

# REGRESSIVE ELECTRIC SHOCK THERAPY\*

## *Preliminary Report on 100 Cases*

BY BERNARD C. GLUECK, JR., M.D., HARRY REISS, M.D., AND  
LOUIS E. BERNARD, M.D.

This paper will present the results of experience with "regressive electroshock treatment" (hereafter referred to as REST) in 100 cases over the six years following 1948. This method has been described previously by Milligan,<sup>1</sup> Kennedy and Anchell,<sup>2</sup> Rothschild et al.,<sup>3</sup> Weil<sup>4</sup> and others. However, in spite of the years since the initial report in 1946, few hospitals have adopted the method. At the present time, as far as the writers are aware, it is not being given as a standard form of treatment in any other hospital. In view of their results, they consider this a surprising situation and feel it may be due to the general concern that it is a "drastic" treatment, a view expressed by Weil, and by Rothschild et al. The writers hope, by this presentation, to reveal that REST does not lead to permanent impaired cerebration and that the term "drastic" is not justified since the results are generally satisfactory, with no greater side effects or complications than with less intensive EST.

### CLINICAL MATERIAL

The series of 100 cases is composed mainly (67 per cent) of schizophrenics who had had previous adequate courses of EST and/or insulin coma therapy without lasting improvement. They were all patients at Stony Lodge, Ossining, N. Y.

As familiarity with the technique increased, and as its safety, absence of organic sequelae, and generally satisfactory results were noted, its use was commenced with fresh cases (33 per cent of the total) in which there had been no previous organic treatment. The first patient was treated on November 7, 1948, the last in the series, on October 5, 1953.

During the early experience with REST, when the writers were unsure of the margin of safety and restricted by fear of inducing irreparable organic damage, the number of treatments was

\*From Stony Lodge, Ossining, N. Y., where the authors were members of the medical staff. The paper was read at the 111th annual meeting of the American Psychiatric Association in Atlantic City in May 1955.

limited, even though some patients were not completely "regressed" by the standards used later. In retrospect, it is felt that results from this group might have been improved. This opinion is reflected by a progressive increase in the number of treatments given in a course. The average numbers, in each quarter of the series, were 28, 30, 33 and 43, which reflect an average increase of 15 EST to the course from the beginning to the end of the series. Subsequent experience has shown that one can safely continue up to 65 treatments if regression does not occur previously.

Each patient was carefully screened to be sure of good physical condition before treatment. The women ranged from 15 to 50 years old, with an average of 33.2 years. Durations of psychosis from the date of first manifestation ranged from a week to 26 years, with an average of 6.3 years. The men's ages ranged from 16 to 56, with an average of 27. Durations of psychosis ranged from a month to 18 years, with an average of 4.6 years.

#### TECHNIQUE

In this treatment method three grand mal convulsions are electrically induced each day (8:30 a.m., 11 a.m., 3 p.m.) seven days a week, until clinical signs indicate that "regression" is complete. The required number of treatments has varied from 17 to 65, with an average of 34.

Regression is assumed to be complete when the patient manifests a majority of the following signs: There are memory loss, marked confusion, disorientation, lack of verbal spontaneity, slurring of speech to the point of complete dysarthria or muteness, and utter apathy. The patient behaves like a helpless infant, is incontinent in both bowel and bladder functions, requires spoon-feeding and, at times, tube-feeding. Frequently, he holds his food in his mouth as if unaware that he should swallow it—permitting fluids to flow out of the mouth.

Neurological signs of altered cerebral function become evident toward the end of the series and indicate when treatment should be discontinued. The patient becomes progressively ataxic, until he may not be able to walk without assistance. There is increased tonus with possible spastic rigidity; reflexes become more active; and, ultimately, the abnormal reflexes of Babinski and Hoffman, and sometimes ankle clonus, become evident. A grasp reflex sug-

gestive of the frontal lobe syndrome is sometimes seen. These signs are indicative of impairment of upper motor neurone functioning. Evidence of hypothalamic, autonomic nervous system involvement is the occasional drenching sweat occurring toward the end of therapy, and the "gooseflesh" occasionally noted on the limbs and chest during treatment. After the REST ends, the patients usually continue to regress for several days, with increased apathy, rigidity, and incontinence.

A small number reach a plateau where, instead of regressing further, they become more alert in spite of continued treatments. What this means prognostically is still uncertain, although the writers have a feeling that some of the best results come from this group. After these cases are terminated, however, the further regressive manifestations just described are also noted.

Emergence from the regressed state, which takes seven to 10 days, mirrors in some respects the picture noted during its induction. For several days, there may be complete helplessness requiring spoon-feeding; there may be apathy, mutism, and blank expressions. Within three days, patients usually regain sphincter control. They may spend long periods sitting in chairs, staring at pictures in magazines. Gradually, they show signs of integration and awareness, require less direct help, have more expressive features, and, as speech returns, repeatedly ask numerous questions as to what they are doing in the hospital, what happened to them, and so on. They frequently ask to see close relatives, and they misidentify hospital personnel as relatives.

The majority emerge into awareness in a placid, benign manner. In a vocal minority there is much anxiety; increased restlessness to the point of belligerence; and disturbed behavior, occasionally associated with frankly psychotic behavior. This reaction is generally controlled with subcoma insulin treatment for about 10 days. When the convalescent period is very stormy, one or two EST will usually break up the disturbed pattern, and the patient will calm down and integrate in a more benign fashion. Experience subsequent to this series has revealed the usefulness of oral and intramuscular chlorpromazine and reserpine in controlling post-REST disturbed behavior. Many patients speak of waking up with no recollection of having been brought to hospital. Some are aware of having given the personnel a difficult time and

are duly apologetic. In many patients, during this phase, unconscious conflicts over hostile, aggressive attitudes may appear on the surface. One patient believed that her mother, toward whom she had tremendous unconscious hostility, was dead. She also did not recall her brother's second marriage, which she had never accepted. Another patient repeatedly asked if his uncle, a well-to-do man, was alive. His death two years previously had caused the patient great disappointment when he left him only a small sum of money. Another patient did not recall her husband's death four years before, following which environmental stresses exceeded her adaptive resources. Such material, exposed in its raw state, can be very useful in subsequent therapy.

In the majority of patients, most of the improvement they may show is noted following convalescence from REST. Significant improvement, particularly in the less dramatic responses, has been observed to continue over the next five years. All patients are amnesic for the treatments, being aware that they must have had some treatment to account for their memory gaps, but not recalling the treatments themselves.

#### NURSING CARE

During the course of REST, all patients require much nursing care, particularly during the latter phases when they become helpless, rigid and unable to care for even their simplest needs. Since the relationship to the doctors and nurses is very similar to the child-parent relationship, much warmth, patience and tactfulness must be displayed. For optimum results there must be an adequate staff, for care must not be hurried, or irritation at delays will occur, and pressure will be applied, to the patient's detriment. Special diets are required, since patients may have difficulty in chewing. Spoon-feeding becomes necessary when a patient is unable to feed himself. Frequently, patients will hold food in their mouths for long periods and require persuasion to swallow. Gavage is seldom necessary; but, if indicated, should be done rather than discontinue the treatment at an earlier than satisfactorily-regressed level. Intramuscular vitamin preparations are given during treatment to avert vitamin deficiency. Incontinence of bladder and bowel occurs; and, to decrease the obvious nursing

problem, the patient is taken to the bathroom before each treatment whenever possible.

Because of the large number of treatments, redness of the skin develops at the areas where the electrodes are applied. To cope with this those areas are washed after each treatment and vaseline is applied. Patients should be bathed every day, because of incontinence and because of spending much of their time in bed.

#### COMPLICATIONS

In the series of 100 cases presented, 3,394 grand mal convulsions were induced. Curare or curare-like substances, designed to eliminate or reduce the muscular phase of the convulsions were not used. It was considered that they would be hazardous in some cases, and that in view of the low fracture rate, they would be a needless complication of the technique. In spite of the absence of this safeguard, gross evidence of fractures (a vertebral compression, and a fracture of the anatomical neck of the humerus) were encountered in only two cases and, of course, terminated the treatments. A few patients showed prolonged apnea following a convulsion; each responded to a few moments of manual resuscitation. There were no deaths in the series.

Routine post-REST x-rays were not taken, hence there may have been undetected vertebral compressions. Since these, if present, did not result in symptoms, they are not considered significant complications. Many patients had a low grade fever (99°F) toward the end of treatment. If no signs of a localized process could be found, the REST was continued to termination. No untoward results occurred, and the fever was considered due to dehydration.

#### SUBSEQUENT TREATMENT

Although it is felt that the results are primarily due to the REST, the gains should be consolidated by psychotherapy if possible. During the 10-day to 14-day period during which the patient emerges from the regressed state, the therapist visits the patient for short times two or three times daily to assist the patient through his confusion and bewilderment, by answering his numerous questions, and by acting as his lost memory and as a reassuring, stable figure on whom a helpless person may depend.

For this reason, a detailed anamnesis should be obtained before REST.

When possible, one tries to elicit the active co-operation of the family after REST as it has been found that permitting the patient to phone to his home and to have an early visit often dramatically diminishes the marked anxiety caused by loss of memory. The patient's amnesia initially amounts to about a year before REST; with the passage of time, it gradually shrinks, usually leaving a permanent amnesia of two to three months immediately before REST. This period seems to coincide with onset of illness in cases of acute psychotic episodes. In most cases, the severe recent memory impairment does not interfere with subsequent psychotherapy, which begins on a systematic basis about 10 to 14 days after completion of the treatments.

One patient with unusual ability to express himself remarked, "I remember how all the thoughts seemed to reach a blank wall and that all the memories and experiences which make up the essence of one's self were cut short. However, this is only transitory and eventually one regains the vast storehouse of experiences which are one's self." It has frequently been observed that patients, after REST, will discuss material with a freedom from anxiety that was not noted in previous psychotherapeutic attempts. Many new important associations come to mind, the material is more readily utilized in the absence of the overwhelming anxiety and tension which were interfering factors in the past. They frequently are able to make use of an intellectual awareness which had been present but not utilized in the past, and extend this to emotional insight.

A few patients use the impairment of recent memory, which is present in each case of REST, as a defense mechanism. In spite of general return of memory, they emphasize the gaps which they do not recall; or they express their hostility about "what the doctor did to them." This occurs chiefly in those who meet disturbing affects by intellectual defenses.

The repressive mechanism can use the temporary absence of recollection to repress certain periods completely. Enough cases have been studied to show that the treatments per se are not responsible for the phenomenon but are merely used in the patients' defenses.<sup>5</sup> In many cases, one is able to discuss the "forgotten"

episodes with the patient; and their emotional importance has been clarified in terms of the necessity for "forgetting" (repressing) them. The therapist must not emphasize the memory impairment aspects; rather, he must be reassuring but casual, lest the individual fix his attention on his memory gap. Typical schizophrenic symptoms—such as difficulty in thinking and concentrating, headache, and feelings of unreality—that were present before REST may, if present after REST, be attributed by the patient (and relatives) to the treatment.

Emerging from "sleep" as patients describe the long amnesic period ("I just woke up"), they ask numerous questions which, although fully answered, will be repeated several times within the same hour; even the same interview. This repetition is not caused by any current amnesia but is due to the pressure of anxiety. It is sometimes seen even before REST. For example, one patient repeatedly asked how long she had been in hospital, if her parents would come, if she would be all right, if she would get her memory back, etc. She asked if she should return to the study of psychology, and four hours later told her father the verbatim reply of her doctor, demonstrating that there is no organically-produced amnesia during this stage to justify the patients' repeated questions.

### RESULTS

Although the writers' series extends back six years, about 35 per cent of the cases were treated later than June 1952. The results, assessed about three months after each patient completed his treatments (Immediate Results), and again immediately before the presentation of this paper (Late Results), are presented in Table 1.

The major schizophrenic reactions comprise 74 per cent of the authors' group, with 51 patients diagnosed as paranoid, 13 as catatonic, and 10 as hebephrenic. The remaining cases are scattered over a wide range of diagnoses, all but six, however, being some variety of schizophrenic illness. The long durations of illness before REST, and failures of previous methods of therapy in these cases, make the REST method results, both initial and late, all the more encouraging. The immediate results show 48 patients in states of recovery or marked improvement at the time of leaving the hospital, with another 24 considered improved. This was approx-

Table 1. Summation 100 Cases

	Male	Female	Aver. Age Years	Aver. Dur. Illness Mos.	Previous Insulin	Previous ECT	BEST	Complications	Immediate Results*					Late Results*					Hospitalized	Psychosurgery		
									R MI I SI U					R MI I SI U								
									R	MI	I	SI	U	R	MI	I	SI	U				
Paranoid Schizophrenia .....	16	35	32	79	26	34	3	3	20	15	7	6	7	15	4	4	8	13	14	3		
Catatonic Schizophrenia .....	3	10	26	54	6	7	25	2	6	4	0	1	3	1	2	1	0	6	3	0		
Hebephrenic Schizophrenia .....	3	7	25	75	6	7	39	1	0	3	1	1	5	3	1	1	0	3	2	4	0	
Simple Schizophrenia .....	2	2	26	37	2	3	42	0	0	1	1	2	0	0	0	0	2	2	2	2	0	
Mixed Schizophrenia .....	1	4	26	60	2	3	24	0	0	2	1	1	1	1	2	1	0	1	0	2	0	
Schizo-affective Psychosis .....	0	4	35	120	3	2	38	0	2	1	1	0	0	1	1	0	0	2	0	0	0	
Pseudoneurotic Schizophrenia .....	1	3	34	50	2	3	40	0	0	3	0	1	0	1	0	0	1	2	1	0		
Pseudopsychopathic Schizophrenia .....	1	2	27	41	0	1	37	1	0	2	0	0	1	0	1	0	0	2	0	3	0	
Manic-Depression, Depressed .....	0	1	38	12	1	1	17	0	0	1	0	0	0	1	0	0	0	0	0	0	0	
Manic-Depression, Manic .....	0	1	38	36	0	1	29	0	0	1	0	0	0	0	0	1	0	0	0	0	0	
Involutional Paranoia .....	1	2	51	23	0	1	32	0	1	1	1	0	0	0	0	0	0	3	0	0	0	
Psychosis with Mental Deficiency ....	1	0	17	144	0	1	25	0	0	0	0	0	1	0	0	0	0	1	0	0	0	
	29	71	31.4	61.8	48	64	34	7	8	40	24	11	17	17	21	9	5	17	31	29	3	

\*Symbols:

R—Recovery—Disappearance of all pathological signs and symptoms, and the ability to function at an adequate level of adaptation with adequate insight.

MI—Much Improved—Disappearance of most pathological signs and symptoms, with adequate level of function and partial insight.

I—Improved—Residual signs and symptoms, e.g., paranoid ideation, not acted upon, but some impairment of function. Little insight.

SI—Slightly Improved—Some lessened intensity of pathological signs and symptoms, with continued impaired functioning and no insight. U—Unimproved—No change. Un.—Unknown.



imately three months post-REST. In the group of 28 slightly improved or unimproved patients, all but seven went home initially since their families considered them improved, even though clinical evaluation did not confirm this. Seven patients were transferred directly to other hospitals, as too psychotic to attempt adjustments outside an institution.

Of the 93 patients sent home, 22 relapsed and were readmitted to various hospitals, three weeks to 27 months (average 9.8 months) after discharge from Stony Lodge. At the time of this writing, February 1955, 71 patients are still functioning outside the hospital. The figures under "Late Results" refer to presently available follow-up information, and have been considered in greater detail in Tables 2, 3, and 4.

The seven complications indicated refer to varying difficulties encountered during the course of REST. Only two of these complications, as was said previously, were severe enough to cause termination of treatment. Both patients were, nevertheless, far enough along in treatment to be considered much improved on discharge.

One case of psychosis with mental deficiency has been included in the series. While the case was prognostically hopeless to begin with, the decision to treat this patient with REST reflected the glow of optimism engendered by the results. Two patients, severe asthmatics in acute respiratory distress at the onset of REST, are also included in this series. They were difficult medical problems, showing poor response to the usual bronchodilating drugs. In both cases respiratory distress was diminished after each treatment during the first few days and was absent long before the completion of REST. Although resuscitative measures were at hand there was no cause for alarm in any instance, dangerous though REST may seem in these cases. One patient, five months pregnant, completed REST without interruption of pregnancy.

The literature is replete with criticisms of shock treatment as possibly leading to permanent structural cerebral change or as inducing spontaneous convulsive disorder in predisposed persons. Five patients who showed favorable immediate responses, but were unable to maintain their improvement, had second courses of REST. In one case, the course was repeated at the request of the patient herself, who remembered the absence of

Table 2. Five-Year Follow-Up

	Male	Female	Aver. Age Years	Aver. Dur. Illness Mos.	Previous Insulin	Previous ECT	REST	Complications	Immediate Results*					Five-Year Results*					Hospitalized	Psychosurgery					
									R	M	I	S	U	R	M	I	S	U							
																					U	U	U	U	
Paranoid Schizophrenia .....	4	12	31	78	13	13	32	1	2	3	5	3	3	3	3	3	0	3	0	3	1	1	0		
Catatonic Schizophrenia .....	1	2	26	25	2	3	24	0	1	1	1	1	0	0	2	0	0	1	0	0	1	0	1	0	
Hebephrenic Schizophrenia .....	0	2	21	18	1	1	28	0	0	1	0	1	0	1	1	1	0	0	0	0	0	0	0	0	0
Simple Schizophrenia .....	1	0	23	120	1	1	20	0	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0
Schizo-affective Psychosis .....	0	2	36	115	2	2	39	0	1	0	1	0	0	1	1	0	0	0	0	0	0	0	0	0	0
Manic-Depression, Depressed .....	0	1	38	12	1	1	17	0	0	1	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0
Manic-Depression, Manic .....	0	1	38	36	0	1	29	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
Mixed Schizophrenia .....	0	3	30	44	2	3	23	0	0	1	1	1	0	1	1	1	1	1	0	0	0	0	1	0	0
Pseudoneurotic Schizophrenia .....	0	1	33	84	1	1	24	0	0	0	0	1	0	0	0	0	0	0	0	0	1	0	1	0	0
Pseudopsychopathic Schizophrenia .....	1	0	27	32	0	0	30	1	0	0	0	0	0	1	0	0	0	0	0	0	1	0	1	0	0
Involuntional Paranoia .....	0	1	50	26	0	0	21	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	1	0	0
	7	25	31.1	63.5	23	26	29	2	4	8	9	6	5	10	8	5	1	6	2	8	1	6	2	8	1

\*See footnote to Table 1.

tension immediately following the treatments. In none of the cases, was there clinical evidence of cerebral damage as a result of the repetition of REST, nor, in the whole series, was there a single instance of a post-treatment convulsive disorder.

When the results of the five-year, four-year and three-year follow-up studies are considered, the late effects of this method of treatment begin to appear (Tables 2, 3 and 4).

There is a shift in the direction of recovery in all these tables, with the greatest change showing in the five-year group. In this group of 32 patients, four were considered recovered and eight much improved at the end of treatments (or 37 per cent of the group), with nine (or 28 per cent) considered improved. At the end of five years, 10 are considered recovered and eight much improved, or 56 per cent of the group, with another five, or 15 per cent, improved. At the other end of the scale, six patients were considered unimproved at the end of the five years, as compared to five immediately after treatment. This tendency toward the continuing improvement of functioning, rather than the holding of a static level or relapsing, seems to be a unique feature of the post-treatment course with REST, as compared to other organic therapies, where the maximum improvement is anticipated immediately after treatment, followed by a gradual falling off to the 35 per cent level of recovery at the end of five years. If this trend can be demonstrated in larger series of cases in other institutions, it may mark significant therapeutic progress.

#### DISCUSSION

In a review of the pertinent literature, the paper by Milligan<sup>1</sup> in 1946 is of great interest and importance. This is the second description of the intensive use of EST and was the basis on which the subsequent work by other investigators has been erected. The actual first reference could be considered Bini's report in 1942 of the repetition of EST many times a day for certain patients. He named the method "annihilation."

Milligan reported phenomenal results (97 per cent recovered or improved) in his series of 100 psychoneurotic patients who were given a course of EST, the number and spacing varying from patient to patient, depending upon their clinical responses. He found that up to four EST could be given daily for short periods with-

Table 3. Four-Year Follow-Up

	Male	Female	Aver. Age Years	Aver. Dur. Illness Mos.	Previous Insulin	Previous ECT	RFS†	Complications	Immediate Results*					Four-Year Results*					Hospitalized	Psychosurgery			
									R	MI	I	SI	U	R	MI	I	SI	U			Un		
Paranoid Schizophrenia .....	3	8	36	114	5	9	30	2	0	3	5	1	2	2	5	1	2	1	2	1	0	5	2
Catatonic Schizophrenia .....	0	2	25	66	0	2	26	1	0	0	1	0	1	1	1	1	0	0	0	0	0	1	0
Hebephrenic Schizophrenia .....	1	1	25	123	2	2	31	0	0	1	1	0	0	1	0	1	0	0	0	0	0	1	0
Mixed Schizophrenia .....	0	1	15	48	0	0	32	0	0	0	0	0	1	0	0	0	0	0	0	0	1	0	0
Pseudoneurotic Schizophrenia .....	0	1	34	13	1	1	22	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0
Pseudopsychopathic Schizophrenia .....	0	1	39	30	0	1	38	0	0	1	0	0	0	0	0	0	0	0	0	0	1	0	1
	4	14	32	97	8	15	31	3	0	6	7	1	4	5	6	2	2	2	3	0	0	9	2

\*See footnote to Table 1.

out any untoward results. He noted that none of his patients exhibited the profound lasting memory defects described the previous year by Brody,<sup>6</sup> and, hence, felt that those whose occupations depended upon intact intellectual skills (such as chartered accountant or teacher) should not be denied the benefit of intensive EST. The writers' findings parallel Milligan's: Partial amnesia does occur, but only for the period under treatment and several months preceding. No evidence indicating impairment of intellectual functioning has been found. Material once learned, such as vocational or professional information, continues to be at the patient's disposal, although review of it may be necessary to facilitate recall. The writers have treated a number of patients who have been able to return successfully to their former pursuits, which required a high degree of intellectual functioning. Among these have been teachers, chemists, graduate students, priests, and a rabbi. Although each was initially concerned about lack of memory for recent events, all were able to work without any deficits after brief review of the required material, and, after several months, seldom, if at all, referred to their concern about their memories.

To evaluate the organic effects of REST on the brain, as well as to assess the degree of psychological change in the writers' patients, the first 50 underwent comprehensive psychological tests. The battery consisted of the Bender Visual Motor Gestalt, the C.A.S. test,\* the Rorschach, a figure-drawing test and the Controlled Word Association test. These were given before REST and eight to 10 weeks after REST. The results uniformly revealed the absence of permanent organic brain damage following REST. This does not imply that there was no organic involvement during the course of REST, but indicates that whatever changes did occur were reversible, compensated by other cortical areas, or not detectable by the psychological tests used. Perlson<sup>7</sup> also showed by a comprehensive psychological battery that 248 shock treatments given to a patient over a three-year period failed to result in any intellectual or emotional deterioration.

Kennedy and Anchell,<sup>2</sup> in 1946, treated 25 schizophrenics who had failed to respond to previous adequate courses of insulin,

\*Modification of the Wechsler Bellevue Test. It includes three subtests: (1) comprehension; (2) arithmetic; (3) similarities.

Table 4. Three-Year Follow-Up

	Male	Female	Aver. Age Years	Aver. Dur. Illness Mos.	Previous Insulin	Previous ECT	RST	Complications	Immediate Results*					Three-Year Results*					Hospitalized	Psychosurgery					
									R	MI	I	SI	U	R	MI	I	SI	U			Un				
Paranoid Schizophrenia .....	4	4	29	41	2	3	28	0	0	3	4	1	0	1	3	0	1	3	0	1	3	0	2	0	
Catatonic Schizophrenia .....	1	1	24	2	2	1	22	0	0	1	1	0	0	0	0	2	0	0	0	0	0	0	1	0	0
Hebephrenic Schizophrenia .....	1	2	27	89	1	1	33	0	0	0	0	0	3	0	0	0	0	0	0	0	3	0	3	0	0
Mixed Schizophrenia .....	1	0	29	120	0	0	19	0	0	1	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
	7	7	28	51	5	5	27	0	0	5	5	1	3	1	4	2	1	6	0	6	0	6	0	0	0

\*See footnote to Table 1.

electric shock or metrazol shock treatments given singly or in combination. The average duration of psychosis in their cases was four and one-half years. Two to four grand mal convulsions were induced daily until regression was considered complete, as indicated by double incontinence and the fact that the "patients acted or talked like a four year old child." The authors believed that 24 of their 25 patients showed significant improvement in adjustment, although at least 11 continued to display some manifestations of psychosis.

The writers' cases were carried well below the four-year-old level described by Kennedy and Anchell, with regression considered complete when the patient was mute, rigid, completely helpless and showed neurological evidence of altered brain function. Kennedy and Anchell's view of functional regression through specific age levels holds a fascination which is difficult to reject. However, it has not been confirmed in the writers' experience. Although some similarities to childlike behavior were noted during the course of REST, the present writers do not consider this to be equivalent to functional regression, such as may occur under hypnosis. They consider regression under REST to be due to temporary, reversible alteration in the neurophysiology. To say that patients with senile or other organic brain disorders may need care like children or infants is more acceptable than to believe that they are functioning like infants.

Weil,<sup>4</sup> in his paper in 1950, described the most intensive form of EST in the literature. His series of 18 chronic schizophrenics, refractory to previous treatment, had seven treatments daily, at 30-minute to 60-minute intervals, until they were considered fully regressed. Only two cases showed any considerable improvement and left the hospital; however, they relapsed into frank psychosis and were returned seven and eight months after treatment. Discouraged by his poor results and justifiably alarmed by two fatalities, he concluded that REST was a dangerous procedure which did not result in lasting improvement.

The present writers feel that Weil's work was a heroic attempt to ameliorate his chronic patients' condition, but do not recommend giving seven treatments a day as a routine. Weil found that he could regress his patients rather quickly (his average duration of treatment was eight and one-half days) by this technique. How-

ever, the writers question that speed is a necessarily desirable goal in the treatment. The fever and marked weight loss in almost all of Weil's patients, and the two deaths in young, apparently healthy, patients, indicate that the treatments must be given cautiously and judiciously. The writers feel that the severity of the physical repercussions was related to the large number of treatments a day, rather than to the total number involved in the treatment course.

In the writers' experience, it is not the number only, but also the spacing of treatments which is beneficial. The writers recommend three shocks a day, given at equal intervals during the day, not within an hour of each other, to permit adequate nutrition. Many of the writers' patients have lost weight during REST, but none have done so with the alarming rapidity of Weil's cases.

Garrett and Mockbee<sup>8</sup> treated 30 schizophrenic patients who had been overtly psychotic for three to six years and had been refractory to previous courses of EST<sup>9</sup> and insulin. All were considered functionally "regressed" before treatment, as they wet and soiled, were coprophagic, were actively assaultive, and were hallucinating. They had three shocks a day, five days a week, to a total of 60 to 72 treatments. One year after treatment, almost all showed some improvement; however, none were sufficiently improved to leave the hospital. The improvements listed included less need of seclusion, restraint and sedation.

Garrett and Mockbee's paper emphasizes that REST<sup>10</sup> is not to be considered a cure for all cases of schizophrenia. Such an unduly optimistic attitude is doomed to bitter disappointment. Their series indicates, however, that REST serves a useful function in hospitals which must care for large numbers of disturbed chronic schizophrenics. As was said in comment on the Kennedy and Anchell series, the present writers feel that the end point of regression should be carried beyond the "three to four-year level." They feel that fewer treatments will be required if they are given daily instead of five days a week.

Although schizophrenia is the greatest problem in psychiatry today, the writers do not feel that one can determine the merits of a therapeutic measure by choosing cases whose prognoses are almost hopeless to begin with. Certainly, success in such a situation would be a dramatic way of proving a method. However, on



the other hand, failure with such cases does not reflect on the method but on the material at hand.

Rothschild et al.<sup>3</sup> intensively treated 52 chronic schizophrenic patients who had previously had adequate courses of insulin, metrazol and electric shock treatments. They gave four shocks daily for one week, attempting to achieve 28 major seizures. At the end of their series, all patients showed varying degrees of incontinence, muteness, apathy and in-co-ordination. Subsequent clinical examination did not reveal organic mental impairment, apart from the temporary changes noted during and shortly after the treatments. EEG studies showed slow wave activity of a temporary nature, but no evidence of permanent alteration. These authors considered REST a "drastic" procedure, "justified only in cases where standard methods of treatment have failed and the course of illness indicates such a poor prognosis that the final step of lobotomy may be considered." They believe that the value in REST thus lies in salvaging a small proportion of such cases.

The present writers feel that the conclusions of Rothschild et al. strike too gloomy a note and stem from their disappointment in their results. The writers consider that 28 EST as a course, is an arbitrary number and will give a varied response, in view of their own cases where a wide range was found in the number (17 to 64) of treatments required to produce the same clinical state. Mention was made of the inability to produce total grand mal reactions in 13 of the Rothschild group's 52 cases. These, plus the four who did not finish their courses, make 33 per cent of their series who did not complete the treatments, by the group's own standards, and hence contributed to the disappointing results. In the present series, although petit mal reactions were encountered, it was found that by increasing the voltage and the time of the current flow, a grand mal convulsion could always be induced. Rather than increasing the dose beyond 150 volts and 0.6 of a second, however, two or three stimulations were given in quick succession. In none of the cases where such high voltage or increased time interval was used did complications arise, nor were resuscitative measures necessary. Only a single instance of clinical cardiac disturbance and prostration was encountered, hence the writers consider these complications to be rare with this technique.

Calloway and Boucher,<sup>9</sup> in their electro-encephalographic study of 23 cases treated intensively by Rothschild et al., noted the complete absence of residual EEG abnormalities five months after the end of intensive EST. They describe a slow wave phenomenon during the early phase of treatment and during the early post-treatment phase. They believed this was a cortical phenomenon, and it disappeared from nine to 21 days after the last treatment.

During the course of REST, there is ample evidence to indicate that changes in cerebral functioning do occur. The simplest change in the psychic sphere is reflected in the impairment of memory, which progresses and becomes part of an organic syndrome, characterized by confusion, memory impairment, bewilderment and lack of inhibitions. Continuation of the treatments leads to the dulling of alertness, to apathy, and finally, to a complete lack of response. Neurological indications of altered function are reflected by increased muscular tonus, rigidity, increased reflexes, the pathological reflexes of Babinski, and occasional ankle clonus. Autonomic changes, perhaps mediated by the hypothalamus, are reflected by the occasional appearance of drenching sweat and goose-flesh, also relaxation, improved appetite and sleep during the early stages of treatment.

Calloway and Boucher conclude, however: "We believe that this intensive shock treatment produces no more permanent electro-encephalographic changes than does orthodox EST." Serial EEG's on 24 REST patients treated by the senior author of the present paper in another institution showed a return to the pre-treatment EEG pattern four weeks after treatment. In no case, was there evidence of a continued change in the EEG.

In the writers' opinion, REST has proved its merit in chronic schizophrenics who were refractory to previous adequate courses of EST and insulin. On the basis of the writers' work they believe that REST should be tried as the treatment of choice when hospitalization is necessary in schizophrenia (except simple schizophrenia) rather than lose valuable time in waiting for results with lesser courses of organic treatment. Since it does not result in cerebral impairment and since its results are far superior to standard forms of EST, the writers feel that it should supplant the standard form, even in patients who seemingly have good prognosis, as, only too often, they relapse in a few months.

It is the writers' impression that, before any patient be subjected to psychosurgery, REST should be given. Those who are able to maintain their improvement will thus avoid the irreparable cerebral damage caused by surgery. Those who improve with REST, but are unable to maintain their gains, may derive more lasting benefit from psychosurgery. The writers feel that those who do not show significant initial improvement are unlikely to benefit from psychosurgery; and, hence, REST may be utilized as a screen against which the anticipated results of psychosurgery may be projected.

#### SUMMARY

1. The writers' technique for REST<sup>1</sup> was described, with emphasis on the neurological determination of the completion of regression. The present cases were considered to have achieved a deeper degree of regression than those previously reported in the literature.

2. A series of 100 cases was presented and the results were analyzed according to the subgroups.

3. Asthma with a major psychogenic component, and refractory to usual medical therapy, may be relieved by REST.

4. Although previously described as a drastic technique, no serious medical complication occurred in the present series other than two fractures, nor was there any indication of cerebral damage. REST is considered a safe procedure, involving no more risks or complications than standard EST.

5. The literature on REST was reviewed in a critical constructive manner, particularly with reference to the interrelationship of technique and results.

6. REST is a superior procedure to standard EST<sup>1</sup> or insulin coma therapy in the treatment of paranoid and catatonic schizophrenia and, if instituted as the first organic treatment, may prevent subsequent repeated relapses.

7. Schizophrenic cases under consideration for psychosurgery should first have a trial of REST.

University of Minnesota Hospitals  
University of Minnesota  
Minneapolis 14, Minn.

## REFERENCES

1. Milligan, W. L.: Psychoneuroses treated with electrical convulsions, the intensive method. *Lancet*, 215:516, 1946.
2. Kennedy, C. J. C., and Ansell, David: Regressive electric shock in schizophrenia refractory to other shock therapies. *PSYCHIAT. QUART.*, 22:317, 1948.
3. Rothschild, D.; Van Gordon, D. J.; and Varjabedian, A.: Regressive shock therapy in schizophrenia. *Dis Nerv. Sys.*, 12:147, 1951.
4. Weil, P.: "Regressive" electroplexy in schizophrenics. *J. Ment. Sci.*, 514, 1950.
5. Bogoch, S.: A preliminary study of postshock amnesia by amytal interview. *Am. J. Psychiat.*, 111:108, 1954.
6. Brody, M.: Prolonged memory defects following electro-therapy. *J. Ment. Sci.*, 90:777, 1944.
7. Perlson, J.: Case of schizophrenia treated with 248 shock treatments. *Arch. Neurol. and Psychiat.*, 54:409, 1945.
8. Garrett, E. S., and Mockbee, G. W.: Intensive regressive electroconvulsive therapy in treatment of severely regressed schizophrenics. *Ohio State Med. J.*, 48: 505, 1952.
9. Calloway, E., and Boucher, F.: Slow wave phenomenon in intensive electroshock. *Electroencephalog. and Clin. Neurophys.*, 2:157, 1950.

## BIBLIOGRAPHY

- Brussel, J. A., and Schneider, J., The B.E.S.T. in the treatment and control of chronically disturbed mental patients—a preliminary report. *PSYCHIAT. QUART.* 25:55, 1951.
- Glueck, B. C., Jr.; Krasner, J. D.; and Parres, R.: The use of serial testing in regressive electroshock treatment. In: *Relation of Psychological Tests to Psychiatry*. Grune & Stratton. New York. 1950.
- Krasner, J. D.: Psychological effects of regressive electroshock therapy. (Unpublished doctorate thesis at New York University)
- Schoor, M., and Adams, F. H.: The intensive electric shock therapy of chronic disturbed psychotic patients. *Am. J. Psychiat.*, 107:279, 1950.
- Thorpe, F. T.: Intensive electroconvulsive therapy in acute mania. *J. Ment. Sci.*, 97:89, 1947.
- Tyler, E. A., and Lowenbach, H.: Polydiurnal electric shock treatment in mental disorders. *North Carolina Med. J.*, 8:577, 1947.