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DRUGS TESTED BY C.I.A. ON MENTAL PATIENTS

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The C.I.A. used both the society and the Geschikter Foundation for Medical Research, based here, to supply money to private universities and medical research facilities.

By NICHOLAS M. HORROCK
Special to The New York Times

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The disclosure became one more element in a growing picture of the C.I.A.'s 25-year attempt to learn how to control the human mind.

A survey of 2,000 C.I.A. documents and interviews with scientists, medical researchers and intelligence officers has shown in detail how the agency used private medical research foundations as conduits for a \$25 million program designed to develop drugs or techniques that could control human behavior.

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TREATMENT OF THE CHRONIC PARANOID SCHIZOPHRENIC PATIENT*

D. EVEN CAMERON, M.D. and
S. K. PANDE, M.D., Montreal

THE TREATMENT of chronic paranoid schizophrenia has long been considered one of the most difficult tasks for psychiatrists.

We are presenting a method of treatment which we have found to be more successful than any hitherto reported.

This method consists essentially in the use of prolonged sleep, lasting 30 to 60 days, combined with intensive electroshock therapy. This period of treatment is then followed by a stage of rehabilitation and follow-up therapy on an ambulant basis. This latter is carried on over a two-year period.

OBSERVATIONAL BASIS FOR TREATMENT

1. During the last 20 years we have found frequent occasion to verify Sakel's¹ original observation that a prolonged and severe so-called irreversible coma might have favourable effects in schizophrenic patients who had hitherto failed to respond to any other form of treatment. We have considered that the frequently severe although transient disturbance of brain function is an important factor in the favourable results. This disturbance is shown in terms of severe recent memory deficit, disorientation and impairment of judgment. Similar changes can readily be produced by a combination of sleep and electroshock treatment.

2. In recent years since we re-introduced the use of prolonged sleep with the assistance of chlorpromazine (Largactil)² we observed that schizophrenic patients responded well to this form of treatment. Our first attempts to use this treatment were with very excited schizophrenic patients who could not otherwise be managed in an open hospital.

3. Our third observation was that where coma insulin and electroshock were combined in the treatment of particularly difficult schizophrenic patients we got good results.

Thus it was decided to explore the possibility of using prolonged sleep combined with electroshock therapy; within a few months it became apparent that the best results were obtained where there was an extensive breakup of the behavioural patterns consequent upon a transient disturbance of brain function.

The observational basis for the two-year ambulant follow-up was derived from our observations of the use of a five-year follow-up period in patients suffering from recurrent manic depressive attacks as originally suggested by Geoghegan and Stevenson³

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and as carried out by ourselves for the last ten years. The second basis has been our observations of the disorganizing effects of emotional stress and the restoration of function once the disorganizing stress has been removed.⁴

CASE MATERIAL

The patient group in which the effects of this form of therapy was studied consisted of 26 paranoid schizophrenic patients. Of these, 16 had shown symptoms for more than two years. The remaining 10 had shown symptoms for less than two years and were diagnosed as suffering from acute paranoid schizophrenic breakdown. They were included for the purposes of comparison. Of the 26 patients, five were men and 21 were women. The age spread was from 17 to 54.

All patients were examined extensively before treatment. Clinical, biochemical, psychological and electrophysiological examinations were carried out. In addition the family structure and the general socio-economic background from which the patient came was investigated through the social service department. The diagnosis was made on the basis of the accumulated data and as established in joint discussions of the whole clinical team.

After the conclusion of treatment, routine examinations described above were repeated, the clinical team again assessed the degree of recovery which had been achieved, and at the same time plans were made for follow-up and rehabilitation work with each patient.

PROCEDURE

The sleep technique employed is that reported by Azima.⁵ The objective of this technique is to produce a prolonged sleeping state resembling the normal as closely as possible. The patient sleeps an average of 20 to 22 hours a day and is awakened three times a day for meals and toilet. The drugs used are chlorpromazine (Largactil) and a combination of three barbiturates: secobarbital (Seconal) is chosen as a short-acting barbiturate, pentobarbital (Nembutal) as one of intermediate duration and phenobarbital or barbital (Veronal) as a long-acting drug. Solid food is given during the first week and from then on semi-solid foods, the minimum caloric intake is 1500 per day and the minimum amount of fluid 2000 c.c. The patients are given extra vitamin B and C parenterally. Posturing of the patients by the nurses is carried out every two hours and carbogen is administered if the respirations become shallow. Five units of globin-zinc insulin are given half an hour before each meal. The sleep is induced gradually and is also terminated gradually. At the end of 10 days, at which time sleep has been established, electroshock is commenced.

The objective of the electroshock therapy is to produce in combination with sleep a condition of confusion which we term complete depatterning. For purposes of identification we recognize three

stages of depatterning. The first stage is when the patient begins to show serious memory deficits but still has no difficulty in orienting himself with respect to the fact that he is in hospital, that he is there because he is sick, and is still able to recognize at least some of the doctors and nurses and his own family when they visit him.

The second stage is when the patient has lost his spatial and temporal image but is very conscious of the fact and makes repeated attempts to find re-orienting points. He asks, "Where am I?", "How did I get here?" and "What is this place?" In the third stage the feeling that he ought to have a spatial-temporal image is also lost and the patient is now quite smiling and unconcerned. He answers simple questions but does not recognize anyone, has no idea where he is and is not troubled by that fact. He usually shows urinary incontinence and has difficulty in performing quite simple motor skills. During the first stage of depatterning his original delusional ideas are usually still present. During the second stage they are becoming broken up and in the third stage are completely absent, as are all other evidences of his schizophrenic behaviour. To achieve this, electroshock therapy frequently has to be carried out once daily and sometimes in the form of a Page-Russell² treatment, namely, the giving of four or five shocks within a period of two or three minutes. The rate of administration of electroshock therapy is set so that complete depatterning is achieved somewhere between the 30th and the 60th day of sleep and after about 30 electroshock treatments.

Once complete depatterning is obtained, it is maintained for five to seven days. The amount of sleep medication is gradually reduced (too rapid reduction of barbiturates may produce convulsions) and the rate of administration of electroshock is reduced to three a week, the Offner apparatus being used.

After about four or five days the patient is able to get up and the phase of rehabilitation is then initiated. Care is taken as far as possible to assign one person to looking after the patient so that he can the more rapidly begin to orient himself, at least with respect to one person. He joins the other patients at meals and as soon as his memory will permit he is referred to the occupational therapy department.

During the period of recovery continuous observations are carried out with respect to any evidence of a recurrence of his schizophrenic behaviour. Should any sign of his previous delusional thinking appear, electroshock is again intensified, the patient being given daily treatments for a few days until the delusional thinking is once more broken up. Ordinarily such relapses do not occur, but in some patients they may recur repeatedly during the period of rehabilitation and on each occasion further electroshock is given until they are broken up again.

Care should be taken to distinguish actual schizophrenic relapses from forms of behavioural disturbance which we have noted in about 25% of our cases at the point of transition from the second to the first stage of depatterning. At this phase in the recovery of the patient—namely, when his attempts to re-establish his space-time image are becoming satisfactory but while there are still severe memory deficits—there may appear states of excitement or depression and states of actual delusional formation, this being in contrast with the placidity and the freedom from any delusional thinking which one finds in the third stage of depatterning. Our experience has shown that this transition period of disturbance of behaviour is best treated conservatively. The patient is usually put on chlorpromazine or reserpine (Serpasil) in moderate doses and is given a great deal of support and reassurance from the start. Such periods of disturbance ordinarily last less than a week and gradually subside as the patient emerges into the first stage of depatterning.

The period of rehabilitation in hospital ordinarily lasts about a month, at the end of which time the patient can be discharged and put on an ambulant follow-up basis. During this period, moreover, through our social service department we plan the patient's rehabilitation on the outside. Preparations are made for the last phase of stabilization and prevention. This generally lasts two years and requires the patient to come to the hospital for one electroshock treatment a week for the first month after discharge and one treatment a month for the next two years. We have repeatedly found that the patients do much better if they remain in the Montreal area and attend the Institute than if they return after discharge to their home city and place themselves under the care of one of our colleagues, being treated in a manner precisely the same as they would be if they had been in Montreal. This interesting observation demonstrates the great significance to the patient of the therapeutic milieu in which he recovered and the need for him to remain in this milieu during the period of stabilization.

The form of psychotherapy which we carry out with these schizophrenic patients during the period of rehabilitation in the hospital and during the two-year follow-up period when they are ambulant is limited to meeting the needs of the patients for support and acceptance and for guidance in their attempts to re-establish themselves in the community and in a job. We do not, save in the rare instances where there are marked neurotic tendencies, undertake any form of depth psychotherapy. Specifically we do not attempt to uncover unconscious motivations. Our efforts are directed rather to building a strong personal relationship between the patient and the therapist. The therapist takes every opportunity to strengthen this relationship, particularly during the period immediately after prolonged sleep when the patient is

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attempting to re-orient himself and is gradually recovering from the period of helplessness engendered by his prolonged sleep and electroshock therapy. This relationship constitutes a fixed point of strength and support for a patient and is continued throughout the whole two years, care being exercised to see that, as far as possible, the same therapist is available to the patient. It is important to underscore the fact that the therapist brings to his work not only knowledge and skill but also attitudes. We are increasingly impressed with the fact that the attitudes of the therapist are crucial for the outcome. In dealing with the long-term schizophrenic patient the therapist must have great persistence. He cannot afford to give up easily. He must continually focus his attention and that of his staff and the patient on the gains which have been made, even though for a time they should be small.

During this period of stabilization and prevention outside the hospital, the patient ordinarily works. Some of our patients have married and have had children. Some have shown relapses. Where evidence of relapse is reported to us, the patient is treated again within a few hours or at the most within two days by intensive electroshock therapy on an ambulant basis. We have an arrangement with a nursing organization in the city by which all our ambulant schizophrenic patients are visited once a week, and their relatives or ladies are instructed to get in immediate touch with this nursing organization if there is any evidence of a relapse. This may take the form of moodiness, of sleeplessness, of lack of interest, of impairment of appetite, or of the appearance of thinking difficulties or beginning delusional ideas. We have found that where this happens we are always able to terminate the relapse within two or three days and often within 24 hours by intensive electroshock therapy. In the last two years we have only rarely had to readmit a patient.

RESULTS

It is proposed to report the results of the two groups of paranoid schizophrenic patients separately, namely, those patients having symptoms of more than two years' duration and those patients having symptoms of less than two years' duration. With regard to the first group, which is comprised of 16 patients, the initial results were favourable in that all patients could be discharged home save for one patient who left against advice and has been readmitted for further treatment.

The follow-up results of those discharged were good except in five patients, two of whom refused follow-up care, developing paranoid reactions of such fixity that we could not persuade them to continue. They were nonetheless able to remain outside the hospital. Two others had to be readmitted for further treatment and were later discharged again and have done well. One other had

to be readmitted and as indicated above is still under treatment. A number of others have had minor relapses but could be managed on an ambulant basis. Out of all the patients now discharged, paranoid trends were apparent only in the two patients mentioned above as having refused further treatment and in the one patient who had treatment in hospital subsequent to readmission. It should, however, be pointed out at the same time that although most of them are able to lead active lives as housewives and also in other occupations on the outside, some evidence of schizophrenic damage can be seen in the majority of these chronic patients. This takes the form of some blunting of affect, some loss of drive relative to that shown in earlier years.

TABLE I.—RESULTS IN THE TREATMENT OF PARANOID SCHIZOPHRENIC PATIENTS WITH SYMPTOMS OF OVER TWO YEARS' DURATION

Number of patients	16
Number discharged	16
Number readmitted	3
Number re-discharged	2
Number still in hospital	1
Number refusing follow-up treatment but still ambulant	2

Those in the group with symptoms of less than two years' duration have all been discharged and the results are also good, indeed more favourable than in those with symptoms of over two years' duration. None of them have had to be readmitted. Occasional relapses have been seen but these have been managed quite successfully on an ambulant basis. The evidence of lasting schizophrenic damage in the form of blunting of affect, or reduction in drive and initiative, is rarely apparent in this group of short-term paranoid cases.

TABLE II.—RESULTS IN THE TREATMENT OF PARANOID SCHIZOPHRENIC PATIENTS WITH SYMPTOMS OF LESS THAN TWO YEARS' DURATION

Number of patients	10
Number discharged	10
Number readmitted	0

DISCUSSION

Earlier in this paper we presented the observational basis for the development of this technique. We now wish to present the theoretic basis. Our working theories or premises are three in number:

1. That schizophrenia represents a biological process which can be arrested but which tends, particularly when of any intensity or duration, to leave behind permanent damage.
2. That recovery consists primarily in: (a) halting the process, and (b) a reorganization of the individual which results in a short-circuiting or inactivation of the damaged area but which does not result in an abolition of the established damage.
3. That a considerable proportion of schizophrenic relapses, though certainly not all, constitute not a reactivation of the process but a breakdown

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The follow-up results of those discharged were good except in five patients, two of whom refused follow-up care, developing paranoid reactions of such fixity that we could not persuade them to continue. They were nonetheless able to remain outside the hospital. Two others had to be readmitted for further treatment and were later discharged again and have done well. One other had

to be readmitted and as indicated above is still under treatment. A number of others have had minor relapses but could be managed on an ambulant basis. Out of all the patients now discharged, paranoid trends were apparent only in the two patients mentioned above as having refused further treatment and in the one patient who had treatment in hospital subsequent to readmission. It should, however, be pointed out at the same time that although most of them are able to lead active lives as housewives and also in other occupations on the outside, some evidence of schizophrenic damage can be seen in the majority of these chronic patients. This takes the form of some blunting of affect, some loss of drive relative to that shown in earlier years.

TABLE I.—RESULTS IN THE TREATMENT OF PARANOID SCHIZOPHRENIC PATIENTS WITH SYMPTOMS OF OVER TWO YEARS' DURATION

Number of patients	16
Number discharged	16
Number readmitted	3
Number re-discharged	2
Number still in hospital	1
Number refusing follow-up treatment but still ambulant	2

Those in the group with symptoms of less than two years' duration have all been discharged and the results are also good, indeed more favourable than in those with symptoms of over two years' duration. None of them have had to be readmitted. Occasional relapses have been seen but these have been managed quite successfully on an ambulant basis. The evidence of lasting schizophrenic damage in the form of blunting of affect, or reduction in drive and initiative, is rarely apparent in this group of short-term paranoid cases.

TABLE II.—RESULTS IN THE TREATMENT OF PARANOID SCHIZOPHRENIC PATIENTS WITH SYMPTOMS OF LESS THAN TWO YEARS' DURATION

Number of patients	10
Number discharged	10
Number readmitted	0

DISCUSSION

Earlier in this paper we presented the observational basis for the development of this technique. We now wish to present the theoretic basis. Our working theories or premises are three in number:

1. That schizophrenia represents a biological process which can be arrested but which tends, particularly when of any intensity or duration, to leave behind permanent damage.
2. That recovery consists primarily in: (a) halting the process, and (b) a reorganization of the individual which results in a short-circuiting or inactivation of the damaged area but which does not result in an abolition of the established damage.
3. That a considerable proportion of schizophrenic relapses, though certainly not all, constitute not a reactivation of the process but a breakdown

The damage is not from this treatment but from years of other schizophrenic damage

Interpretation (Cameron)

of the reorganization of the individual, usually under emotional stress.

Turning now to deal with the premises in more detail we may say that we have found chemical and physical therapies to be the only satisfactory means of halting the schizophrenic process. The objective of our initial intensive physical and chemical therapy is two-fold, first to bring the process to an end and second to break up completely, through the procedure of depatterning already described, the ongoing structure of the behavioural patterns of the individual. This results in breaking up at the same time the pathological schizophrenic thinking and general symptomatology.

Turning to the second premise, namely, that recovery requires reorganization, we wish again to emphasize the need to break up old pathological patterns before the new ones can be re-established. We may also indicate the value of psychotherapy at this point. The psychotherapy is, as indicated, supportive and also directive in so far as the pressures of the social setting are brought to bear on the patient in an attempt to get him to establish acceptable patterns of behaviour.

Numerous reports in the literature indicate that where a patient has made a good clinical recovery psychological tests may well show the same amount of schizophrenic damage as before. We see this as supporting the premise which we have put forward, namely, that recovery consists not in repair of damaged aspects of the individual's personality but in a rearrangement. The damaged parts are, as it were, bypassed or omitted from the key areas of the patient's new organization. We are further of the opinion that every individual possesses reserve capacities—alternative ways of managing reality and latent assets—which can be called upon and woven into the new organization of the self. This means, of course, that the damaged areas which have suffered schizophrenic damage are still present within the individual and that there always remains the possibility of a breakdown in the new organization and a return to the old but still existing patterns of schizophrenic behaviour.

This takes us to the third premise, namely, that under the impact particularly of emotional stress the new organization may break down, disorganization may occur and the previous schizophrenic patterning may reappear. It is to protect the patient against the possibility that the earliest evidences of damage due to stress might not be noticed and hence that the patient would begin to pass into disorganization that our plan of treatment requires weekly visits by the nursing organization and monthly interviews with the therapist, together with a monthly electroshock treatment over the two-year period. When relapses do, nonetheless, occur they are treated on an ambulant basis; the patient is seen if necessary daily for three or four days and receives an electroshock treatment daily on an ambulant basis. Under these circumstances

we have almost invariably succeeded in bringing the relapse to an end within a few days.

SUMMARY

The results of combined prolonged sleep and intensive electroshock treatment with subsequent rehabilitation and follow-up ambulant therapy in chronic paranoid schizophrenic patients have been presented.

The group of patients consists of 16 chronic paranoid patients having had symptoms of two or more years' duration contrasted with a group of 10 paranoid schizophrenic patients with symptoms of less than two years' duration.

Three of the long-term cases have been readmitted and two of these have been subsequently discharged. One is still in hospital undergoing re-treatment. The longest period of follow-up subsequent to discharge is two years.

Two of the long-term patients have broken treatment and have again showed paranoid symptomatology but remain outside the hospital.

Minor relapses have occurred in several of the patients, in both the long-term and short-term cases, but these have been managed successfully on an ambulant basis. None of the short-term cases has had to be re-admitted.

In the long-term cases some residual evidence of schizophrenia can be seen. This takes the form of reduction in drive and blunting of affect. In only three of the long-term cases (two who have broken therapy and the one who has been readmitted) and in none of the short-term cases is there any evidence of paranoid thinking.

Our primary purpose in this presentation is to show that our therapeutic procedures have advanced to the point where it is now possible for schizophrenic patients, even when suffering from the most severe forms of the illness, to be passed through a phase of intensive treatment followed by long-term rehabilitation measures and thereby be enabled to live, and in many instances work, outside the hospital.

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RÉSUMÉ

Les auteurs de cet article ont récemment fait l'essai d'un traitement combiné de sommeil prolongé et de sismothérapie intensive chez des schizophrènes paranoïdes chroniques, réhabilités par la suite, et suivis à la clinique externe. La présente série comprend un groupe de 16 malades dont les symptômes remontaient à au moins deux ans et que l'on a comparé à un autre groupe de dix malades dont les symptômes étaient d'origine plus récente. Trois malades du premier groupe durent être hospitalisés de nouveau, mais deux d'entre eux ont depuis reçu leur congé. Le troisième est encore sous traitement. Ces malades furent vus pendant deux ans à différents intervalles après leur sortie de l'hôpital. Deux autres malades du premier groupe abandonnèrent le traitement et retombèrent sous l'effet de leur symptomatologie paranoïde, mais sans toutefois revenir à l'hôpital. Certaines recrudescences de peu d'importance furent notées chez plusieurs malades des deux groupes et toutes répondirent au traitement à la clinique externe. Aucun malade du deuxième groupe n'eut à être hospitalisé de nouveau. On peut encore déceler

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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 Bini¹ 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 Ancell³ 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

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—RO-4-1038—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 reinstated. 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 Alexander¹⁶ (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	81	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. R.	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	2	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 Recovery
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

Readmission Rates	Control Group (N = 314) 1956-1959	Preventive EST Group (N = 30) 1956-1960
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 amnesic 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 (Cameron¹⁷), we have suggested that recol-

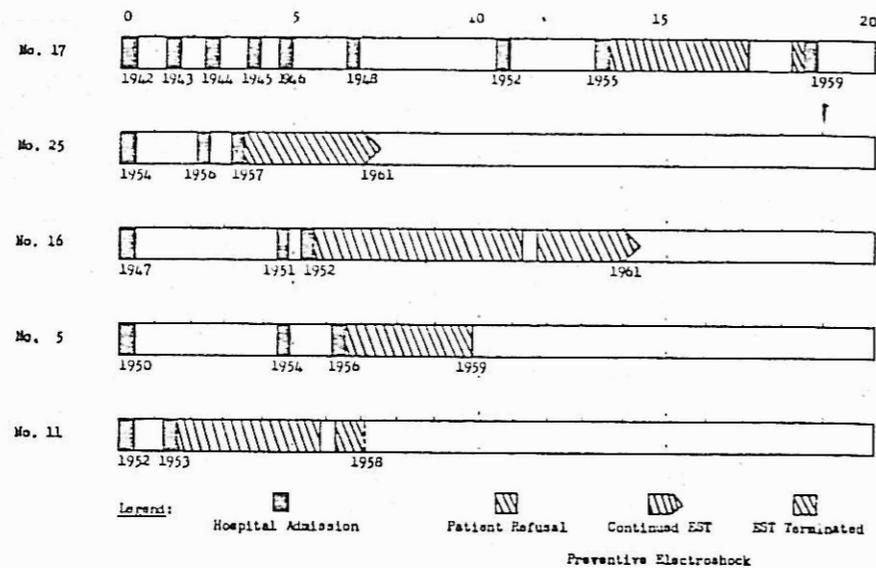


Figure 1

to be inhibited. This is in accord with what Bartlett¹⁴ 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,¹⁰ 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.

Table 4.—Comparison of Diagnostic Categories

	Sex Distrib.		Mean Age	Mean Duration Rx (mo.)	Mean EST No.
	M	F			
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 re-admitted. We have also come to recognize that emotional disturbance of any kind seems to facilitate these breakdowns. Finally, we have advanced the hypothesis already reported²⁰ that most of these relapses are not so much re-activation of the schizophrenic illness as a breakdown in the organization of

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

Glueck and his co-workers¹ 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.

Weil² 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-workers³ 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 Klaesi⁴ and modified by Azima⁵ and preventive shock therapy as described by Geohagan and Stevenson.⁶ 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 Geohagan 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-workers¹⁰ referred to certain of their organically disorganized patients as being unable to swallow but able to suck fluid from a feeding bottle. Glueck¹¹ 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" (Cameron¹³).

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 Largaetil 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

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.

DRUGS TESTED BY C.I.A. ON MENTAL PATIENTS

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documents, however, have been heavily edited and do not contain the names of people involved in the medical or drug research or the institutions at which it was performed.

Adm. Stansfield Turner, the Director of Central Intelligence, will appear before a joint meeting of the Senate Select Committee on Intelligence and the Senate Health subcommittee tomorrow to give information about the agency's behavior control research.

He is expected to disclose that the C.I.A. paid for a knockout drug to be tested on terminal cancer patients and to report on an "improper" payment for research.

The Times obtained a 1959 financial report of the Society for the Investigation of Human Ecology Inc., which indicates that the society paid Dr. D. Ewen Cameron \$18,405 in 1958 to conduct studies that included testing three highly potent drugs on the patients of the Allan Memorial Institute of Psychiatry at McGill University in Montreal.

Drugs That Were Used

The drugs were thiorazine, LSD and sernyl. Thiorazine is still marketed as a powerful tranquilizer, but sernyl has been withdrawn from the market for human consumption and is used only as an immobilizing agent for primates.

The society was set up in 1955, according to a former director, to provide a vehicle for the C.I.A. to finance a study on brainwashing. During the next 10 years it supported a wide range of medical research programs and psychological studies around the United States and in Canada.

One former official, James L. Monroe, said in an interview that only about 25 to 30 percent of the society's \$1 million to \$1.5 million annual budget came from the C.I.A. But Dr. Lawrence B. Hinkle, a former director, said that he believed most of the support had been from the agency.

The C.I.A. used both the society and the Geschikter Foundation for Medical Research, based here, to supply money to private universities and medical research facilities.

DRUGS TESTED BY C.I.A. ON MENTAL PATIENTS

Documents Disclose Use in '58 of
LSD in Canadian Hospital

By NICHOLAS M. HORROCK

Special to The New York Times

WASHINGTON, Aug. 2—Mental patients at a Canadian hospital were given powerful tranquilizers and LSD in a 1958 experiment supported by a foundation that secretly dispensed money for the Central Intelligence Agency, medical financing records disclosed today.

The disclosure became one more element in a growing picture of the C.I.A.'s 25-year attempt to learn how to control the human mind.

A survey of 2,000 C.I.A. documents and interviews with scientists, medical researchers and intelligence officers has shown in detail how the agency used private medical research foundations as conduits for a \$25 million program designed to develop drugs or techniques that could control human behavior.

5,000 More Documents

Under the Freedom of Information Act, The New York Times obtained today 415 additional pages of C.I.A. documents pertaining to drug experimentation and behavior control research. The new pool of information disclosed the following:

¶The C.I.A. arranged for 12 volunteers to be hypnotized in a hotel room to "demonstrate" to covert-operations experts how hypnosis could help espionage agents remember details that their conscious minds might have discarded.

¶In 1954, the C.I.A. hoped to use its "basic data" on "LSD and related materials" to devise operational techniques to disturb the memory, to discredit people through aberrant behavior, to alter sex patterns, to elicit information and to create emotional dependence.

¶The C.I.A. employed a magician to help explain what one former C.I.A. official said were matters "they couldn't explain."

The C.I.A. is expected to make public over the next two weeks some 5,000 newly discovered documents pertaining to its behavior control programs. The

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New York Times
Aug. 3, 1977

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TREATMENT OF THE CHRONIC PARANOID SCHIZOPHRENIC PATIENT*

D. EVEN CAMERON, M.D. and
S. K. PANDE, M.D., Montreal

THE TREATMENT of chronic paranoid schizophrenia has long been considered one of the most difficult tasks for psychiatrists.

We are presenting a method of treatment which we have found to be more successful than any hitherto reported.

This method consists essentially in the use of prolonged sleep, lasting 30 to 60 days, combined with intensive electroshock therapy. This period of treatment is then followed by a stage of rehabilitation and follow-up therapy on an ambulant basis. This latter is carried on over a two-year period.

OBSERVATIONAL BASIS FOR TREATMENT

1. During the last 20 years we have found frequent occasion to verify Sakel's¹ original observation that a prolonged and severe so-called irreversible coma might have favourable effects in schizophrenic patients who had hitherto failed to respond to any other form of treatment. We have considered that the frequently severe although transient disturbance of brain function is an important factor in the favourable results. This disturbance is shown in terms of severe recent memory deficit, disorientation and impairment of judgment. Similar changes can readily be produced by a combination of sleep and electroshock treatment.

2. In recent years since we re-introduced the use of prolonged sleep with the assistance of chlorpromazine (Largactil)² we observed that schizophrenic patients responded well to this form of treatment. Our first attempts to use this treatment were with very excited schizophrenic patients who could not otherwise be managed in an open hospital.

3. Our third observation was that where coma insulin and electroshock were combined in the treatment of particularly difficult schizophrenic patients we got good results.

Thus it was decided to explore the possibility of using prolonged sleep combined with electroshock therapy; within a few months it became apparent that the best results were obtained where there was an extensive breakup of the behavioural patterns consequent upon a transient disturbance of brain function.

The observational basis for the two-year ambulant follow-up was derived from our observations of the use of a five-year follow-up period in patients suffering from recurrent manic depressive attacks as originally suggested by Geoghegan and Stevenson³

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and as carried out by ourselves for the last ten years. The second basis has been our observations of the disorganizing effects of emotional stress and the restoration of function once the disorganizing stress has been removed.⁴

CASE MATERIAL

The patient group in which the effects of this form of therapy was studied consisted of 26 paranoid schizophrenic patients. Of these, 16 had shown symptoms for more than two years. The remaining 10 had shown symptoms for less than two years and were diagnosed as suffering from acute paranoid schizophrenic breakdown. They were included for the purposes of comparison. Of the 26 patients, five were men and 21 were women. The age spread was from 17 to 54.

All patients were examined extensively before treatment. Clinical, biochemical, psychological and electrophysiological examinations were carried out. In addition the family structure and the general socio-economic background from which the patient came was investigated through the social service department. The diagnosis was made on the basis of the accumulated data and as established in joint discussions of the whole clinical team.

After the conclusion of treatment, routine examinations described above were repeated, the clinical team again assessed the degree of recovery which had been achieved, and at the same time plans were made for follow-up and rehabilitation work with each patient.

PROCEDURE

The sleep technique employed is that reported by Azima.⁵ The objective of this technique is to produce a prolonged sleeping state resembling the normal as closely as possible. The patient sleeps an average of 20 to 22 hours a day and is wakened three times a day for meals and toilet. The drugs used are chlorpromazine (Largactil) and a combination of three barbiturates: secobarbital (Seconal) is chosen as a short-acting barbiturate, pentobarbital (Nembutal) as one of intermediate duration and phenobarbital or barbital (Veronal) as a long-acting drug. Solid food is given during the first week and from then on semi-solid foods, the minimum caloric intake is 1500 per day and the minimum amount of fluid 2000 c.c. The patients are given extra vitamin B and C parenterally. Posturing of the patients by the nurses is carried out every two hours and carbogen is administered if the respirations become shallow. Five units of globin-zinc insulin are given half an hour before each meal. The sleep is induced gradually and is also terminated gradually. At the end of 10 days, at which time sleep has been established, electroshock is commenced.

The objective of the electroshock therapy is to produce in combination with sleep a condition of confusion which we term complete depatterning. For purposes of identification we recognize three

stages of depatterning. The first stage is when the patient begins to show serious memory deficits but still has no difficulty in orienting himself with respect to the fact that he is in hospital, that he is there because he is sick, and is still able to recognize at least some of the doctors and nurses and his own family when they visit him.

The second stage is when the patient has lost his spatial and temporal image but is very conscious of the fact and makes repeated attempts to find re-orienting points. He asks, "Where am I?", "how did I get here?" and "what is this place?" In the third stage the feeling that he ought to have a spatial-temporal image is also lost and the patient is now quite smiling and unconcerned. He answers simple questions but does not recognize anyone, has no idea where he is and is not troubled by that fact. He usually shows urinary incontinence and has difficulty in performing quite simple motor skills. During the first stage of depatterning his original delusional ideas are usually still present. During the second stage they are becoming broken up and in the third stage are completely absent, as are all other evidences of his schizophrenic behaviour. To achieve this, electroshock therapy frequently has to be carried out once daily and sometimes in the form of a Page-Russell² treatment, namely, the giving of four or five shocks within a period of two or three minutes. The rate of administration of electroshock therapy is set so that complete depatterning is achieved somewhere between the 30th and the 60th day of sleep and after about 30 electroshock treatments.

Once complete depatterning is obtained, it is maintained for five to seven days. The amount of sleep medication is gradually reduced (too rapid reduction of barbiturates may produce convulsions) and the rate of administration of electroshock is reduced to three a week, the Offner apparatus being used.

After about four or five days the patient is able to get up and the phase of rehabilitation is then initiated. Care is taken as far as possible to assign one person to looking after the patient so that he can the more rapidly begin to orient himself, at least with respect to one person. He joins the other patients at meals and as soon as his memory will permit he is referred to the occupational therapy department.

During the period of recovery continuous observations are carried out with respect to any evidence of a recurrence of his schizophrenic behaviour. Should any sign of his previous delusional thinking appear, electroshock is again intensified, the patient being given daily treatments for a few days until the delusional thinking is once more broken up. Ordinarily such relapses do not occur, but in some patients they may recur repeatedly during the period of rehabilitation and on each occasion further electroshock is given until they are broken up again.

Care should be taken to distinguish actual schizophrenic relapses from forms of behavioural disturbance which we have noted in about 25% of our cases at the point of transition from the second to the first stage of depatterning. At this phase in the recovery of the patient—namely, when his attempts to re-establish his space-time image are becoming satisfactory but while there are still severe memory deficits—there may appear states of excitement or depression and states of actual delusional formation, this being in contrast with the placidity and the freedom from any delusional thinking which one finds in the third stage of depatterning. Our experience has shown that this transition period of disturbance of behaviour is best treated conservatively. The patient is usually put on chlorpromazine or reserpine (Serpasil) in moderate doses and is given a great deal of support and reassurance from the start. Such periods of disturbance ordinarily last less than a week and gradually subside as the patient emerges into the first stage of depatterning.

The period of rehabilitation in hospital ordinarily lasts about a month, at the end of which time the patient can be discharged and put on an ambulant follow-up basis. During this period, moreover, through our social service department we plan the patient's rehabilitation on the outside. Preparations are made for the last phase of stabilization and prevention. This generally lasts two years and requires the patient to come to the hospital for one electroshock treatment a week for the first month after discharge and one treatment a month for the next two years. We have repeatedly found that the patients do much better if they remain in the Montreal area and attend the Institute than if they return after discharge to their home city and place themselves under the care of one of our colleagues, being treated in a manner precisely the same as they would be if they had been in Montreal. This interesting observation demonstrates the great significance to the patient of the therapeutic milieu in which he recovered and the need for him to remain in this milieu during the period of stabilization.

The form of psychotherapy which we carry out with these schizophrenic patients during the period of rehabilitation in the hospital and during the two-year follow-up period when they are ambulant is limited to meeting the needs of the patients for support and acceptance and for guidance in their attempts to re-establish themselves in the community and in a job. We do not, save in the rare instances where there are marked neurotic tendencies, undertake any form of depth psychotherapy. Specifically we do not attempt to uncover unconscious motivations. Our efforts are directed rather to building a strong personal relationship between the patient and the therapist. The therapist takes every opportunity to strengthen this relationship, particularly during the period immediately after prolonged sleep when the patient is

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The damage is not from this treatment but is due to the disease itself

attempting to reorient himself and is gradually recovering from the period of helplessness engendered by his prolonged sleep and electroshock therapy. This relationship constitutes a fixed point of strength and support for a patient and is continued throughout the whole two years, care being exercised to see that, as far as possible, the same therapist is available to the patient. It is important to underscore the fact that the therapist brings to his work not only knowledge and skill but also attitudes. We are increasingly impressed with the fact that the attitudes of the therapist are crucial for the outcome. In dealing with the long-term schizophrenic patient the therapist must have great persistence. He cannot afford to give up easily. He must continually focus his attention and that of his staff and the patient on the gains which have been made, even though for a time they should be small.

During this period of stabilization and prevention outside the hospital, the patient ordinarily works. Some of our patients have married and have had children. Some have shown relapses. Where evidence of relapse is reported to us, the patient is treated again within a few hours or at the most within two days by intensive electroshock therapy on an ambulant basis. We have an arrangement with a nursing organization in the city by which all our ambulant schizophrenic patients are visited once a week, and their relatives or ladies are instructed to get in immediate touch with this nursing organization if there is any evidence of a relapse. This may take the form of moodiness, of sleeplessness, of lack of interest, of impairment of appetite, or of the appearance of thinking difficulties or beginning delusional ideas. We have found that where this happens we are always able to terminate the relapse within two or three days and often within 24 hours by intensive electroshock therapy. In the last two years we have only rarely had to readmit a patient.

RESULTS

It is proposed to report the results of the two groups of paranoid schizophrenic patients separately, namely, those patients having symptoms of more than two years' duration and those patients having symptoms of less than two years' duration. With regard to the first group, which is comprised of 16 patients, the initial results were favourable in that all patients could be discharged home save for one patient who left against advice and has been readmitted for further treatment.

The follow-up results of those discharged were good except in five patients, two of whom refused follow-up care, developing paranoid reactions of such fixity that we could not persuade them to continue. They were nonetheless able to remain outside the hospital. Two others had to be readmitted for further treatment and were later discharged again and have done well. One other had

to be readmitted and as indicated above is still under treatment. A number of others have had minor relapses but could be managed on an ambulant basis. Out of all the patients now discharged, paranoid trends were apparent only in the two patients mentioned above as having refused further treatment and in the one patient who had treatment in hospital subsequent to readmission. It should, however, be pointed out at the same time that although most of them are able to lead active lives as housewives and also in other occupations on the outside, some evidence of schizophrenic damage can be seen in the majority of these chronic patients. This takes the form of some blunting of affect, some loss of drive relative to that shown in earlier years.

TABLE I.—RESULTS IN THE TREATMENT OF PARANOID SCHIZOPHRENIC PATIENTS WITH SYMPTOMS OF OVER TWO YEARS' DURATION

Number of patients	16
Number discharged	16
Number readmitted	3
Number re-discharged	2
Number still in hospital	1
Number refusing follow-up treatment but still ambulant	2

Those in the group with symptoms of less than two years' duration have all been discharged and the results are also good, indeed more favourable than in those with symptoms of over two years' duration. None of them have had to be readmitted. Occasional relapses have been seen but these have been managed quite successfully on an ambulant basis. The evidence of lasting schizophrenic damage in the form of blunting of affect, or reduction in drive and initiative, is rarely apparent in this group of short-term paranoid cases.

TABLE II.—RESULTS IN THE TREATMENT OF PARANOID SCHIZOPHRENIC PATIENTS WITH SYMPTOMS OF LESS THAN TWO YEARS' DURATION

Number of patients	10
Number discharged	10
Number readmitted	0

DISCUSSION

Earlier in this paper we presented the observational basis for the development of this technique. We now wish to present the theoretic basis. Our working theories or premises are three in number:

1. That schizophrenia represents a biological process which can be arrested but which tends, particularly when of any intensity or duration, to leave behind permanent damage.
2. That recovery consists primarily in: (a) halting the process, and (b) a reorganization of the individual which results in a short-circuiting or inactivation of the damaged area but which does not result in an abolition of the established damage.
3. That a considerable proportion of schizophrenic relapses, though certainly not all, constitute not a reactivation of the process but a breakdown

of the reorganization of the individual, usually under-emotional stress.

Turning now to deal with the premises in more detail we may say that we have found chemical and physical therapies to be the only satisfactory means of halting the schizophrenic process. The objective of our initial intensive physical and chemical therapy is two-fold, first to bring the process to an end and second to break up completely, through the procedure of depatterning already described, the ongoing structure of the behavioural patterns of the individual. This results in breaking up at the same time the pathological schizophrenic thinking and general symptomatology.

Turning to the second premise, namely, that recovery requires reorganization, we wish again to emphasize the need to break up old pathological patterns before the new ones can be re-established. We may also indicate the value of psychotherapy at this point. The psychotherapy is, as indicated, supportive and also directive in so far as the pressures of the social setting are brought to bear on the patient in an attempt to get him to establish acceptable patterns of behaviour.

Numerous reports in the literature indicate that where a patient has made a good clinical recovery psychological tests may well show the same amount of schizophrenic damage as before. We see this as supporting the premise which we have put forward, namely, that recovery consists not in repair of damaged aspects of the individual's personality but in a rearrangement. The damaged parts are, as it were, bypassed or omitted from the key areas of the patient's new organization. We are further of the opinion that every individual possesses reserve capacities—alternative ways of managing reality and latent assets—which can be called upon and woven into the new organization of the self. This means, of course, that the damaged areas which have suffered schizophrenic damage are still present within the individual and that there always remains the possibility of a breakdown in the new organization and a return to the old but still existing patterns of schizophrenic behaviour.

This takes us to the third premise, namely, that under the impact particularly of emotional stress the new organization may break down, disorganization may occur and the previous schizophrenic patterning may reappear. It is to protect the patient against the possibility that the earliest evidences of damage due to stress might not be noticed and hence that the patient would begin to pass into disorganization that our plan of treatment requires weekly visits by the nursing organization and monthly interviews with the therapist, together with a monthly electroshock treatment over the two-year period. When relapses do, nonetheless, occur they are treated on an ambulant basis; the patient is seen if necessary daily for three or four days and receives an electroshock treatment daily on an ambulant basis. Under these circumstances

we have almost invariably succeeded in bringing the relapse to an end within a few days.

SUMMARY

The results of combined prolonged sleep and intensive electroshock treatment with subsequent rehabilitation and follow-up ambulant therapy in chronic paranoid schizophrenic patients have been presented. The group of patients consists of 16 chronic paranoid patients having had symptoms of two or more years' duration contrasted with a group of 10 paranoid schizophrenic patients with symptoms of less than two years' duration.

Three of the long-term cases have been readmitted and two of these have been subsequently discharged. One is still in hospital undergoing re-treatment. The longest period of follow-up subsequent to discharge is two years.

Two of the long-term patients have broken treatment and have again showed paranoid symptomatology but remain outside the hospital.

Minor relapses have occurred in several of the patients, in both the long-term and short-term cases, but these have been managed successfully on an ambulant basis. None of the short-term cases has had to be re-admitted.

In the long-term cases some residual evidence of schizophrenia can be seen. This takes the form of reduction in drive and blunting of affect. In only three of the long-term cases (two who have broken therapy and the one who has been readmitted) and in none of the short-term cases is there any evidence of paranoid thinking.

Our primary purpose in this presentation is to show that our therapeutic procedures have advanced to the point where it is now possible for schizophrenic patients, even when suffering from the most severe forms of the illness, to be passed through a phase of intensive treatment followed by long-term rehabilitation measures and thereby be enabled to live, and in many instances work, outside the hospital.

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RÉSUMÉ

Les auteurs de cet article ont récemment fait l'essai d'un traitement combiné de sommeil prolongé et de sismothérapie intense chez des schizophrènes paranoïdes chroniques, réhabilités par la suite, et suivis à la clinique externe. La présente série comprenait un groupe de 16 malades dont les symptômes remontaient à au moins deux ans et que l'on a comparé à un autre groupe de dix malades dont les symptômes étaient d'origine plus récente. Trois malades du premier groupe durent être hospitalisés de nouveau, mais deux d'entre eux ont depuis reçu leur traitement est encore sous traitement. Ces malades furent vus pendant deux ans à différents intervalles après leur sortie de l'hôpital. Deux autres malades du premier groupe abandonnèrent le traitement et retombèrent sous l'effet de leur symptomatologie paranoïde, mais sans toutefois revenir à l'hôpital. Certaines recrudescences de peu d'importance furent notées chez plusieurs malades des deux groupes et toutes répondirent au traitement à la clinique externe. Aucun malade du deuxième groupe n'eut à être hospitalisé de nouveau. On peut encore déceler

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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 Bini¹ 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 Ancell³ 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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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 Largaetil 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—RO-4-1038—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 Largaetil. 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 Largaetil, is reinstated. 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 Alexander¹⁶ (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.	3	?	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	40	0	Improved
21	C. O.	F	33	Schiz.-Par.	1	0	24	48	0	Complete Recovery
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

Readmission Rates	Control Group (N = 314) 1956-1959	Preventive EST Group (N = 30) 1956-1960
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 amnesic 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 (Cameron¹⁷), we have suggested that recol-

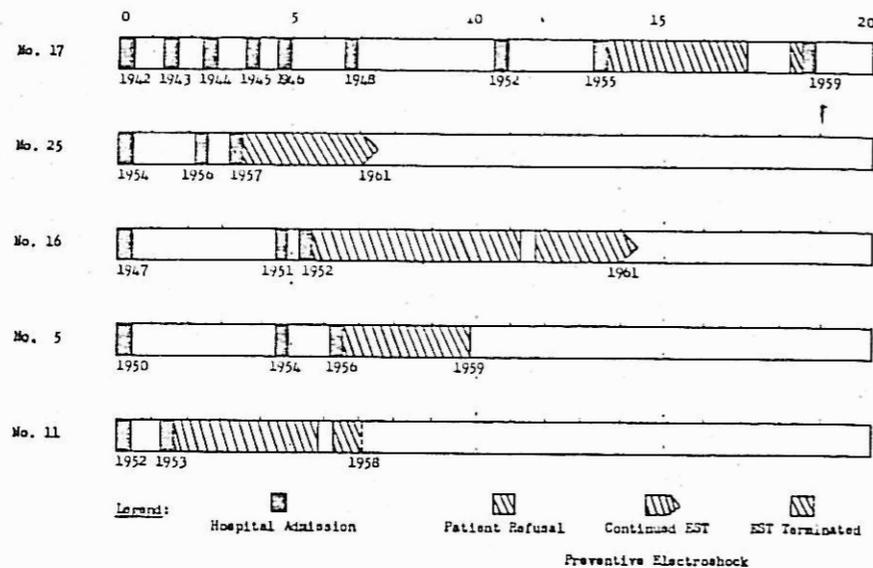


Figure 1

to be inhibited. This is in accord with what Bartlett¹⁸ 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.

Table 4.—Comparison of Diagnostic Categories

	Sex Distrib.		Mean Age	Mean Duration Rx (mo.)	Mean EST No.
	M	F			
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 re-admitted. We have also come to recognize that emotional disturbance of any kind seems to facilitate these breakdowns. Finally, we have advanced the hypothesis already reported²⁰ that most of these relapses are not so much re-activation of the schizophrenic illness as a breakdown in the organization of

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

Glueck and his co-workers¹ 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.

Weil² 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-workers³ 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 Klaesi⁴ and modified by Azima⁵ and preventive shock therapy as described by Geohegan and Stevenson.⁶ 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-workers¹⁰ referred to certain of their organically disorganized patients as being unable to swallow but able to suck fluid from a feeding bottle. Glueck¹¹ 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" (Cameron¹³).

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 Largaetil 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

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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Freud and Galton

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THAT FREUD was acquainted with the work of Sir Francis Galton is made clear by only one piece of direct evidence. He refers to Galton's work on three occasions in "The Interpretation of Dreams"¹ and in one instance in his shorter treatise "On Dreams,"² but all of these references are made in only one context. He describes briefly Galton's method of composite portraiture,³ by which the faces of several people are superimposed on one photographic plate, and uses it to illustrate the formation of collective and composite figures in dreams. He does not indicate the magnitude of this piece of Galton's work, which was carried out for ethnologic and anthropometric purposes in the pursuit of eugenic interests, nor does he give any indication of having been particularly impressed by Galton's contributions. There is, however, considerable indirect evidence that Freud might have been very familiar with Galton's extensive and variegated investigations, and have been much influenced by them. If inquiry shows such to have been indeed the case, the facts would be of much interest to psychoanalysts and psychiatrists.

Galton was born in England in 1822. He began the study of medicine but discontinued it upon his father's death so that he never practised. He devoted some two years to exploring unknown parts of South Africa, achieved prominence largely because of his interest in the study of heredity and its application for eugenic purposes and became the president of the Anthropological Institute. He died in 1911. As a prominent scientific investigator at the time when Freud was a medical student and in the early part of Freud's professional career, and as a cousin of Charles Darwin, it is altogether probable that Galton commanded the attention of Freud, who devoted so much time to the reading of English literature. It is almost inconceivable that a neurologist of Freud's calibre could have remained uninformed about Galton's techniques for investigating sensory perception, e.g., by the devising of graded weights for testing proprioceptive discrimination, and whistles for examining the upper limits of auditory perception. It is, however, when Galton's psychologic studies are perused, that one gains a more definite impression that he may have had considerable germinative influence on the growing formulations in Freud's mind.

According to Galton's biographer, Karl Pearson,⁴ "He was the first to insist upon the importance of experimental psychology," (p. 211) and "was the pioneer of experimental psychology" (p. 212) in England. His interests dovetailed in many ways with those of Freud. Galton said,⁵ "It would seem as though the physical structure of future generations was almost as plastic as clay, under the control of the breeder's will. It is my desire to show, more pointedly than, so far as I am aware, has been attempted before, that mental qualities are equally under control" (pp. 312-313). According to Pearson "the first central fact of his [Galton's] life is the relative lateness of much of

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INTENSIVE ELECTROCONVULSIVE THERAPY: A FOLLOW-UP STUDY*

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Intensive electroconvulsive shock has been investigated as a method of treatment at the Allan Memorial Institute for the past ten years. The procedure, its *rationale* and immediate effects have been described elsewhere by Cameron and his co-workers (1). The present study is concerned with the identification and assessment of long-term changes associated with this form of therapy.

Our basic sample for follow-up investigation comprised 79 former patients admitted to the A.M.I. during the years 1956-63, who were known to have reached the 'third stage of depatterning' as defined by Cameron (2). Comparisons between these cases and the general population of the Institute indicate that a) they were, on the average, ten years younger; b) many more of them were single; c) they remained in hospital twice as long as others; d) 77 per cent as compared to 23 per cent were diagnosed schizophrenic or borderline; e) 24 per cent relapsed following depatterning, while still in hospital; f) physical complications ranging from 'mild' to 'severe' were associated with the treatment in 23 per cent of the group; severe complications accounted for six per cent of the sample.

Information was obtained on 47 cases with regard to current status; a) 15 per cent of these patients are currently hospitalized and an additional 70 per cent maintain psychiatric contact; b) 62 per cent receive medication as out-patients; 25 per cent also receive E.C.T. periodically; c) 40 per cent are judged either

symptom free or functioning adequately despite symptoms; varying degrees of psychiatric impairment are reported for the rest of the group; d) 75 per cent of the sample demonstrate unsatisfactory or impoverished social adjustment; e) more than half of patients fully employed prior to hospitalization are now either in part-time work or sheltered employment or are not working. A comparison of the foregoing findings with those reported by Leyberg (3) on 81 discharged schizophrenics receiving other forms of treatment, reveals little to distinguish between the two groups in terms of long-term clinical outcome.

Intelligence and memory tests were administered to 28 former patients. The results, when compared with pre-treatment scores, yielded little evidence of general intellectual or memory impairment attributable to the intensive electroconvulsive shock. Current response to the Rorschach test, however, was notably diminished as compared with pre-treatment performance. There was a reduction of colour perception, and an increased rejection of stimulus cards. The results are similar to those obtained in hospitalized chronic schizophrenics.

An intercorrelational analysis was undertaken to identify factors associated with clinical outcome and current test performance; a) there was a clear-cut and consistent positive association between intelligence and educational levels and current clinical, social, and work status; b) a pattern of frequent electroconvulsive shock during hospitalization was associated with poor clinical outcome; c) the shorter the interval between electroshocks, the greater was the current memory impairment as seen on the Wechsler Memory Scale; d) finally, no significant correlations were obtained

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between measures of current status and lengths of illness, hospitalization and time elapsed since hospitalization.

A questionnaire designed to examine memory function in detail was completed by 27 former patients who had received the intensive E.C.T. The 29 'memory' items were distributed among 31 questions dealing with physical and emotional health in order to minimize the aim of the questionnaire. The dependence on others for recall of past events is reported by 63 per cent of the sample. A persisting amnesia retrograde to the 'depatterning' and ranging in time from six months to ten years is reported by 60 per cent of the respondents. The number of 'memory' complaints presented by the patient appeared to be independent of both the patient's state of health as reported by the patient, and his current clinical condition as judged by the clinician.

The results of the questionnaire are at variance with those derived from objective memory tests where little impairment was noted. It is possible that, despite actual recovery from the short-term amnesic effects of intensive E.C.T., the questionnaire reflects the persisting distress of the patient concerning the severe loss of memory experienced during and immediately following his course of treatment. On the other hand, it is also possible that the questionnaire and the tests of recall are examining different facets of memory function, and that particular areas of deficit do, in fact, persist long after the termination of intensive electroconvulsive shock therapy.

Conclusions

Results of our follow-up investigation indicate that, in terms of both recovery rate and current clinical condition, patients who received intensive electroconvulsive shock therapy cannot be distinguished from those who receive other forms of treatment. Indicators of favourable clinical outcome associated with this type of treatment are also indistinguishable from those operating for other approaches. The incidence of physical complications and the anxiety generated in the patient because of real or imagined memory difficulty argue against the administration of intensive electroconvulsive shock as a standard therapeutic procedure.

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COMPUTER SIMULATION AS AN AID TO THE PLANNING OF PSYCHIATRIC SERVICES*

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Need for Simulation

In any society the proportion of its skilled manpower and of the gross national product allocated to health services will always be limited, so that they should be used optimally.

Within the health field itself many different areas are competing for available staff and funds. Decisions as to allocation at present are only partly determined by need. Many decisions are political (in the broadest sense of the word) or are based on emotional appeal. There is a need to measure the benefits of resources spent in one area or in one way against resources spent in other areas or in different ways.

For example if \$100,000 were available to a government health department, would it be best spent on tuberculosis surveys or on establishing a cytological service for cervical smear examination? If the tuberculosis survey is opted for, should the screening be Mantoux testing in school children, mass X-rays in the general population or focused investigation of high risk groups like the aged or Indians? To answer such questions we need data as to the likely effects of each form of survey. With this data available a decision then has to be made to embark on one particular form. A decision to provide a service invariably implies a decision to not supply another service.

Need for Computer Involvement in Health Service Planning

Health service planning is not as simple as the above notes might make it appear. Even when all the facts are known human decisions have to be made (preferably by humane physicians). For instance if we

know that the expenditure of X dollars will bring to light four early cancers of the cervix, or that for the same money in a different program three elderly patients with early tuberculosis will be discovered; the choice of which program to follow is difficult and no machine can make it.

Another factor concerns the interaction of society and patient. In psychiatric planning, society demands special consideration. For example society may find it more difficult to tolerate a paranoid schizophrenic in its midst than a case of open tuberculosis treated at home.

A third point concerns the role of the computer. In any social system the interaction of numerous variables adds up to a complexity which precludes accurate prediction by human methods unaided by complex gadgetry like a computer.

To take a simple problem from the psychiatric field, an increase of out-patient facilities at first tends to increase admission (by detecting more cases). Later it tends to diminish admission (by preventing some admissions). This relationship is frequently complicated by the fact that the same personnel provide both services, so that if out-patient services are increased, there is less time to devote to in-patient services and they therefore become less efficient. *Vice versa*, increased time devoted to in-patient service reduces time available to out-patient service, thus more patients have to be admitted and further increase the demands on in-patient time. When to this complex relationship we add such variables as the type of staff or facilities available, the type of patients (diagnostically and socially) involved, and the type of society being served, we find the interactions too complex to handle unaided. The standard scientific techniques of holding all variables except one

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