reach is that this acute and intense brain reaction continues for ten days to two weeks after the rate of electroshock therapy is reduced and the patient once more begins to record, as is shown by his day-to-day discussions.

It is interesting to note that the more intense the brain reaction, the longer the period of posterograde amnesia. However, there is a limit, and we very rarely see posterograde amnesia for longer than three to four years duration; but with a relatively limited brain reaction to the electroshock, the amnesia may extend only for a period of six months. The question now comes up in regard to what process is going on contemporaneously which could be inter-

fered with by this acute brain reaction which lasts throughout the period of intensive electroshock therapy and for a week or ten days beyond it?

The most obvious process to propose is that of incorporation. It is certainly not the matter of primary registration, since one can readily test the fact that during the greater part of the intensive electroshock therapy, the patient is well able to register at least for brief periods. He will remember what you say to him and repeat it back a few minutes later. For quite a long time he will remember people until he enters the third stage of depatterning.

And it is almost impossible to think that this posterograde amnesia could be due to a defect in the retrieval mechanism since one would have to postulate that this would operate with respect to all recollections and not simply those within a limited period of time.

What incorporation consists in is still very much unknown. It is suggested that it probably does consist in the formation of cross connections between memories through rumination and through repeated activation. We are aware of the fact that the vastly greater number of things that we register seem to be lost forever and it is only those things which are emotionally endowed or are repeatedly used which tend to be remembered. Hence it may be that the events of the last several years are not sufficiently worked through to be permanently incorporated and hence are vulnerable to the acute and intense brain disturbance.

Another suggestion which is put forward with considerable reserve is that it may be that events of a particular kind are laid down in a particular part of the brain and then with the passage of time and on the basis of multiple inter-relations with other events brought about by rumination and reflection, close connections may be established in a variety of areas of the brain.

If we then go on to postulate what seems to be the case from animal experimentation that electroshock affects in a cone-shaped manner the area which immediately underlies the electrodes, then this may serve to explain why the more recently laid down memories are most vulnerable.

3. Finally, from our experience with this method, there arises an interesting suggestion with respect to the working model that we have of schizophrenia. Whether we say so explicitly or not, most of us have a working model of schizophrenia which resembles that of cancer; namely, that it is a progressive disease mostly ending up in disaster, but with periods of progression and periods of relative inactivity and, like cancer, with a few exceptional cases in which the disease arrests spontaneously. However, in view of what has been suggested about relapses, and in view of the curious phenomenon to which reference is being made of the appearance of clinical health contemporaneously with psychological findings indicating the presence of schizophrenic damage, one wonders whether for most kinds of schizophrenia, at least, a better working model would not be one like poliomyelitis—a disease with a very acute phase followed by long-lasting sequelae which may become progressively worse if not treated. If this working model is correct, we can then see the value of depatterning as a means of bringing the process to an end and also breaking up the sequelae. It would also underscore something which has been well emphasized for a long time, namely, the great urgency of early recognition of this serious illness.

Summary

We have described a method of treatment of schizophrenia especially adapted to short-term hospitalization in the psychiatric divisions of general hospitals. This method of treatment consists of three components:

a) the administration of intensive electroshock treatment;

b) concurrent administration of continuous sleep;

c) a two-year post-discharge follow-up phase of treatment.

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