

Psychiatric Shock Therapy

Current Views and Practices

by

GRANVILLE L. JONES, M. D.



Sponsored by

THE MANFRED SAKEL FOUNDATION

THE NATIONAL COMMITTEE FOR MENTAL HYGIENE, Inc.
1790 Broadway, New York 19, N. Y.

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FOREWORD

The Manfred Sakel Foundation sponsored this questionnaire as part of its program to inquire into and advance any medical treatment that brings relief or a chance of recovery to the mentally ill, particularly schizophrenics, whose prolonged misery constitutes a great drain on the spiritual and physical resources of society.

With the discovery of shock treatment by Dr. Sakel some twenty years ago in Berlin, and its introduction to the United States in 1935, great hopes were aroused of helping by medical treatment those often referred to as the incurably insane. This Foundation, composed of laymen, has been anxious to explore and evaluate the treatment to see if its early promise has been sustained by fact and experience.

This subject has been investigated on several occasions in the past by competent and impartial authorities and a considerable amount of written material is in existence. Special mention is made of two such inquiries: one a study on shock therapy by the Mental Hygiene Division of the U. S. Public Health Service in 1942; the other a report submitted to Governor Dewey in 1944 by Mr. Homer Folks, chairman of the Temporary Commission on State Hospital Problems, which covered many other subjects but dealt in some detail on the status of shock therapy in the New York institutions.

Having concluded that a new study would be desirable to throw light on the progress made in the intervening years we sought the cooperation of Dr. George S. Stevenson to assist in the preparation and compilation of the material. We are much indebted to him and his staff for their invaluable assistance.

The questions were sent out to 487 hospitals listed in the 1947 Hospital Number of the Journal of the American Medical Association under description of "mental" or "nervous and mental." Three hundred fifty-nine replies were received, representing 73 per cent, or a sufficiently large segment of the institutions of the country to give real significance to the data. These have been carefully analyzed and ably edited by Dr. Granville L. Jones, in the report that follows this introduction.

We believe that this latest study confirms the broad conclusion of the previous investigations that the Classical Shock Treatment, properly applied, has fulfilled its early promise. It is at present the only practical medical treatment available for dementia praecox (schizophrenia).

It was to be expected that the repeatedly demonstrated usefulness of this treatment, when properly applied, would be universally and promptly taken up by the profession, taught through clinical methods,

and made available to those in need of it on a national scale. However, more than four years have elapsed since the previous official report showed the desirability of expanding the research and implementing the skilled application of this approach to bring it promptly within the reach of those thousands of young people who each year succumb to the dreaded disease. Even though there has been some progress it has been lamentably slow—perhaps due in part to war conditions and shortages, but also in part to false ideas of economy. Added to these factors there has been a reluctance on the part of some psychiatrists to adjust their thinking to the radically new medical approach involved in this therapy.

While we realize that a survey via the mailed questionnaire method is a limited instrument as to scope and accuracy, we can draw certain conclusions from this new material:

1—that there is a medical treatment for schizophrenia—namely, the Classical Shock Treatment as taught and practised by Sakel. Although probably not the complete, ultimate answer, when properly applied it has proved extremely useful.

2—that for emotional disturbances the convulsive factor of shock therapy is distinctly helpful—but

3—the convulsive factor used alone may produce side effects, and the accumulation of these may be damaging.

4—that while the Classical Shock Treatment is acknowledged by the majority to be superior for schizophrenia, the convulsive factor induced by electricity is frequently used for reasons of convenience or expediency.

The principal reasons given by hospitals that do not administer insulin shock are the same now as in the past—shortages of doctors, nurses, and cash. While these same factors have to be contended with they do not seem to inhibit the development of surgical skills or far-reaching programs for other illnesses.

The fear of the treatment is aggravated because there is not a sufficient number of properly trained doctors to administer it skillfully. It should be recalled that a similar situation existed some years ago in connection with appendectomy before skill in removing the appendix was taught and acquired by enough surgeons. Irreversible coma and other serious contraindications should not develop in insulin shock to any greater extent than septicaemia in a properly performed operation.

The expense involved in solving the joint problems of training and proper application is insignificant compared to the alternative of long-term commitment of patients. This would be true even if a smaller percentage of cures resulted than is claimed by the institutions that are doing an outstanding job, such as the Brooklyn State Hospital and the Trenton State Hospital, among others.

In this connection the Folks report mentioned above bears careful study. The Commission found that the use of insulin shock on 1,128 patients at Brooklyn State Hospital between January 1, 1937, and June 30, 1942, effected a saving of 286,695 days of hospital care. The report showed that 79.5 per cent of the insulin-treated patients were able to leave the hospital, compared with 58.8 per cent of 876 untreated controls. There was an average saving of 3.8 months of hospitalization for each of the 879 insulin-treated patients who left the hospital. It is suggested that you apply current per diem costs of custodial care to these figures when considering the ultimate levy against the taxpayers.

In our opinion the outstanding disclosure of this present inquiry is the extraordinary neglect to provide adequate training programs in the only generally available treatment that gives promise of hope to the schizophrenics. In 1936 Dr. Sakel gave a six weeks' elementary course in his methods to one or more doctors from each of nineteen New York State hospitals. A follow-up inquiry of the results obtained by these doctors shed light on astonishing discrepancies in recovery rates. These ranged from 2.4 to 37.1 per cent, averaging 11.1 per cent compared with an average recovery rate of 3.5 per cent for untreated controls (*American Journal of Psychiatry*, Vol. 96, September, 1939). Because standards are uniform in the hospitals of New York State it has been suggested that these wide differences in recovery rates probably were related to the skills of the doctors.

This point is emphasized because the current survey discloses a failure in many places, even today, to provide adequate training in insulin shock therapy. The current survey shows that only 102 physicians are being trained for this purpose in 153 State Hospitals, even though these institutions stated unequivocally that the new approach was the most fruitful. Moreover, the usual type of training is described as "informal apprenticeship." The query arises—apprenticeship to whom? For it should be to masters capable of transmitting their skill, or else mistakes are perpetuated and come to establish themselves as recommended procedure.

We hope that this report will serve once more to remind the responsible authorities that there is at hand a means of alleviating conditions of suffering and horror that have only recently come to the attention of a dismayed public. Their demand will become increasingly insistent that prompt action be taken by Psychiatry to grasp the only expedient, economical, and humane goal—namely, RECOVERY.

THE MANFRED SAKEL FOUNDATION

By

AUGUSTE RICHARD
President

Current Views and Practices in Psychiatric Shock Therapy

by

GRANVILLE L. JONES, M.D.

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Perhaps once in each generation there is a more or less mild revolution in medical thinking or practice, brought about by the introduction of a new concept of a disease or group of diseases, or a radically new form of treatment. Such a revolution in treatment was initiated by Manfred Sakel when he introduced insulin shock. It was given further impetus and significance by the metrazol and electric convulsive techniques which followed quickly. There is little doubt now that the total effect on the practice of psychiatry of these forms of treatment has been so great that shock therapy stands with the Kraepelinian concepts, the fever treatment of Von Jauregg, and the dynamic theories of Freud in the historical sense that each has initiated an epoch in psychiatry. Shock therapy was introduced at a time when, particularly in State Hospitals, there was a general feeling of mild defeatism and stagnation, and it was largely responsible for a wave of aggressive optimism which has been far more healthy, even though at times it was overdone.

Literally thousands of articles have been written about shock therapy, consisting of studies, tabulations, comparisons, etc. It is obvious that there is great need for a general survey, to find out whether we are all talking the same language. Does this person or group use a technique sufficiently similar to the other that figures from one can be compared with figures from the other? What is an "adequate course"? What are the indications and contraindications and are they generally the same? These are a few of the questions which it would seem should be answered in order that we can understand each other when we talk about shock therapy.

In an effort to determine some of these facts, a questionnaire was compiled by representatives of the National Committee for Mental Hygiene and others. It was intended to determine facts, not to defend or advance any particular technique. Provision was made for some

comments and explanation, although such material is very difficult to tabulate in concise form. The questionnaire, consisting of fourteen questions, is shown here.

Shock Therapy Questionnaire

- I. (a) Is physiological shock treatment for psychiatric disorders used in your hospital? Yes..... No.....
- (b) In what year did you start this type of treatment?
- (c) Total number of cases treated?
- II. (a) How many doctors now in your hospital have been trained in insulin shock therapy and are qualified to give it?
- (b) What did the training consist of?
- (c) How many doctors now in your hospital are being trained in insulin shock therapy?
- (d) What does the training consist of?

If answer to Question I is "no," please answer Questions III, IV, and V, and omit remainder of questionnaire. If answer to Question I is "yes," omit Questions III, IV, and V.

- III. What are your reasons for not using shock therapy?
- IV. If shock treatment was ever used, in what year was it discontinued?
- V. (a) Do you consider any other treatment more effective in schizophrenia than the physiological shock treatment? If so, what?
- (b) Is it your experience and opinion that schizophrenia is a self-curing disease?
- VI. What contraindications do you consider as precluding shock therapy?
- VII. Which means to induce a physiological shock do you prefer for (change the categories to suit your practice if desired):

 - (a) Schizophrenia? Electricity..... Insulin.....
 - (b) Manic-depressive? Electricity..... Insulin.....
 - (c) Severe psychoneurosis? Electricity..... Insulin.....
 - (d) Involutional melancholia? Electricity..... Insulin.....

- VIII. Which reaction type of the physiological shock have you found more effective:

 - (a) In schizophrenia? Convulsion..... Coma.....
 - (b) In manic-depressive? Convulsion..... Coma.....

- IX. Which of the following specific means of inducing a physiological shock for therapeutic reasons are used by you:

 - (a) Insulin alone?
 - (b) Electricity alone?
 - (c) Metrazol alone?
 - (d) The above in combination?
 - (e) Other means? (please describe)

- X. What unfavorable organic after-effects do you get after shock treatment induced by:

 - (a) Insulin?
 - (b) Electricity?

- XI. If insulin is used as the principal means of inducing a therapeutic shock, is it given according to the original outline by Sakel in his book, "Pharmacological Shock Treatment," i. e., by intensifying the shock to the maximum possible therapeutic degree resulting in either convulsions or coma? Yes..... No.....
- XII. If the answer to question XI is "yes," please state:

 - (a) Maximum dose
 - (b) Minimum dose of insulin generally used to induce a shock.
 - (c) Length of time of complete coma or grand mal.....

- XIII. If the Sakel outline is modified, what modifications are used?
- XIV. If electricity is used, do you aim for

 - Grand mal, resembling insulin convulsion?
 - Coma-like state, resembling insulin coma?

This questionnaire was sent to 487 hospitals, listed in the 1947 Hospital Number of the Journal of the American Medical Association under the description of "mental" or "nervous and mental." They were mailed on December 11, 1947, and followed up a month later with a reminder. On February 2, 1948, a total of 359 replies had been received, equalling 73 per cent. These contain the material analyzed here. There were a few received after that date, with answers which would not have changed the figures significantly.

It is the writer's opinion that 73 per cent represents a sufficiently large segment of the psychiatric institutions of the country to give statistical significance to the figures. It certainly covers a representative cross-section—state, county, city, Veterans Administration, private, endowed, and university hospitals are all included.

The questionnaires were marked and the answers tabulated and summarized by a worker in the National Committee for Mental Hygiene office.¹ This analysis is given in part, with comments and interpretations by the present writer. These are entirely his own views, and for them he is solely responsible. They do not necessarily represent the opinions of the National Committee.

The questions have in some instances been rearranged, since it seemed that a different sequence was more logical. The original numbering of the questionnaire has been retained.

I. (a) Is physiological shock treatment for psychiatric disorders used in your hospital?

	No.	%
Yes	302	84
No, never	53	15
No, discontinued	4	1
	<hr/> 359	

¹ Mrs. H. B. MacDonald, M.A., a psychologist with experience in public opinion research. The writer wishes to express his gratitude to Mrs. MacDonald for making his task easier, and his admiration for the thorough job she did.

The fact that 302 hospitals use shock (approximately 84 per cent) certainly indicates that a large majority of our treatment institutions are convinced that it has a place in the psychiatric therapeutic armamentarium. It is likewise significant that only four have discontinued it. It would have been interesting to know the reasons. One is tempted to speculate—lack of trained personnel, or change in policies of admission?

Some of the "yes" answers included comments indicating limited use (because of type of patients treated), or that shock therapy had just been started.

I. (b) In what year did you start this type of treatment?
(Replies from all respondents now using shock therapy)

	No.	%
1933-1935	10	3
1936	31	10
1937	67	22
1938	54	18
1939	24	8
1940	9	3
1941	24	8
1942	13	4
1943	20	7
1944	10	3
1945	11	4
1946	16	5
1947-1948	5	2
No answer	8	3

302

(More than one date was given by some respondents, for various types of shock therapy; the earliest date mentioned was the one tabulated.)

Over half of the hospitals started the use of shock by the end of 1938. This was the period of introduction, and one remembers well the wave of enthusiasm and often uncritical optimism which aroused deep anxiety in many. There were fears that the methods were in danger of being discredited by their promiscuous use and the premature reports of success. The steady increase in its use, all during the war period and since, indicates that we are now witnessing a much more conservative attitude and a well grounded acceptance of its value. Since the various types are not separated, it is impossible to chart the rise and fall of metrazol, its replacement by E.C.T., and the reluctant abandonment of insulin during the wartime famine of nurses. These would be interesting and informative facts, but had the questionnaire been made much longer the percentage of returns would doubtless have dropped seriously.

IV. If shock treatment was ever used, in what year was it discontinued?
Two of the four hospitals stating that they have discontinued shock treatment give dates: 1941 and 1942.

The paucity of replies to the question regarding the date of discontinuing shock makes any comment pointless.

I. (c) Total number of cases treated.
(Replies from all respondents now using shock therapy.)

Cases	No.	%
1 - 100	10	3
101 - 200	20	7
201 - 300	20	7
301 - 400	16	5
401 - 500	18	6
	93	28
501 - 600	15	5
601 - 700	17	6
701 - 800	8	3
801 - 900	9	3
901 - 1000	19	6
	68	23
1001 - 1500	27	9
1501 - 2000	20	7
2001 - 2500	14	5
2500 -	34	11
No answer	46	15
	302	

(Incomplete answers: These figures slightly underestimate the total number of cases treated, as some hospitals (less than 50) could not give complete figures; e. g., they gave only the number of cases treated by electroshock.)

There is cause for embarrassment in that 15 per cent of the hospitals using shock apparently do not have accurate figures of the number of cases treated. Good hospitals keep good records!

The total number of cases treated, as far as accurate records go, has now reached a rather important number. Thirty-four of the hospitals have treated more than 2,500, and 95 more than 1,000. It would certainly seem possible now to compile figures large enough to be statistically valid.

II. How many doctors now in your hospital have been trained in insulin shock therapy and are qualified to give it?

Doctors trained in insulin shock	No.	%
1	59	16
2	81	23
3	32	9
4	34	9
5	9	3
6	12	3
7	2	1
8	4	1
9	4	1
10	4	1
11 - 25	15	4
Number unspecified	2	1
	258	72
None	51	14
No answer	50	14
	359	

Presumably most of the 51 hospitals with no doctors trained in insulin are among the 57 which do not use shock, but there are, of course, many hospitals in which electric convulsive therapy is used exclusively and there is no present necessity for training physicians in the insulin technique.

II. (b) What did the training consist of?

(Replies from all hospitals in which there are doctors trained in insulin shock therapy; i. e., percentages are of 258, but add to more than 100 per cent because some hospitals gave separate answers for different staff members.)

	No.	%
1. Practical experience, under supervision; about one-third mention in addition reading, observation, lectures, etc.; times mentioned range from 3 weeks to 4 years, with 3 to 6 months most frequent.	111	43
2. Learning by experience independently, with some guidance from reading, observation visits to other hospitals, lectures, demonstrations.	41	16
3. Special courses at various hospitals, Dr. Sakel's courses at Harlem Valley State Hospital most frequently mentioned; special training visits to other hospitals.	31	12
4. Residency, fellowship, postgraduate training.	17	7
5. Incomplete answers, including:	64	25
a. Experience; e. g., "previous insulin experience," "10 years' experience," "private and state hospital work."		
b. Place of training; e. g., "state hospital training."		
c. By whom training given; e. g., "trained by competent psychiatrist."		
d. Length of training; e. g., "several months' insulin training."		
e. Content of training; e. g., "administering correct dose, when to increase and decrease, etc."		
6. No answer.	10	4

The failure of most mental hospitals to develop the specialty training methods common in surgery, E.E.N.T., etc., is evident here. Most of the physicians doing this difficult and potentially dangerous therapy were trained by apprenticeship, and some by independent experience! It is certainly to be hoped that the psychiatric training program now being developed will eliminate this unsatisfactory situation. Another point, of considerable interest to the writer, is that the State Hospitals can no longer expect to recruit ambitious, keen young doctors unless they can offer worth-while training programs, approved by the Specialty Boards.

II. (c) How many doctors now in your hospital are being trained in insulin shock therapy?

Doctors being trained	No.	%
1	33	9
2	26	7
3	11	3
4	6	2
5	5	1
6	6	2
7	2	1
8	5	1
9	—	—
10	1	—
11-24	6	2
Number unspecified	1	—
	<hr/> 102	<hr/> 28
None being trained	249	70
No answer	8	2
	<hr/> 359	

(Nature of training: Among the hospitals in which there are doctors being trained are 10 which have been tabulated in Question XI as using moderate or light coma, or subcoma, rather than deep coma.)

II. (d) What does the training consist of:

(Replies from all hospitals in which there are doctors being trained in insulin shock therapy.)

	No.	%
1. Practical experience under supervision; almost half mention, in addition, reading, lectures, observations, etc.; times mentioned range from 1 to 6 months, with 3 months most frequent.	84	82
2. Observations, lectures, reading, demonstrations, etc.	10	10
4. Residency training.	1	1
5. Incomplete answers.	3	3
6. No answer.	4	4
	<hr/> 102	

Two things are gravely wrong with the picture presented here: there is a relatively small number of hospitals giving training in insulin therapy, and the training being given appears to be rather informal and loosely organized. No doubt many skilled therapists are developed by apprenticeship methods. However, it is difficult to measure the effectiveness of such training, and in view of the shortage of physicians in State Hospitals there is reason to believe that inadequately trained doctors are rushed into the work at the expense of their patients. Furthermore, shock is only one small field of psychiatry, and should be taught in its proper relationship—in short, as a part of a residency in psychiatry, not as a thing in itself.

III. What are your reasons for not using shock therapy?
(Replies from all hospitals not using shock therapy.)

	No.	%
1. Not treatment hospital; for care of chronic or senile, or for observation; 6 also mention lack of facilities and/or personnel.	36	63
2. Type of patients not thought suitable—alcoholics, neurotics, etc.; 1 also mentions lack of equipment.	3	5
3. Hostile or indifferent to shock therapy; 1 also mentions lack of personnel.	6	10
4. Lack of facilities and/or personnel; 2 comment that patients needing shock are transferred elsewhere.	5	9
5. Patients needing shock therapy are transferred elsewhere.	2	4
6. No answer.	5	9
	57	

Hostile or indifferent answers are as follows:

Danger to patient, and my conclusions as to its ultimate benefit.
Discontinued because we doubt the permanency of beneficial results.
There seems to be a possibility of deterioration being expedited.
The opinions formed were that not enough benefit accrued (or none at all, or even further deterioration) to warrant its continuance.
Experimental, much abused, too commercial.
Its indiscriminate use in other centres without controls.
We are interested in the application and development of the principles of intensive psychotherapy to the psychoses.

Several comments come to mind in regard to the 36 hospitals which classify themselves as non-treatment hospitals, or as observation hospitals only. It would seem somewhat difficult to justify the term "hospital" if no effort is made to treat. It also seems a questionable policy on the part of the governing bodies to segregate chronic patients from acute. This policy was explored a hundred years ago in New York State, and found to be unsatisfactory because of the rather obvious effect on the medical personnel. The recent vogue of "receiving hospitals" seems to the writer to be a back door approach destined to have the same result. A better situation would probably result from the development of psychiatric accommodations in general hospitals, with all mental hospitals staffed and equipped to treat acute and subacute cases not promptly relieved by the general hospitals.

Thirteen hospitals report lack of facilities and personnel. This is a sad commentary on the situation in mental hospitals today. Could a general hospital, no matter how small or isolated, justify the lack of a surgical table and someone able to do a laparotomy? Certainly an electro-shock machine is cheap enough, and the equipment necessary to give insulin shock is even more trivial in cost. The lack of personnel is often difficult for local authorities to overcome, when legislative bodies are niggardly in their appropriations and official salary scales are low, but reflects no credit on the state responsible.

The replies indicating hostility or indifference to shock therapy are surprisingly few, being only 10 per cent of the total group of hospitals not using shock. If all hospitals were as well staffed as they should be, there might be an appreciably larger number who preferred the psychological to the pharmacological (or, perhaps more correctly, the physical) approach to therapy. Probably most psychiatrists believe that in the ultimate analysis mental disease is psychogenic and, therefore, is properly treated by psychological methods, properly integrated with appropriate medical and surgical measures. However, in view of the incompleteness of our present knowledge, and the consequent crudity of our treatment, most of us are not willing to reject any empirically useful methods. The perennial problems of finance, the attitude of the public (which can understand passing an electric current through a patient's head but bogs down in an esoteric explanation of ego, id, and superego), the difficulties of procuring training and utilizing competent auxiliary personnel, all constitute enormous obstacles to the practice of ideal psychiatry. The same problems, one must observe in all fairness, exist in the practice of somatic medicine. Surgery is largely a primitive approach to disease, and in the Utopian future will be limited to a few such conditions as skeletal injuries. Nevertheless, until our mastery over micro-organisms and tissue degeneration is far more advanced than it is at present, we must accept, utilize, and be grateful for the surgeons' skill!

Finally, the reasons given for opposition reflect the existence of a healthy scepticism toward shock. They are based on the findings and observations of some competent observers, and should force the advocates of the therapy to examine their results more critically and to control their studies more carefully.

V. (a) Do you consider any other treatment more effective in schizophrenia than the physiological shock treatment? If so, what?
(Replies from all hospitals not using shock treatment. However, since this question was presumably intended chiefly for the group hostile or indifferent to shock therapy, their comments are also quoted separately below.)

	No.	%
Yes; other treatments suggested—psychotherapy, etc.	4	7
No other treatment more effective.	9	16
"Depends upon case and condition."	1	2
No answer.	43	75
	57	

Comments from hostile or indifferent group:

Integrated psychotherapy with tension-lessening gymnastics and recreational program.
Personal attention and rapport between physician and patient.
We feel that intensive psychotherapy shows promise of alteration in basic personality patterns.
Depends upon case and condition.
No answer, 2.

It would seem that if a hospital had no treatment more effective the treatment under comment would be used until such time as a better one could be found. However, our figures reveal that the largest number of those answering the question have nothing in mind better than shock, although they do not use it. Speculatively, one supposes that the dangers of accident or deterioration, or the lack of equipment or trained personnel has produced this curious situation.

It would have been more revealing had the question been framed in such a way that shock or other treatment were not exclusive. Many psychiatrists have reported on the effective combination of shock and psychotherapy, and some comments to that effect appear in the answers and in letters of transmittal.

It also seems that a mistake was made in framing the question to exclude those who use shock therapy. A fairly large number of shock-using institutions answered the question, and some protests were entered at the intended exclusion.

The three therapeutic plans given as superior to shock, by the group listed as hostile or indifferent, are admirably phrased, considering the restrictions of space. If facilities (and funds) were available, no doubt many of us would like to use such treatment in most of our early cases, with shock as an alternative, to be instituted if the symptoms were not relieved quickly. However, it will be many years before there are a sufficiently large number of skilled psychiatrists to give all early schizophrenics intensive psychotherapy, and one wonders how such a program could be financed, granted the doctors were available.

V. (b) Is it your experience and opinion that schizophrenia is a self-curing disease?
(Replies from all hospitals not using shock treatment. However, since this question was presumably intended chiefly for the group hostile or indifferent to shock therapy, their comments are also quoted separately, below.)

	No.	%
Yes; in many cases; many remissions.	4	7
Some cures or remissions.	4	7
"Personality outgrowth."	1	2
No; not self-curing.	5	9
No answer.	43	75
	<hr/>	
	57	

Comments from hostile or indifferent groups:

In many cases, yes.

Sometimes and in suitable environment.

We do not feel that it is self-curing but that there may be remissions without active treatment, but also in all probability without much basic change in the personality structure.

Personality outgrowth.

No answer, 2.

Since 75 per cent of the institutions not using shock did not answer this question the small percentage of those who did has no statistical significance. The replies are nevertheless of interest.

Perhaps all of us have had the experience of seeing an apparently hopeless case of undoubted schizophrenia go into a remission without an adequate explanation. However, since practically all schizophrenics of any severity are hospitalized, it is questionable that these remissions should be considered as self-induced. The patient has been removed from a possibly pernicious environment, is subjected to some degree of restraint and regimentation, and, in the better hospitals, to suggestion, encouragement, and the considerable psychotherapeutic effect inherent in occupational therapy, and nursing attention. Self-cure? Perhaps, just as in tuberculosis, in which disease some patients will achieve an arrest with restricted activity and good food. However, in most cases of tuberculosis which reach a moderately advanced stage, some interference by the physician or surgeon is necessary, and in schizophrenia one should not wait for the one-in-a-million chance of "spontaneous" remission.

This writer is also troubled by the lack of uniformity and clear criteria in the diagnosis of the so-called psychogenic mental illnesses. It is noteworthy that institutions vary considerably in the schizophrenic-cyclothymic ratio and there is no doubt that some cases of "schizophrenia" showing remissions in one hospital would have been called manic-depressive types in another. Who is right?

VI. Contraindications.

Summary

(Replies are from all respondents using shock therapy; i. e., percentages are of 302, but add to more than 100 per cent because respondents gave replies in more than one category.)

	No.	%
1. Cardiac and cardio-vascular	237	78
2. Pulmonary and respiratory	188	62
3. Skeletal	113	38
4. Cerebral and neurological	59	19
5. Renal	42	14
6. Hepatic	15	5
7. Glandular	39	13
8. Pregnancy	15	5
9. Miscellaneous physical	23	8
10. Age	36	12
11. Undefined infections, febrile states	61	20
12. Undefined physical disorders, debility, etc.	81	27
13. Long duration, etc., of mental illness	14	5
14. Miscellaneous psychological	16	5
15. Those commonly accepted; "those listed by Sakel in his articles 1937-42"	4	1
16. None, almost none	2	1
17. Depends on individual, on type of shock	2	1
18. No answer	12	4

The percentage of answers to this question is an impressive one, and the variety of conditions listed as contraindicative is startling. However, it is seen that relatively few general categories are considered important—cardiovascular, pulmonary, and skeletal with the other conditions generally listed in far fewer numbers.

Inasmuch as cardiovascular and pulmonary are the only two disease classes listed by more than 50 per cent, one assumes that most of the others are considered *relative* contraindications by a majority—that is, granted a psychosis appearing to have a good prognosis for response to shock, or, perhaps being in itself a threat to life, the risk, let us say of skeletal injury, is calculated as sufficiently less than the possible gain to justify going ahead. As a matter of fact, the writer has seen cases of active tuberculosis, pregnancy, cardiovascular disease, fractures (protected by cast or curare), neuro-syphilis, and hernia, treated and usually benefitted by shock. Some of these patients were suffering with a severe psychosis, interfering with sleep and nutrition, which appeared likely to lead to a fatal termination unless interrupted. Others were patients whose psychosis prevented proper handling of the complicating condition—the same dilemma in a lesser degree.

It seems probable that some of the conditions listed by a few institutions only are based on unfortunate experiences with the specific conditions, and that some are theoretical only. In general, however, it is obvious that any condition in which irreversible or irreparable damage is considered likely to result is held to contraindicate shock therapy by experienced shock therapists.

Under cardiac and cardiovascular there were altogether 113 different combinations and permutations of diagnostic terms and syndrome names. They will not be reproduced here in the whole—they range from simple "cardiac disease" (listed by 37) to such as "cardiac disease; serious hypertension; history of coronary occlusion; failure; dysrhythmia." Some gave specific arterial pressure figures, ranging from "170 systolic or higher" to "hypertension over 240 systolic." One would indeed hesitate at the latter finding! Others listed coronary diseases—specifically, in various questionnaires, "acute," "severe," "active," or "recent," as well as the unqualified listing, which was given by 5. Also mentioned are aneurysm, cerebral vascular conditions (including brain hemorrhage!), angina, heart block, thrombo-phlebitis, and fibrillation.

In the pulmonary and respiratory contraindications there is much greater agreement or at least more uniformity of terminology. There are only 29 different listings, headed by "tuberculosis" (77 times), and "active tuberculosis" (48 times). In other questionnaires this disease was listed as contraindicating shock if it was "incipient." Other respondents gave lung abscess, bronchiectasis, suppurative pulmonary dis-

ease, and some covered the matter with such generalizations as "any pulmonary disease unless of very mild or benign nature."

Under skeletal contraindications there are 75 terms listed in 113 questionnaires. However, the terms are almost all reducible to three: bone diseases, deformities, and fractures. Some specify that the disease be extensive, or serious, some used general terms ("skeletal fragility," "atrophy," "osteopathies"), or refer to a specific disease (tuberculosis), or a general state (senescence). Joint conditions are mentioned by a few. The replies mentioning deformity mostly refer to the spine, but general terms (orthopedic defects, gross deformities) are sometimes used. Fractures naturally occur most frequently in the replies, altogether 38 times in combination or singly. Some specify acute or recent, but one or two use the terms "old" or "history of." Fractures of skull, both recent and old, are listed.

Fifty-nine replies listed cerebral or neurological contraindications or both. The general term "organic brain disease" (or the essentially synonymous term "intracranial pathology") was used by 14. There were a number of others who qualified this by "severe," "advanced," or "certain," or specified expanding or destructive lesions. A fair number preferred not to shock cases of syphilis of the brain or nervous system and a few exclude encephalitis. A good many mentioned brain injuries or head traumata, some qualifying these as "severe" or "recent." Other conditions mentioned were neoplasms, epilepsy, cerebral dysrhythmias, and hypothalamic syndrome. One respondent covered the subject completely by listing "organic complications!"

Among the 42 respondents including renal contraindications most gave simply "renal disease" (16) or "serious renal disease" (14). Others use modifying terms "certain" or "active," and the rest specified nephritis of some degree or extent.

Some 15 questionnaires indicated that shock would not be given to patients with hepatic disorders. All except one were content with "hepatic disease," either unmodified or as "serious," "active," or "certain." The exception specified cirrhosis.

Out of the 39 replies listing glandular contraindications, 19 mentioned diabetes, and 6 others pancreatic disease. A total of 9 (there was some overlapping) considered thyroid dysfunction as barring shock.

As one would expect, post-operative or post-puerperal states are considered as contraindication by a significant number of respondents. These are included in the miscellaneous group in the analysis. Other replies mentioned gastric or peptic ulcer, "bleeding lesion of gastrointestinal tract," "certain hernias," and one mentioned "recent

wounds." Two listed detached retina, one glaucoma. Eleven considered malignancy, one specifying "advanced carcinoma."

It is quite interesting to note that a few respondents judged 40 as the maximum age for shock, others 50, 60, or 70, and one felt that 80 was the limiting age! Most of those mentioning age as a contraindication gave general terms as "senility" or "extreme age." One gave "extreme of age in either direction."

Listed under "infections and febrile states" are 61 replies, in which the general consensus is that shock should not be given in the face of infections of significant degree. Thirty-two listed "acute (or active) infections," and 14 "febrile states." Other replies indicated temperature limits, as "100 oral" or "102 rectal." A few considered chronic infections as objectionable, and the other replies include "toxic" or "septic" states.

In 81 questionnaires, replies were given listing physical contraindications of a general, nonspecific nature which could not be conveniently classified in the categories listed above. Representative of these are "physical disease" (5); "poor physical state" (5); "serious physical illness" (9); "debilitated states" (8); "serious debilitating disease" (5). One respondent, in the writer's opinion, gave the most apt reply possible by saying "any physical disease or condition which would substantially increase the risk of treatment."

As noted, 14 replies considered chronicity or long hospitalization as contraindication, particularly in schizophrenics. Some gave specific times, as "one year," or "more than a year and a half." Occasionally replies touched on clinical findings of bad prognostic implication, as "insidious onset," "previous failures with shock," or "tendency to relapse."

Some 16 questionnaires gave contraindications which did not fit under the previous category, although they were generally of a psychological nature. Typical replies were: "mental deficiency," "psychopathic states," "psychoses other than schizophrenia and affective disorders," "most psychoneuroses," "acute alcoholism." Other more general replies were: "fear and antagonism," "fear of treatment," "memory defect," "advanced regression." Curiously enough, one reply gave inability to cooperate as a basis for rejection, and another listed "amenable to psychotherapy in a cooperative patient with insight." One can understand the apparent paradox, although the majority of psychiatrists would probably treat the non-cooperative patient in the hope of reducing that particular symptom, and many would shock the patient with insight with the hope of accelerating his response to psychotherapy.

VII. (a) Which means to induce a physiological shock do you prefer for schizophrenia—electricity or insulin?
(Replies from all hospitals using shock therapy.)

	No.	%
Insulin	153	51
Electricity	85	28
Both	50	16
"Neither gives good results"	1	—
Treat chronic cases only	2	1
"We use electro-shock only"; no answer	1	—
No answer	10	3
	<hr/> 302	

About half the hospitals using shock give insulin shock as the preferred treatment for schizophrenia, either unqualifiedly or listed first with electricity, metrazol, or some combination second. The group which qualifies (22 out of 153) is largely offset by a similar group (15 out of 85) who qualify their preferences for electricity. It appears that the preference for insulin is based on a feeling that it is the most effective, and that the preference for electricity is because it is simpler and shorter, and will be followed if necessary by the more formidable insulin treatment.

The answers giving "both" as the treatment of choice are, perhaps, ambiguous. Many mean a combination in which a convulsion is produced by electricity (a few use metrazol) during or immediately after an insulin-induced coma. Others mean the use of insulin for one subtype of dementia praecox, electricity for another. Others give such incomprehensible answers as "insulin 50 per cent, electricity 50 per cent," or "depends on the case."

In analyzing the explanatory and qualifying comments, it is evident that a definite majority of all psychiatrists using shock feel that insulin is the heavy artillery in schizophrenia. Many prefer to use it at once and in all cases; others use it at once in the cases with bad prognosis (paranoid and hebephrenic types). A smaller group use electricity first in all cases or in the cases with a better prognosis (catatonic type or "acute episodes") with recourse to insulin if electricity fails.

VII. (b) Which means to induce a physiological shock do you prefer for manic-depressive—electricity or insulin?

	No.	%
Electricity	278	92
Insulin	9	3
Both	6	2
Treat chronic cases only	2	1
Use EST only; no answer	1	—
No answer	6	2
	<hr/> 302	

In treating manic-depressive psychosis the preference is so overwhelming as to be almost unanimous. Ninety-two per cent indicate preference for electric shock, with a few (2 per cent) indicating that

this preference applied only to the depressed phase. The 3 per cent who placed insulin first and the 2 per cent who used a combination also contain some who qualified their replies.

In short, the consensus is that electricity is the effective type of shock for manic-depressives.

VII. (c) Which means to induce a physiological shock do you prefer for severe psychoneurosis—electricity or insulin?

	No.	%
Electricity	158	52
Insulin	50	16
Both	18	6
Neither; do not use shock for psychoneurosis	64	21
Treat chronic cases only	2	1
Use EST only; no answer	1	—
No answer	9	3
	<hr/>	
	302	

In regard to the psychoneuroses (it should be noted that the question was worded "severe psychoneuroses") the replies were much less clear-cut and decisive. While 52 per cent listed electricity as the method preferred, there was a sizable group (10 per cent of the hospitals using shock) who qualified their choice by such comments as "not very effective," "rarely used," "only with depression," "when irresponsible to psychotherapy," or to indicate that electricity was used more or less routinely with recourse to insulin if it failed.

In the replies listing insulin as their first selection, many indicated that less than coma doses were used, and others that some selected cases were treated (implying that most were not). In one reply, cases with anxiety were treated.

In the group giving "both" as their method, half of them qualified the answer, in most instances by such statements as "both methods used as adjuncts, particularly electricity in severe depressions and subshock insulin in anxiety states."

Another large group (21 per cent) stated categorically that they did not use shock for psychoneuroses. It is clear, then, that a larger group of all answering are more dubious as to the value of shock in psychoneurosis than in schizophrenia or manic-depressive, that if shock is used, electricity is preferred, and that insulin is likely to be used in "tonic" or subshock dosages.

VII. (d) Which means to induce a physiological shock do you prefer for involuntional melancholia—electricity or insulin?

	No.	%
Electricity	282	94
Insulin	6	2
Both	2	1
Treat chronic cases only	2	1
Use EST only; no answer	1	—
No answer	9	3
	<hr/>	
	302	

Little need be said in reference to the replies to the question regarding involuntional melancholia except to comment that in any field of therapeutics, 94 per cent is practically equivalent to unanimity!

Among the six replies selecting insulin, two indicated that convulsive therapy was used to some extent.

VIII. (a) Which reaction type of the physiological shock have you found more effective in schizophrenia—convulsion or coma? (Replies from all hospitals using shock therapy.)

	No.	%
Coma	146	48
Convulsion	94	31
Both	20	7
Depends on individual case	5	2
Depends on type of schizophrenia	8	3
Neither effective	1	—
Treat chronic cases only	2	1
No answer	26	9
	<hr/>	
	302	

In the analysis of the replies to this question there is reason to believe that some respondents were not answering on the basis of experience with both types of shock reaction, but were merely stating which type they used; hence there is some doubt as to the validity and significance of their replies. This is true of both parts of the question, and is based on a comparison of the replies to this and to Questions XIV and IX.

However, assuming that the replies are valid, it would appear that more than half the respondents are of the opinion that coma is desirable in schizophrenia (48 per cent coma plus 7 per cent both). This is more impressive in view of the replies to Question IX and the common knowledge that electro-shock is used by necessity in many institutions lacking the nursing staff necessary to use insulin.

VIII. (b) Which reaction type of the physiological shock have you found more effective in manic-depressive—convulsion or coma? (Replies from all hospitals using shock therapy.)

	No.	%
Convulsion	266	88
Coma	16	5
Both	2	1
Depends on type of illness	1	—
Treat chronic cases only	2	1
No answer	15	5
	<hr/>	
	302	

Bearing in mind that the replies to this question may be slanted somewhat in favor of convulsive therapy, it is still apparent that the convulsive reaction is believed to be desirable in treating manic depressives. A few qualified their answers to specify depressions, or to indicate that coma was better in manics; but there are not enough to change the percentages more than a point or two.

IX. Which of the following specific means of inducing a physiological shock for therapeutic reasons are used by you?

(Replies from all hospitals using shock therapy; i. e., percentages are of 302, but add to more than 100 per cent as more than one means was chosen by most respondents.)

	No.	%
Electricity alone	278	92
Insulin alone	176	58
Metrazol alone	62	20
Combinations of the above	162	53
Other means	7	2
No answer	1	—

Other means are the following:

Lobotomy (2)
 Prefrontal lobotomy
 Histamine (2)
 EST with coramine
 Intravenous sodium amytal and sodium pentothal
 CO₂ facilitation
 Intravenous insulin, electro-shock comb. + sodium amytal facilitation, post-coma

While there were only 302 hospitals using any form of shock, it is noted that there were 686 checks as to the method used. This came about because many used two or more. The percentages given are of 302.

It is to be borne in mind that this question is one of fact and not of opinion. The opinions have already been asked in Questions VII and VIII. The answers to Question IX indicate that a large number of hospitals use electricity and not insulin. Many of these do so of necessity and not from choice—low budgets and inability to find registered nurses make it difficult to carry out many therapies which we know to be desirable.

While the nature of combinations was not asked for, a number of respondents did describe the ones used by them. Electricity with insulin was the one most frequently mentioned.

From the replies to other questions it seems probable that some (about 20) who checked "combination" meant that they use both insulin alone and electricity alone. These have been added to the totals given above for consideration of Questions X and XIV, bringing the number using insulin to 196 and the number using electricity to 295.

An interesting figure is the number (62) who use metrazol alone. It had been my impression from casual observation and conversation that metrazol had been almost completely superseded by electricity. This must have been the belief of the group who framed the questionnaire, since no special comments as to its efficacy, etc., were called for.

Another interesting list is that of "other means" given. One could arouse an argument very easily over the propriety of listing lobotomies and intravenous barbituates as shock therapies!

One point which should be noted is that a sizable number of replies indicated that insulin was used in less than coma dosage. These have all been tabulated under insulin, regardless.

X. (a) Unfavorable effects—insulin.

Summary

(Replies are from all respondents using "insulin alone"; i. e., percentages are of 196, but add to more than 100 per cent because respondents gave replies in more than one category.)

	No.	%
1. Prolonged coma, including irreversible	57	29
2. Delayed reactions	10	5
3. Amnesia, confusion; mental and/or emotional disturbance or deterioration	7	4
4. Headache, dizziness, vomiting, chilling, exhaustion, "post-comatose conditions"	11	6
5. Temporary sensory disturbances, paralysis	6	3
6. Spontaneous post-therapy convulsions	5	3
7. Cerebral complications, damage	4	2
8. Cardiac collapse, disturbances	10	5
9. Pulmonary and respiratory complications	16	8
10. Skeletal injuries	8	4
11. Weight gain	11	6
12. Other physical	11	6
13. "As described in Ryan 'Shock Treatment in Psychiatry' and in 'Shock Treatment' by Kalinowsky and Hoch"	1	1
14. None; almost none; nothing serious; nothing permanent; none with proper care; none with subshock doses	64	35
15. No answer	16	8

It is hard to explain the 8 per cent of questionnaires in which no answer is given regarding unfavorable effects incidental to insulin shock, except as indicating carelessness or indifference. However, since one-third of the respondents indicated that no serious results occurred, perhaps the omission could be interpreted as indicating "none."

It is noteworthy that included in the "none" group are the replies "none with proper care" and "none with subshock doses." One need not question the honesty of these answers to challenge their validity in such an analysis as this. Subshock insulin is usually not dangerous, but reports have been published recently of fatalities from irreversible coma from doses thought to be below the level of shock. Furthermore, if it is necessary to extend the hypoglycemic state to the degree of coma or convulsion, this reviewer is definitely skeptical of the statement that there is no danger. I suppose it depends on what is meant by "proper care," although it is generally considered that there is no organization of human beings completely infallible. As long as *people* make up solutions, observe symptoms, make decisions as to the margin between desirable shock and danger signals, work as a team in such things as gavage and venoclysis, and have to distinguish between the breathing of a deep sleep and insulin reaction, it is my firm conviction that accidents will happen, just as morbidity and mortality still occur in lapar-

otomies, even in the best surgical centers. It should be noted here that "delayed reactions" and "spontaneous post-therapy convulsions" are considered by some to be unfavorable effects. Theoretically the convulsions might be eliminated by careful screening, particularly by electroencephalography, but that would probably screen out many possible recoverable cases. I do not see how the delayed reactions could be eliminated, but careful supervision can certainly reduce the danger of permanent bad results.

Prolonged coma, or, as it is sometimes called, irreversible coma, is listed by only 29 per cent of the respondents. Even if the 2 per cent of "cerebral complications" and the 6 per cent of amnesia, confusion, etc., are added (which is not entirely justified) the total is still surprisingly low. This may be taken as a reflection of the skillful management today of insulin shock, since most of us who observed this therapy in the first few years after its introduction know only too well the formidable nature of this complication. Since the question was worded, "What . . . do *you* get?" the fact that two-thirds of the respondents do not list this does not, of course, eliminate it as a definite possibility to be borne in mind and guarded against.

Pulmonary and respiratory complications constitute the next largest group, but are listed by only 8 per cent. Here again there is reason to believe that careful methods are paying dividends, notably the screening out of tuberculosis and more frequent use of intravenous glucose in place of the stomach tube.

The same comments are somewhat appropriate in regard to cardiac complications. There should be very few such cases, if careful pre-treatment examinations are made, unless one deliberately assumes certain risks because of the urgency of the psychiatric disorder.

The skeletal injuries mentioned are mostly spinal fractures from convulsions and are hence no more disabling nor preventable than those occurring in electro-shock therapy or epilepsy. Some other fractures and dislocations are mentioned.

The other complications are mostly of relatively benign and transitory character, and while undesirable are certainly minor compared to the mental disease being treated. Under item 12, "other physical," some replies listed death, with the cause not listed except in one instance. This was said to be due to "extensive destruction of liver and pancreas," which leaves the story still incomplete.

X. (b) Unfavorable effects—electricity.

(Replies are from all respondents using "electricity alone"; i. e., percentages are of 295, but add to more than 100 per cent because respondents gave replies in more than one category.)

	No.	%
1. Amnesia and/or confusion	117	40
2. Temporary excitement, euphoria	10	3
3. Other psychological	9	3
4. Headaches, nausea, vomiting	12	4
5. Sensory defects, paralysis, etc.	8	3
6. Spontaneous convulsions	9	3
7. Cerebral damage	6	2
8. Cardiac collapse, disturbances	15	5
9. Pulmonary collapse, apnea	13	4
10. Pulmonary disease	7	2
11. Skeletal and muscular	123	42
12. Other physical	12	4
13. "Usual expected ones"	1	—
14. None, nothing serious, nothing permanent; very few; none consistently; none with care	75	25
15. No answer		3

Of the unfavorable effects of electric shock reported by 295 respondents the largest groups were concerned with memory disturbances and skeletal injuries, with much smaller percentages describing cardiac and pulmonary collapse; spontaneous convulsions; headaches, nausea and vomiting and cerebral damage, etc.

Among the comments on amnesia and confusion one is impressed by the almost unanimous observation that the memory disturbances are transitory. The point of view is pretty well epitomized by one statement: "Whether or not transitory memory loss is properly classified as unfavorable is not clear; anyway we see it uniformly." Since there is little doubt that memory disturbance occurs in almost all patients who receive more than two or three shocks, the inevitable assumption is that the 60 per cent who did not list it did not consider it as unfavorable.

A number of observers do find that in the older patients there seems to be an exaggeration of the senile memory loss which is perhaps permanent. It is also conjectured that improvement seems to be proportional to the degree of memory loss. This may be related to the also common observation that the amnesia usually covers "at least a part of the period of the acute psychotic reaction preceding the treatment."

Some reports indicated that the degree of confusion was less with the unidirectional type of apparatus than with the original machine.

Forty-two per cent of the replies listed skeletal and muscular injuries as unfavorable results. Since the question is worded, "What . . . do *you* get?" one cannot assume that only 42 per cent consider fractures, etc., as *possible* bad effects. The general experience is that unless very careful and somewhat elaborate precautions are taken, compression of the thoracic vertebrae is a rather likely occurrence, although, as some observations point out, this is less common with electricity than

with metrazol. It is also quite well established that the compression fractures of the middorsal vertebrae are relatively innocuous and often asymptomatic or accompanied only by back pains of mild degree and short duration. It is only by routine pre- and post-treatment x-ray studies that the true incidence of this complication can be determined. To my personal knowledge this is not carried out in a number of hospitals, and I would hazard the guess that it is omitted in the majority of institutions. Hence the conclusion is logical that skeletal injuries occur in many more than 42 per cent of the hospitals using electric-convulsive therapy.

Besides the reports of spinal injuries there are reports of hip fractures; fractures of humerus; "long bone fractures"; fractures and dislocation of jaw; dislocation of shoulder; and fracture of scapula. Some of the reports indicate that the injuries do not usually occur during the convulsion, but during the stage of confusion and excitement which is sometimes quite marked.

There were a number of comments, which were not tabulated, concerning the use of curare to avoid skeletal complications. It is unfortunate that some provision could not have been made in the questionnaire to explore this phase of shock treatment, but as one reply put it, "In general we are tired of questionnaires," and probably this one was long enough.

In 5 per cent of the hospitals answering, cardiac collapse was reported. In several of these there were specific cases of death from cardiovascular causes cited. In others there were such remarks as: "occasional cardiac murmur" and "changes in electro-cardiogram. . . ." It would seem that since more than three-quarters of all hospitals using shock consider cardiovascular disease as a contraindication, a close and effective screening is being carried out. If this were not the case one would expect a far higher number of replies to list cardiac complications among their unfavorable effects.

It has been reported from time to time that electric shock seems to have a slightly depressing effect on respiratory function, and that there is a longer period of apnea than with metrazol. It is noteworthy here that only 4 per cent of the replies mentioned pulmonary collapse or apnea as an undesirable effect. Of course, one theory of the therapeutic effect of shock is that it is due to temporary cerebral anoxemia, and perhaps a good many physicians do not consider apnea *per se* as bad. None of the replies indicated fatalities, nor commented on any correlation between prolonged apnea and cyanosis and cerebral symptoms, which might be pertinent.

Some seven replies listed pulmonary disease as complications—lighting up of tuberculosis, pneumonia, and lung abscess as a rule.

Tabulated under several headings are some more or less serious results, indicating either primary organic damage or the breakdown of a previously vulnerable system. These are such things as persistent spontaneous convulsions; Parkinsonian symptoms; Korsakoff's syndrome; hemiplegia (transitory); cerebral edema; chronic glomerulonephritis; detachment of retina; menstrual disturbances and other endocrine disorders. These are reported by one or two observers (except the persistent convulsions which were listed by 9), and are probably to be considered as relatively insignificant in the overall picture.

XI. If insulin is used as the principal means of inducing a therapeutic shock, is it given according to the original outline by Sakel in his book "Pharmacological Shock Treatment"; i. e., by intensifying the shock to the maximum possible therapeutic degree resulting in either convulsions or coma?

XIII. If the Sakel outline is modified, what modifications are used? (Replies from all hospitals using "insulin alone.")

	No.	%
1. Use Sakel outline (deep coma)	127	65
2. Use deep coma, and also other levels of coma or subcoma	21	11
3. Use moderate or light coma, or subcoma	35	18
4. Incomplete answers	9	5
5. No answer	4	2
	196	

Since two-thirds of the hospitals using insulin shock rely on the Sakel technique, a decade after its introduction, one might be justified in commenting on the essential soundness of his original work. In addition to the 65 per cent who use the Sakel method unmodified, there are some of the 9 incomplete answers which indicate minor departures in the method with deep coma probably considered essential.

In the second group of 21 respondents (11 per cent) the comments generally indicate that for neurotics (particularly anxiety state), alcoholics, mild psychotics (depressions mainly), intense maniacal reactions, aged and debilitated patients, etc., various hospitals depart from the Sakel outline by reducing the dosage to subcoma levels. In some of these replies, specific mention is made that in schizophrenia the Sakel method is used. In others, by elimination, it is implied that in major psychoses such as schizophrenia the coma or convulsion dosage is used. Some replies did not classify by diagnosis, but indicated that deep coma was used for severe or resistive cases, and in a few electrically induced convulsions were added.

There seems to be some question as to the exact meaning of "coma." In some instances, such expressions are used as "deep wet shock subcoma," which sounds slightly paradoxical, and in one instance, describing "sub-coma" technique, it was stated "just to the stage of coma but not sufficiently deep to require intravenous interruption." Does the

hospital use gavage? If it does, the patients are almost certainly in coma. One reference is made to "sub-shock" in which the patients are described as "sweating, drowsy, and with thick speech." This is certainly shock, but can be described as sub-coma.

A sizable group (35, or 18 per cent) have adopted techniques largely eliminating the deep coma, regardless of the type of patient or diagnosis. It is significant that four of these replies state that this was so because of personnel shortages. There may have been others in which the explanation was omitted.

There are a few replies in which the reason for avoiding deep coma is stated as "thus avoiding the mortality rate." One assumes that many others have been similarly motivated, or have concluded that, as stated in one reply "extreme depth of coma is no longer believed necessary to achieve therapeutic results."

In this group of replies there is again some doubt as to exactly what is meant by deep, moderate, and light coma. It would have clarified the matter greatly if some specific scale of reflex changes could have been called for in the questionnaire.

In addition to the classification of the replies as given above, a tabulation was made of answers indicating the use of definite measures to avoid convulsions. There were 59 such replies in classes 1 and 2 (i. e., those who permitted deep coma to supervene). The measure usually mentioned to prevent convulsions was the use of some barbiturate. Other methods referred to manipulation of food and insulin dosage. In a number of replies it was indicated that a convulsion was the signal for immediate termination of the hypoglycemic state, usually by intravenous sugar. However, one respondent stated "would interrupt if patient had a second grand mal or status on any given day."

Among the 59 replies were seven who indicated in their answers to Question XIII (c) that they terminated immediately when a convulsion occurred by stating that a grand mal was permitted for times ranging from 20 seconds to 3 minutes. May I express polite skepticism at the 20-second time?

Another large group (34) among the 59 crossed out the words grand mal or underlined the word coma in the replies to Question XII (c).

Although not capable of very exact tabulation, there were a number of very interesting comments indicating more or less minor modifications of Sakel's outline. Some of these were counted in the 65 per cent considered to be using the method, since the modification was not material. For example, the use of the so-called zigzag, alternating, or staggered dosage if insulin resistance is apparent, or the reduction of dosage after a coma-producing level has been reached. It has been found that often the successively smaller doses continue to produce comas.

In a number of other instances, somewhat more definite departures from the Sakel technique are described—rapid jumps in daily dosage in the beginning (doubling the dose, going up by 40 to 100 unit steps) and in some instances beginning with 50 or 60 units the first day. Divided doses and intravenous insulin are also mentioned.

Several references are made to other standard techniques—the Shurley, Kalinowsky and Hoch, the New York Psychiatric Institute, principally. (In the section under sub-coma techniques some references were made to Rennie's method.)

In a small number of instances mention was made of the routine use of intravenous glucose for termination. In one instance, it was stated, clearly, "Recourse to parenteral glucose is made only if veins are not available." One trusts that this was a slip of the pen!

In one reply blood transfusion was mentioned as used "if i. v. glucose and thiamine fail."

Three respondents differed from the orthodox method by eliminating the "tapering off" or polarization phase. These three "ended abruptly."

Two most intriguing replies were "no preliminary fasting" and "music therapy during insulin treatment."

XII. (a) If the answer to Question XI is "yes," please state maximum dose of insulin generally used to induce a shock.

(Replies from all hospitals using deep coma.)

Units	No.	%
1 - 100	4	3
101 - 200	25	172
201 - 300	29	20
301 - 400	17	11
401 - 500	12	8
501 - 600	5	3
601 - 700	3	2
701 - 800	8	5
801 - 900	2	1
901 - 1000	3	2
1000 - 5000	5	3
No answer, or obviously wrong answers	35	24
	<hr/>	
	148	

Wrong answers are chiefly stating maximum or minimum dose ever used.

XII. (b) . . . Minimum dose of insulin generally used to induce a shock.
(Replies from all hospitals using deep coma.)

Units	No.	%
1 - 10	13	9
11 - 20	14	9
21 - 30	16	11
31 - 40	16	11
41 - 50	10	7
51 - 60	9	6
61 - 70	4	3
71 - 80	10	7
81 - 90	3	2
91 - 100	9	6
101 - 150	9	6
151 - 200	3	2
201 - 250	2	1
No answer, wrong answers	30	20
	<u>148</u>	

XII. (c) . . . Length of time of complete coma or grand mal.
(Replies from all hospitals using deep coma.)

Minutes	No.	%
5 - 30	12	8
31 - 45	10	7
46 - 60	49	33
	<u>71</u>	<u>48</u>
61 - 90	13	8
91 - 120	23	16
	<u>36</u>	<u>24</u>
121 - 150	6	4
151 - 180	8	5
	<u>14</u>	<u>9</u>
181 - 240	5	3
241 - 300	3	2
No answer	19	13
	<u>148</u>	

This question was evidently worded somewhat poorly, since there was a high percentage of manifestly wrong answers, and there were a number of comments, such as "question not clear." Moreover, it is asking a little too much to expect one to believe that the maximum dose of insulin required for shock in the *average* patient is as much as 1,000 units, ignoring the replies of 2,000 and 5,000 units! Obviously the majority (56 per cent) who placed their average maximum between 100 and 500 units were likely to have read the question correctly, but this reviewer is inclined to throw out all replies to sections (a) and (b) of this question as being of doubtful validity.

I would have preferred to separate part (c) of this question into two—"How long do you permit a patient to remain in coma?" and

"How soon do you interrupt the hypoglycemic state if a grand mal convulsion occurs?" However, this was not the wording of the question, and we are dealing with the present real replies, not the hypothetical ones.

It is evident that in about half of the hospitals the stage of coma is permitted to last from one-half to one and one-half hours, as described by Sakel. However, there are a few in which the termination usually occurs sooner, and a considerable number in which the coma is allowed to last longer. The subtotals in the tabulation above indicate, however, that very few allow coma above three hours. There is a trend, doubtless, to hold the coma a shorter length of time and to lighten the depth of coma. Whether this is as effective as the original plan is questionable, but there is little doubt that fewer serious complications arise.

XIV. If electricity is used, do you aim for: grand mal, resembling insulin convulsions, or coma-like state, resembling insulin coma?
(Replies from all hospitals using "electricity alone.")

	No.	%
Grand mal	267	90
Coma-like state	4	1
Both	21	7
Neither; "only very light petit mal convulsions desired"	1	2
No answer	2	1
	<u>295</u>	

From the tabulation, it is evident that the overwhelming majority of hospitals are following the simplest possible method in electro-shock, with a grand mal convulsion as the desideratum. There are a few institutions in which some of the more recent methods are used, such as electro-narcosis or brief stimulus techniques. There were some comments indicating that some physicians try to avoid skeletal or cardiovascular complications in elderly or debilitated patients by avoiding major convulsions, and one or two where schizophrenics are given coma-like states preferably.

SUMMARY AND CONCLUSIONS

1. A questionnaire was sent to 487 hospitals treating mental patients, inquiring into certain aspects of the use of pharmacological or physical shock therapy. Replies were received from 359 hospitals.
2. The use of shock therapy was reported by 302 hospitals; four reported they had used it but had discontinued its use. Some hospitals have begun in each year between 1933 and 1948, but more than half had begun by 1938.
3. Thirty-four hospitals have treated more than 2,500 cases each, and 95 more than 1,000.
4. Relatively few hospitals are now giving training in insulin shock therapy, and in practically all of these the training appears to be an informal apprenticeship. This indicates the need for a far more extensive use of the psychiatric residency.
5. Some comments are made on the inadequacy of some mental "hospitals," and on the unfortunate trend to separate receiving hospitals.
6. Comments are made on the reasons for not using shock, or for being hostile to it, indicating the impracticability of such attitudes as a general principle for the average mental hospitals, but their value as a check on uncritical reports.
7. Some hospitals do not use shock, although they know of no better treatment for schizophrenia.
8. A question as to possible "self-curing" of schizophrenia was answered by a statistically inadequate number of hospitals. Comments are made by the reviewer as to variations in diagnostic criteria for psychogenic psychoses.
9. Cardiovascular, pulmonary, and skeletal pathology are usually considered as contraindications to shock therapy, but any condition which is likely to result in irreversible complications of serious nature may well be so considered. However, most hospitals indicate that their contraindications are largely relative, and in the face of great psychiatric urgency "calculated risks" are often taken despite the presence of grave contraindications.
10. A majority of hospitals feel that insulin shock is better for schizophrenia but many prefer to try electro-shock first. The consensus is that electro-shock is superior in manic-depressive psychosis. A

majority of hospitals appear to doubt the value of shock in psychoneurosis, but if used, electricity or sub-shock insulin seems to be preferable. The opinion appears to be almost unanimous that electro-shock is the most effective therapy for involuntional melancholia.

11. Replies of somewhat doubtful validity suggest that coma is considered better than convulsion in schizophrenia, and that the reverse is true in manic-depressive.
12. While a majority of the hospitals replying state that they use electricity alone, there is reason to believe that many do so by necessity (largely staff and nursing shortages). Many also use combinations, most frequently insulin with electricity.
13. A third of the hospitals using insulin alone did not experience any significant unfavorable effects. Of those which did, the larger number listed prolonged or irreversible coma. Aside from fractures and memory disturbances there were relatively few complications reported for electric shock. Comments are made on the evidently effective screening and technique to account for the low occurrence of complications.
14. Two-thirds of the hospitals using insulin shock follow Sakel's technique. The principal deviations reported are in reduction of dosage to achieve less than coma, usually for neurotics, mild psychotics, or debilitated patients. Comments are made on the meaning of such terms as sub-shock or sub-coma.
15. A question as to dosage of insulin and length of time of treatment was considered poorly worded and as not having elicited valid replies. Probably the maximum dosage usually used lies between 100 and 500 units, and most patients are kept in coma from one-half to one and one-half hours.
16. In the vast majority of hospitals using electricity alone, the aim is to produce a grand mal convulsion. A few use electro-narcosis or brief stimulus techniques.
17. Improved records, better training of psychiatrists, more critically controlled studies, and more exact terminology are needed, not only in shock therapy but in psychiatric practice in general.

Faint, illegible text on the left page, possibly bleed-through from the reverse side. The text is arranged in several paragraphs and is too light to transcribe accurately.

