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PROBLEM OF THERAPY AT THE PRESENT STATE OF DEVELOPMENT
OF PSYCHIATRY IN SOVIET UNION

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THE PROBLEM OF THERAPY AT THE PRESENT STATE OF
DEVELOPMENT OF PSYCHIATRY IN THE SOVIET UNION

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(Inasmuch as the question concerning positive and ^{indications} negative ~~findings~~ concerning the use of leukotomy has not been resolved, but has resulted in a number of contradictory opinions, the editors ask readers to give their opinions as based on personal experience with respect to the problems dealing with positive ^{indications} and negative ~~findings~~ concerning the use of leukotomy. The Editors).

Soviet psychiatrists have always attached much significance to problems of therapy not only from a practical point of view, but also in relation to the working out of theoretical problems, clarification of the mechanism of operation of individual methods, and the determination of positive and negative ^{indications} ~~findings~~. Such work continued even during the Great Fatherland War. Our doctors, enriched by the experience and stimulated by the successes of general medicine, are trying to place therapy on a higher level. The possibility of utilizing the achievements of the physiologists of I. P. Pavlov and his school and new and exact data on heredity as ^{established} ~~determined~~ by biologists of Michurin's orientation, guarantees strict scientific illumination of questions relating to pathogenesis, the structure of psychosis and the conditions of remission. All these factors open up extremely wide horizons for therapy. Naturally there is a desire to bring out the most significant achieve-

ments and indicate the direction for future effective work. Such is the author's purpose.

Our science must be credited with having succeeded in departing from ^{empiricism} former ~~experience~~ and with striving to ^{justify} establish theoretically various methods of therapy. This refers primarily to active methods of therapy. The attempts of authors abroad to explain the mechanisms of their operations have not been very convincing. This includes the anesthesia of neural centers as the principal element in sleep therapy and the hypothesis concerning the contrast of the nature of schizophrenia and epilepsy as being basic in convulsion therapy. Soviet investigators are in a position to propose an explanation of the principles of shock and sleep therapy based on the findings of our physiologists. Although psychosis has a material basis, it cannot be considered to consist of merely destructive changes of the nervous system. The latter are permanent only in organic psychoses and, moreover, can be explained principally by symptoms of prolapsus. In toxic and infectional psychoses such changes develop only after a prolonged period. The basis of schizophrenia is to be found rooted in the brain process (mozgovoy protsess), but that results in destructive changes only in advanced stages. ^{Psychosis} It is to be explained ^{by} in the processes of stimulation, inhibition, irradiation, positive and negative induction, all in all, in processes of a pathophysiological character. In contradistinction to processes resulting from the destruction of brain tissue, they are reversible, and, to the degree that they are physiological, their ^{remission} ~~reversal~~ may be achieved precisely by physiological reaction. It is important to note that physiological mechanism need not be specific in any way. What is important is to see that they satisfy ^{the requirement that they be intense} intensity demand. If we consider ^{is satisfied} inhibition, then, in accordance with the findings of N. Ye Vvedenskiy, it may be ^{produced by} subjected to various types of irritation, chemical, heat, and

mechanical. With respect to this, clinical observation shows that ^{identical} ~~they and the same~~ brain mechanisms may be ^{induced by} ~~included under~~ various types of factors. According to this the elimination of pathogenic symptoms does not necessarily call for any specific reactions but may be achieved by various rather intense irritations. This is done by shock methods. Insulin shock therapy and convulsion methods are different from the point of view of their physiological nature, but in therapeutic application they result in the rupture of pathological connections to more or less the same degree and make it possible to rebuild the process through the reestablishment of normal relations.

All applied active methods admit the great importance of psychotherapeutic factors in the treatment of schizophrenia. In this respect sleep therapy finds itself under the most favorable conditions. This method was established theoretically by I. P. Pavlov and stems from his concept of protective inhibition. In addition the beneficial power of sleep, in the sense of soothing, rest, removal of the feeling of worry or anxiety brought on by current cares, is so well known that the idea of therapy by prolonged sleep finds ready acceptance.

The Ministry of Health is endeavoring to raise the quality of therapeutic aid. No doubt, this refers to the diffusion of achievements in the field of therapy to the greatest possible number of sick persons to be found in all hospitals. Moreover, analysis of the existent ^{situation} ~~position~~ throughout the Soviet Union with respect to the therapy of persons with psychic illnesses shows that

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in spite of important achievements there are certain ~~doubtful~~ aspects. They are to be explained by the severance of the periphery from the center, the breaking away in therapy of practice from theory. We have made a study of the scientific techniques of psychiatric institutions in the USSR and noticed the absence from psychotherapy of hypnosis and work therapy, of physical methods of therapy, and of psychoprophylaxis, while at the same time plans are overloaded with studies on electric shock, although it has been sufficiently studied. Electric shock can be of use in schizophrenia and in presenile psychoses, but a number of authors have shown a tendency for applying it to neurotic conditions. However, it has been established that it can lead to a permanent psychic depression, in particular, to weakening of the memory. Widespread interpretation of evidence concerning electric shock shows that it can have most serious consequences for patients. Weakening of the memory or a general slight psychic deterioration would be a serious catastrophe in the lives of patients with neurotic conditions or manic-depressive psychosis. The wide^spread distribution of electric shock therapy presents a danger to right development of therapy. An overall picture of therapy in psychiatric institutions shows that electric shock is used 10 times more than sleep therapy, but no one has proved that it is ten times more effective. At a session of the Institute of Psychiatry of the Ministry for Health USSR, V. Ye. Galenko communicated her findings relating to the catamnestic study of 110 schizophrenics who had been clinically treated by prolonged sleep in which 40 percent of the cases showed a permanent cure.

The theoretical foundation for this method of treatment has found striking verification in research on electrical activity. Professor M. N. Livanov has shown the presence in schizophrenia of the rupture of curves of electrical activity, the ^{asymmetry} ~~asymmetry~~ and asynchronousness ~~asynchronousness~~ not only of individual hemispheres, but of different parts of the same side. This agrees with the researches of N. N. Dzidzishvili in Tbilisi. At the same time the researches of M. N. Livanov have shown that sleep therapy leads to the elimination of this pathology, while the normalization of pictures of electrical activity corresponds with clinical improvement. This gives one the right to assume that this method should be given as much attention as possible. There should also be recommended the use of broken sleep when the patient sleeps 16-18 hours a day. It is somewhat less effective but at the same time quite helpful. V. P. Protopopov even prefers this form of sleep therapy, saying that it more closely approaches the natural.

Sleep achieved through amytal though it is closer to physiological sleep than can be obtained by Kloett's mixture nevertheless is a pharmacological sleep which is to a certain extent toxic.

The extraordinary importance of the principle of protective inhibition of I. P. Pavlov should lead to working out of new methods of therapy which would bring on sleep in the full sense of the word resembling physiological sleep. We have tried to achieve a sleep-inhibition based on the researches of I. P. Pavlov on sleep and N. Ye. Vvedenskiy on stimulation, inhibition, and narcosis. In our first researches we applied relatively strong currents and achieved the state of electronarcosis. While working on this method and

trying to create a more suitable apparatus, I with N. M. Liventsev and S. A. Kirillova achieved a certain amount of success which was made public at a meeting of the Learned Medical Council in October 1947 and in the magazine Klinicheskaya Meditsina in 1948. But later we abandoned this method. The state that it creates is a true narcosis, but it is accompanied by deafening, and thus is distinctly different from sleep. For this reason we decided to decrease the strength of the current and the duration of each im-
impulses,
pulse. By applying weak doses of electrical ~~impulses~~, we were able to use them as ^rrhythmic irritations for evoking a diffused inner inhibition, that is, physiological sleep. The reaction to the im-
pulses of current, which were given with a frequency varying from
applied to the occipital
1 to 10 per second, the electrodes being ~~applied to the occipital~~
lobes,
~~is~~ is successful with minimal doses of current and does not cause any special sensations nor any visual reactions, but instead brings on a state of drowsiness, which under the right conditions (of quiet) passes over into physiological sleep.

Without going into a description of the apparatus and details pertaining to the manner of applying the current, we direct attention to the possibility of creating sleep with the help of electric current, a sleep which almost in no way differs from physiological sleep, a fact which we consider to be most significant. This is corroborated by a description by our patient Ye., a 20-year old schizophrenic, in which he speaks of his experience while undergoing therapy by this method.

"During the first few days following my arrival at the clinic, I was in a state of inner retirement, isolation, and

indifference to everything. I felt dull and absent-minded. My head ached. Moreover, I was frightened by my surroundings and started at the slightest sound or noise. I was in agony because of the moans of the patients, felt dread at the sight of a hypodermic needle in the hands of a nurse, and was very depressed at having to undergo injections. I talked neither to the patients nor to members of the hospital staff and acted with distrust toward the doctors. I feared my coming treatment although I did not know what it was going to be and steeled myself for pain and suffering. But my fears proved unfounded: except for a pleasant sensation in the head during the treatment, there was no pain whatsoever. In the next 2 - 3 treatments I began to notice that my headaches and fear were decreasing, while at the same time my apathy began to leave me. I began to feel alive. This period increased with each day and each treatment. After 7 treatments I succeeded in remaining in a good state for a whole day. I felt the desire of wanting to mix with people, to work and live at the collective. I should mention that during treatments I entered a state of sleep. After the electrodes were attached, I seemed to see flickering lights for 2 or 3 minutes and then felt slightly dizzy as if slightly drunk. Throughout the body my muscles started to relax, my breathing became deep, then a certain forgetfulness, and finally, sleep. The condition of sleep continued for 15 to 30 minutes after completion of a treatment. Up to the present time I have had twelve such treatments of electrical sleep. I want to emphasize once more my desire to complete the entire treatment and return to my profession."

The electrical activity of this patient was tested before and after treatment. It gave results that were similar to those obtained from prolonged amytal sleep with the exception that the reduction in electrical activity observed during sleep was not quite as significant. This is due to the fact that sleep in the given instance is relatively lighter than in sleep caused by drugs. Let us compare the oscillograms before and after therapy (Figure 1). Without doubt we are on the way to developing a method of therapy that would be in the full sense of the word Soviet and stemming from I. P. Pavlov. By the character of its action on the patient and its operation, it falls in line with the principles of solidarity and humaneness of S. S. Korsakov.

The mission of therapy is the introduction into the network of psychiatric institutions, primarily into the larger hospitals, the most effective methods of therapy, with as few as possible of those methods that show possible complications. Among such methods may be included sleep and insulin therapy. These should have first priority in scientific investigation for the purpose of improving and simplifying the technique of their application, thereby creating the possibility for their wide application. At the same time electric shock in the practice of therapy dominates all other methods; it occupies a central place as a topic of study. This partiality should be considered to be of a harmful nature.

Among certain investigators there is to be observed a similar preoccupation with prefrontal leu^xotomy. The theoretical basis for it is to be found in the desire to exclude the possible

onset in the lobal sections of irritations issuing from the thalamic region. Technically the operation has been developed sufficiently so that in the hands of such experienced neural surgeons as Professor Babchin and Yegorov there are no bad aftereffects in most cases. Actually in a number of cases it brings about an end to anxiety, a reestablishment of contact with surroundings, and an end to delirium with the possibility of at least a temporary return of the patient to his family. However it is necessary to distinguish between the initial and long-range effects. Thanks to the courtesy of Doctors M. Ya. Grebliovskiy and V. S. Ryazanova of the First Rural Psychiatric Hospital we have been able to obtain exact information concerning 41 patients of the course of the disease subsequent to leukotomy. These patients were transferred from Moscow psychiatric institutions because of the non-effectiveness of the operation or deterioration taking place after the initial favorable result from this method. We were able to observe some of these patients ourselves in our clinic where they were accepted for further study. We were able to gather that in a number of instances there was a disruption of delirium, depending no doubt upon the general deterioration of the psyche, a disappearance of hallucinations, at the very least, a ^{weakening} of their effect upon behavior. There was observed in some cases a derangement of speech of the organic type. All the patients showed considerably lowered psychic activity which sometimes presented a picture of complete apathy.

We consider this operation to be permissible only in exceptional cases where patients are to be relieved of excitability only after all other methods have been tried and where there

is present a definite depression. Leukotomy must in no case be considered an active method of therapy. Even if one does not speak of its insignificant therapeutic effectiveness, one still must remember that neither convulsion therapy, insulin shock therapy, nor prolonged sleep ever bring on that picture of total psychic depression which is to be observed resulting from leukotomy.

Before Therapy

OD

OS

PD

PS

After Therapy

OD

OS

PD

PS

Figure 1.

Before therapy OD and OS - - the electroencephalograms of the right (upper) and left (lower) occipital zones of the cortex of the brain. There is to be observed marked asymmetrical variation between the biocurrents of the right and left hemispheres. The electrical activity of the left occipital region shows sharp,

sudden variations expressed in modifications of the frequency and amplitudes of the biocurrents. It is this that is responsible for the "fragmentary character" of the curve.

PD and PS - - the electroencephalograms of the right (upper) and left (lower) regions. There is to be seen the normalization of electrical activity expressed in the disappearance of the asymmetric fluctuations.

The essential problem in the field of therapy is its activation and introduction of the most practicable methods into the practice of psychiatric institutions, hospitals, and dispensaries. There arises the question: To what extent has the scientific-research work of psychiatric institutes and clinics been reflected in general psychiatric practice?

To determine this we made use of the data collected by our Institute of Psychiatry. As an index of the activity of therapy we determined the percentage of patients who had been treated by insulin therapy, electric shock, sleep therapy, and blood transfusions. In this analysis there should first be noted the small degree of application of active methods in therapy by the majority of psychiatric hospitals. Together with this it was noticed that the existence of a connection between a hospital and a special institute or clinic was responsible for most patients so treated. It cannot be considered accidental that therapy is not carried on intensively in those hospitals which have no connections with special scientific institutions. There can be said to exist, therefore, a gap between scientific-research institutions, institutes,

and clinics and large psychiatric hospitals which is harmful to the interests of therapy. The work of many hospitals in a number of cases is ^Snot energized by clinics belonging to higher educational institutions in the same cities. Since there are 63 clinics and 7 institutes it should be possible for every hospital to establish a connection with some scientific-research establishment (institute or clinics) to serve as its guide. The benefit from such a relationship would be mutual. The tone of the work would be higher in the hospital, while institutes and clinics would acquire the possibility ^{of} with dealing with a large body of material for their scientific work. This naturally refers to the new methods of active therapy; these should include others besides the ones already mentioned. Successes in blood-transfusion therapy achieved during the war have been made little use of by psychiatrists. The same can be said for therapy using stimulators and antibiotics. The results obtained from using penicillin in treated syphilitic psychoses and progressive paralysis should serve to direct attention in general to the role of antibiotics. The Institute of Psychiatry has been obtaining good results in treating with penicillin complications resulting from schizophrenia caused by the toxic process in the intestines. Much profit could be gained in developing methods of physiotherapy. We have already referred to the little attention that has been given to psychotherapy and work therapy.

The development of new, special methods of therapy, especially those that can be classed among the active ones, is an important stage in therapeutic work. Insulin, sleep therapy and other methods should not be panaceas but only one link in

the general system of therapy carried on in institutions.

Active methods of therapy are used first of all in schizophrenia, but there is also experience in treatment by discontinuous sleep of manic-depressive psychosis. This method may be used to advantage in the treatment of reactive conditions and also in such sicknesses as ulcers and asthenic condition following a trauma.

Psychiatrists now have sufficient experience in treating psychic disorders following trauma to be able to successfully carry on work in this field. A stimulus to this work should be the knowledge of the fact that psychic depression of patients of this kind is due not to destruction but to inhibition. This fact, which we have noted, has been verified by A. S. Shmar'yan.

A most important problem is the therapy of ^P epilepsy. No doubt it should be included among those problems which are to be studied in the immediate future. The use of electrical activity has been very successful in the study of metabolism, changes in the physiological processes of the nervous system, and the condition of chronaxie. But the same thing cannot be said of therapy. It may be considered proven that the possibility of cure exists when treatment begins at the very beginning. Drug treatment without doubt offers much in the sense of suppressing attacks.

Reports read at the All-Union Congress and at special conclaves on psychotherapy and logotherapy arm psychiatrists with new data and assure the success of work in this field.

Attention should be directed not only to special active methods, but to activity in therapy in general, by applying to the proper cases special methods. Successes in the field of pathophysiology, and researches in metabolism may help the psychiatrist select that system of treatment which best of all would guarantee success. Symptomatic therapy also is very important. At the present time it naturally should not be empirical. For its foundation there should be clarified pathophysiological mechanisms and changes in metabolism.

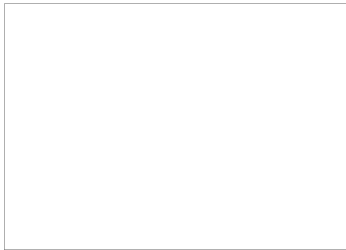
Of exceptionally great importance is the creation of a healthy atmosphere for therapy through a regime in which everything relating to the case of a patient is planned out in advance of his arrival.

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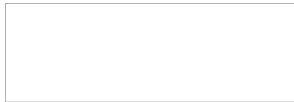
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AND SLEEP

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COMBINED THERAPY OF PSYCHIATRIC PATIENTS BY ELECTROSHOCK AND SLEEP

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In preceding years, like many other authors, we made wide use of soporofics where convulsive attacks in electroconvulsive therapy had brought on a marked post-attack excitement or an intensification of procedural symptomatology (symptomatika), which had the effect of ^{strain on} ~~served as~~ an additional load for the body (somatika) of the patient. There was created the impression that such a preliminary introduction of soporofics ^{counteracted} ~~neutralized~~ excessive muscular contractions, sharp increases of blood pressure, and, possibly to a certain extent, the derangement of memory.

When giving soporifics prior to electrotherapy, patients would wake up and not experience fear with regard to further therapy. This, among other things, helped make it unnecessary to hold patients by force.

The introduction of "barbamil" (barbitol amyl?) orally or intravenously prior to provoking the attack eased the post-convulsion condition without, however, showing any marked effect on sleep ensuing after the attack. Incidentally, we already have indicated quite some time ago that prolonged post-attack sleep was a favorable prognostic factor. We referred to this in detail both at the session of the Central Institute of Psychiatry in 1943 and in an article entitled "Problems of Clinics and Therapy

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with respect to Psychic Illness" in the symposium of the Psychiatric Hospital imeni Kashchenko in 1946. Shekhanova (Ryazan') confirmed and widened our observations. We were successful in noting a definite correlation between the post-attack sleep and the prognosis. If prolonged absence of sleep, generally observed in the post-attack condition of a patient without any improvement in the clinical condition was transformed into an onset of sleep after the attack, this quite frequently presaged the start of a remission. If, on the other hand, post-attack sleep, which was usually present in a patient, disappeared, this was a negative sign.

It would be interesting to know what influence post-attack sleep exerts on epileptics. Unfortunately we were not able to find data of such kind in literature, so that at the present time it is necessary for us to try to determine this on the basis of our own material.

According to the findings of Goland (Vladimir) in treating epileptics by electroshock and by our own method, the number of spontaneous convulsive attacks decreases during the period of treatment (in the first type of treatment the electroshock was applied twice, with our method six times). However it is true that the frequency of attacks 2 to 3 months after therapy both by the one and the other method reverts to what it had been formerly. Sleep as a favorable factor is confirmed by experiments we are carrying on at the present time in treating epilepsy by the method of prolonged sleep.

by a factor of 2, in the second by a factor of 6

By what method is it possible to achieve prolonged post-attack sleep?

Large doses that ordinarily prolong sleep raised the "threshold of disposition to convulsions" to such an extent that an attack which is an essential and necessary element in therapeutic reactions, would never take place.

The method proposed by us has for its component a single rectal dose of 0.5 to 0.8 of barbamil (barbitol amyl?) immediately following the end of the clonic phase of the convulsion attack. The action of soporifics when administered rectally is very close in essence to the action of the preparation when administered internally. In our case the soporific lodged in the lower part of the rectum enters the Vena cava inferior by way of the lower hemorrhoidal veins from where it goes straight to the heart. The rectal introduction of sodium amytal causes patients to go into a deep sleep lasting from 14 to 20 hours, although they wake up usually for a short period during the 5th to 8th hour, at which time it is possible to feed them. During this interval patients show an insignificant deafness.

It should be noted that in therapy with prolonged interrupted sleep brought on by barbamil (barbitol amyl?) it is necessary to give a repeated dose of this soporific (on the whole up to 1.5 to 2.0 per 24 hours) to obtain a daily sleep lasting from 15 to 22 hours (Tarasov, according to data from our clinic; Yablonskaya).

How can one explain the surprising fact that barbamil

(barbitol amyl?) when administered rectally at the end of the subsidence of the convulsion attack produces a sleep lasting many hours, while when administered prior to electroconvulsion therapy it produces only a short sleep (half-hour)?

We are inclined to explain this in the following manner. It is essentially related to the fact that with our method barbiturates (possibly ^{in a combination} combined with bromine, about which more will be said below) fall on a soil which is favorable to narcotic action and act in unison with the basic condition. We have in mind the aggravated hypoxemic condition (marked cyanosis, disturbance of breathing, etc.) caused by the provoked convulsive attack. This hypoxemia plays the part of protective inhibition (Sepp, Ravkin). Moreover, barbamil (barbitol amyl?) is given at that phase of the epileptic attack when it is passing into the state of deafness and sleep. Finally, one may suppose that an intensification of inhibitive action prior to the onset of the deafness phase results from the conjunction of the narcotic preparation with the abating, but nevertheless stimulating, influence of the end of the electroconvulsion attack. We can see this type of intensified inhibitive action in the example of the combined use of barbiturates with small doses of caffeine. ⁱⁿ Through such a combination one can to some degree see a certain element of therapeutic action similar to the combined use of barbamil (barbitol amyl?) with caffeine.

As the work of Glasov and others have shown, electrical current through a bitemporal application of electrodes, even

if the bones of the skull remain intact, passes primarily through the mezoencephalic region. Thus Glazov investigated the paths of the current through the brain in transcutaneous electrification. He struck into the brain thin electrodes which were insulated up to the tip and connected them to a sensitive galvanometer. He noticed that when the electrodes only penetrated into the cortex the mirror of the galvanometer remained still after the current was turned on, but when the electrodes were made to penetrate further, it began to respond. On the basis of these experiments Glazov came to the conclusion that "most of the current passes through the base of the brain and acts on the subcortical core". This was corroborated by Glazov's experiments with animals where current was made to pass through the brain after the cortical and subcortical layers had been administered a narcotic. He concluded that electrical currents intensify the effect only with "core narcotics".

Aleksander disputes earlier beliefs that electrical current passes in the animal organism through the length of the nerve span and along the wider blood vessels. His experimental investigations clearly show that electrical current passes, as it were, along the structureless mass and always prefers the shortest route without being deviated along anatomical landmarks from contact to contact.

In bitemporal application of electrodes, which is the usual procedure in electroconvulsion therapy, the current while traveling in the form of a spindle-shaped cluster between the electrodes passes through the anterior *polus n. tentatus*. If the electrodes are

gradually moved to the rear to the extent that they finally are in a biparietal position, the current begins to pass through larger and larger masses belonging to the subcortical formation (in the biparietal position for the electrodes the current passes directly through the visual mounds). In this connection, the observations of our associates (Rotshteyn and Kononovich) have shown, the more encompassing the mass of tissue comprising the subcortical nodes through which the current passes, the smaller the minimal dose of electricity required for convulsions (both from the point of view of amperage and the point of view of voltage).

A convulsion attack caused by electrical current is closer in essence^{5/} to subcortical than to cortical epilepsy. There exists experimental verification for this (Rizer and others). In work carried on at the Brain Institute, I, together with S. A. Sarkisov and F. M. Lisits, was able to show that in experimental epilepsy convulsion discharges of the brain quickly spend themselves, whereas they repeat for a long time in subcortical formations.

Attacks caused electrically are attacks of a complex mixed type, primarily of a subcortical character, which are joined and followed by attacks of a purely cortical character. Even in electroconvulsion therapy electrical current, as we have already shown, directing itself primarily into the mesoencephalic region^{6/}, acts directly on the core of the brain, and thus creates an experimental "acute diencephalitis".

It is valid to admit that the creation of an attack by

electrical current directed primarily at the region in the vicinity of the hypophysis cavity, sensitizes that region (in particular those parts of the brain which have a direct connection with the regulation of sleep and the awakened state) and makes it more susceptible to the action of narcotic poisons. An indirect but altogether pertinent proof of the role of sub-cortical soporific preparations is to be found in the fact that when we substituted for barbiturates cortical poisons (pantopon, morphine) we were not successful in obtaining prolonged sleep.

We should pause to consider here several experiments which, however, were carried out on animals. Electrical current, on being primarily directed in the direction of the region in the vicinity of the hypophysis cavity, causes an irritation of the hypophysis which leads, in accordance with the latest findings of the Orbeli school (Tonkikh, Moiseyev, and others) to an intensified secretion into the bloodstream of basopressine and a bromine-containing hormone. In this connection, it should be noted that bromides have the faculty of entering into intimate chemical processes which apply to the inhibition process and for a time stabilize it. In bringing this data together we did not forget to take into consideration that it refers to experiments on animals and that it cannot serve as direct proof for acting in the same way on man. A. V. Tonkikh in referring to the participation of hypophysis in the genesis of lung ailments in animals pointed out that analogical mechanisms should be considered to exist in human pathology.

If it should prove possible to show by direct experiments

an increase of bromine in the bloodstream of a human being while undergoing electroconvulsion therapy, with which we are busy now and which we consider to be quite probable, then, by introducing bromines by the rectal method, we would be achieving a simultaneous combined presence of barbiturates and bromine. This should result not in a simple arithmetic total but in a marked intensification of narcotic action. When carrying out experiments (together with S. A. Khachatryan) in 1930 on inducing artificial sleep in monkeys through intracerebral administering of a mixture of the so-called cortical and subcortical poisons, we were able to learn that the individual introduction of cortical (bromine) or subcortical (barbiturates) poisons into the diencephalon region evoked a considerable smaller soporific effect than their combined action.

The method we propose has special features which distinguish it, as will be noted below, from regular electroconvulsion therapy and from therapy by prolonged sleep. We were able to prove in our initial work on prolonged sleep that the therapeutic effect by the latter method does not merely result in the single factor of sleep. Incidentally, we computed the average length of sleep per twenty four hours for a group which had a remission in therapy with barbamil (barbitol amyl ?) sleep and for a group which did not have one. The number of hours for the latter group proved to be somewhat higher, 16 hours as against 15 (according to the findings of Yablonskaya).

How can we prove theoretically⁴ the value of the combined use of electroshock with soporifics?

As is known, an increase in the number of convulsion seizures increases all manner of changes in the organism. Thus there are indications that the intensity and duration of abnormalities to be seen on electroencephalograms is proportionate to the number of attacks. According to our findings during the course of electroconvulsion therapy there is disclosed a definite tendency in the direction of a dynamic modification in metabolism from attack to attack. It is particularly interesting to note the dynamic increase in the initial contents of albumin in the blood stream.

Furthermore, there are indications that a connection exists between the number of attacks after electroconvulsion therapy and the growth of "mnestic" (mnemic ?) disturbances. However, this type of disturbance is sometimes to be observed even after the first attack, while in other cases it does not occur even after numerous attacks. This depends, as we have noted, on individual predisposition, the position of the electrodes, etc.

It has been asked whether or not it is possible to counteract to any degree such or similar disturbances. We see such a possibility to exist in our proposed method. We know that narcotics stop the further development of seizures in experimental epilepsy and stimulate the reestablishment of functions that had been disrupted by the attacks. Thus if in the process of an attack there is to be noticed a decrease in the contents of liquid in peripheral blood, an application of ether narcotic at the same time that the attack is provoked causes the contents of the water to remain normal; the morphological character of the blood is

normalized. A lowered ^{water} content is to be noticed in the brain during a seizure, while the application of a narcotic brings it to normal; this applies particularly to the core of the brain. Similar findings have come from a number of experiments carried out in Galkin Laboratory (Sakharova, Baranovskiy, Fedorov, Sedina).

The researches of Asratyan and his associates (Sakhiulina, Gurova, Romanovskaya, Ivanov) and of Dolin on traumas of the brain are of much interest to the question on hand. The findings of these persons present the general conclusion that soporifics as a rule speed up the restoration of disrupted functions in the animal organism and increase the stability of the restored functions.

They deserve^s attention, in the light of what has been said, experiments (by Geyl'brunn and Beyl') indicating a way of preventing hemorrhages in the brain while provoking convulsion seizures electrically. It was shown that a preliminary injection of atropin into rats, synthetic Vitamin K, and calcium gluconate before provoking a seizure did not prevent this type of hemorrhage, which prevention was successful only by simultaneous administering of ether narcosis. Incidentally the findings of G. A. Rotshteyn and Konomovich proved this does not correspond to the facts with respect to Vitamin K.

Assuming such an a priori opinion and such general pathophysiological and clinical considerations I, together with M. S. Zeleva, L. I. Lando, and M. A. Bunder, began to investigate and

apply our proposed method. Practice has confirmed our hypotheses.

We carried out approximately 400 therapeutic treatments on 52 patients. The majority of the patients were schizophrenics (38), while 14 were observed to have a typical manic-depressant^{ive} psychosis, although they had been sent to us diagnosed as schizophrenics. Almost all of the patients were chronic cases. The clinical picture showed that the majority showed the presence of a depressant component. Remission of type A and B was observed for 26 patients; a year's followup did not disclose any relapse among them. Seventeen patients showed an intrahospital improvement, but the condition of the patients neither changed nor deteriorated. Of course, we consider these findings to be preliminary. Its general effectiveness, as shown by the findings of our clinic and that of the Psychiatric Hospital imeni Kashchenko (Povolotskaya, Khokhulya, Chebysheva, Yakovleva), seems to be somewhat higher than for ordinary electroconvulsion therapy, but the body of material is not sufficiently great numerically for us to insist on this.

Let us begin by stating the fact that with the first treatment there is established good sleep at night which continues to hold true in the intervals between treatments; the same cannot be said for single daily doses of soporifics which quite frequently disrupt sleep at night. It should be pointed out that the "convulsion dose" for bringing on a seizure remained constant throughout the entire period of treatment. Furthermore, there is observed in electroconvulsion therapy a certain pattern for the unfolding of the

seizure and for the concomitant complications (such as a psychomotor excitement); with our method this pattern either completely or partially disappears - - aggravated somato-vegetative manifestations taking place during the first treatment generally begin to fade out gradually while later attacks take place without any manifestation of disturbance of the vascular system or respiration. A dynamic study of the pulse, breathing, blood pressure, temperature, etc., disclosed a smaller amplitude in the scope of their fluctuations than either for electroconvulsion therapy or pharmacological convulsion therapy.

Our method proved applicable for a number of cases with vital somatic indications connected to a psychotic condition (refusal to eat, marked emaciation). All the patients who had been refusing to eat began to eat of their own volition after the first treatment, while later, in contradistinction to what is observed in electroconvulsion therapy, refusal to eat was not to be observed regardless of the psychic condition. A number of investigators (Tarasov, Yablonskaya, etc.) point out that under sleep therapy patients eagerly accept food and gain in weight.

In complete agreement with the special features indicated above for general somatic changes showing smaller amplitude of fluctuation in combined electroshock and sleep therapy are our own biochemical findings for 26 patients, of whom 9 had an atypical form of circular psychosis, 9 with a circular form of schizophrenia, and 8 with various forms of schizophrenia (catatonia, etc.). The majority of these were chronic cases.

The first attack does not show any marked difference from that of electroconvulsion therapy, for here there were also to be noticed sharp⁽¹⁷⁾ responding metabolic reactions (an increase of albumin in blood-serum, a decrease in the coefficients of "A/G" and "K/Sa", and an increase of sugar and lactic acid).

Later the combination of convulsion seizure and sleep bring on a reconstruction of the chemical nature tissues; treatments, as they succeed one another, take place on a modified soil and give a changed expression for metabolism. The amplitude of fluctuation of these two coefficients is definitely smaller than in the case of electroconvulsion therapy. It should be noted that bears evidence of the instability of albumin plasma the considerable instability of albumin portions, a manifestation which is characteristic for aggravated somatic illnesses and also for acute^(S) schizophrenia (Yablonskaya and Ignatov). We observe this instability among schizophrenics with a remission onset in electroconvulsion therapy. Among the majority of patients who had remissions there was a certain increase of the A/G coefficient after the seizure which began as a rule with the thirty-fifth treatment because of the increase of albumins. In patients who had no remissions, as well as in cases showing a deteriorated condition (both somatic as well as psychic), there was to be observed a large variation in biochemical indexes and a decrease in the A/G coefficient. In contradistinction to electroconvulsion therapy, but most pertinent and characteristic, there was to be observed the condition where the expression of the general albumin from attack to attack did not disclose any tendency toward increase and was observed throughout the entire period of treat-

ment to have only slight fluctuations to one side or the other.

What is the mechanism of these changes?

Parallel experiments carried out one time jointly with G. A. Rotshteyn on dry residues from the blood gave no basis to attribute this increase to thickening of the blood, inasmuch as there had occurred an absolute increase of albumin. A considerable increase of sugar and chlorides in the blood after a convulsion seizure lead to the surmise that this might have been caused (while applying the refractometric method) by increased refraction of chlorides and sugar. A specially prepared solution containing chlorides and glucose according to their contents in the blood during the period of emerging from a convulsion disclosed an insignificant refraction which could not have been significantly influential in the results for determining the albumin. There was considerable basis for relating the increase of albumin to a change in the functions of the liver.

In our report at the Third All-Union Congress of Neuropathologists and psychiatrists (Nevropatologiya i Psikhatriya, 17, 6, 1948) concerned with the achievements and prospects of active therapy of psychoses we indicated that an increase of albumins by such a progressive fraction should be thought of as a favorable factor which assisted in the restoration of disrupted functions, particularly disrupted hydremia. As is known, electroconvulsion therapy brings on an accumulation of water in the brain, while an increase of the albumin fraction assists in the transfer of water surplus to the blood and increases the electric potential of the blood.

In my work together with L. I. Lando (Nevropatologiya i Psikhiatriya, 5, 6, 1946; Byulleten' Eksperimental'noy Biologii i Meditsiny, 24, 1, 1947 and 24, 5, 1947; Sbornik Trudov Tsentral'nogo Instituta Psikhiatrii, IV, 1948) concerned with permanent results of electroconvulsion therapy, we point out that an increase in the sugar content in the blood during the process of therapy may be considered to be a favorable factor to the degree that there is a tendency in schizophrenia to lowered indexes for carbohydrates in the blood. The observed systematic increase in electroconvulsion therapy from the time of one attack to another of initial quantities of the total amount of albumin we are inclined to consider as being a sort of slag, which could hardly be said to have any positive value. This increase of albumin could hardly help disturb us since a hyperprotein condition typical for many serious somatic illnesses even among this kind of patients (in particular for schizophrenia) is often observed to be accompanied by a marked loss in weight in spite of adequate nourishment (such at least are our observations which have been confirmed by Yablonskaya and Ignatov). In using our own method we do not observe a comparable increase.

Biochemical investigations made with respect to a number of patients for several months after they had completed their period of therapy by the method in question disclosed among those who had remissions a tendency toward normalization of metabolism (albumin coefficient, albumin and globulin fraction, sugar, lactic acid, potassium/calcium coefficient, chlorides). Patients

who had an incomplete remission or no remission whatsoever showed a normalization of individual species of metabolism, most often carbohydrate, while at the same time indexes of albumin and mineral metabolism remained pathological.

Let us cite an example.

Patient K. (case history No 2570).

Control biochemical investigations with respect to patients, who had received only one barbamil (barbitol amyl ?), disclosed an insignificant fluctuation of the total albumin, the A/G coefficient, and other indexes. There is created the impression that the administering of soporifics and the prolonged sleep they bring on aid the preservation of the stability of the internal habitat.

This explains the fact that the magnitude of the A/G coefficient and other indexes during the time and an hour after treatment disclose a slight amplitude wave in contrast to classical convulsion therapy.

Case History	Total Al- bumin	Albu- mins	Globu- lin	A/G Co- efficient	Sugar in Percent of a Milligram
No 2570					
	<u>in Grams</u>				

First Treatment (20 January 1947)

Before Combined					
Treatment	7.3	3.5	3.8	0.92	71
During Shock	8.5	3.4	5.1	0.67	82

Third Treatment (24 January 1947)

Before Combined					
Treatment	7.2	2.7	4.5	0.6	86
During Shock	7.8	3.5	4.3	0.81	95

Sixth Treatment (31 January 1947)

Before Combined					
Treatment	7.5	2.7	4.8	0.56	86
During Shock	7.6	3.1	4.5	0.69	102

Four Months After Completion of Treatments

	7.3	4.6	2.7	1.7	85
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We emphasized the intimate connection between the tendency toward remission and the protein condition. The method we have been describing gives additional proof that the A/G coefficient can give to

a certain degree prognostic assistance as well as indications relative to the merit of continuing or stopping the course of treatment. In cases in which there is no remission we generally notice a considerable variability in the contents of the total albumin in blood-serum and in the A/G coefficient, as well as a tendency for a decrease of this coefficient because of an increase of the coarse dispersion fraction. In cases where there is remission, the picture of an (inverse) decrease of the albumin fraction should be evaluated as a bad prognostic factor, which, in all probability, is connected with the nervous effect of convulsion therapy on the cerebral mechanisms, in particular on the vegetative centers, and this, as we have shown in previous work, leads to a secondary modification of metabolism.

Hematological investigations are in complete agreement with biochemical findings relating apparently to the non-specific neurohumoral segment. According to our method the effect on erythropoese and on leucopoese shows the same tendencies as in electroconvulsion therapy with the only difference that the observed changes are not as marked and return more quickly to the original state (Vunder). Thus the leucocyte reaction is also in leucocytes is less significant than in electroconvulsion therapy. In the expressed after the attack but the increase ~~in~~ leucocyte formula there is also to be observed a significant weakening in the displacements of those elements which are more sharply expressed in electroconvulsion therapy, thus, eosinphiles do not show any tendency to decrease or disappear. Not a single time was there noticed a predominance of myeloid tendencies in the neutrophile reaction. A reticulocyte reaction causes a fluctuation in the

direction of increase immediately after a seizure accompanied by a return to the original figure. The number of erythrocytes has a tendency to increase immediately after a seizure, but then after a period of 15 minutes it begins to increase.

All that has been said offers a sufficient basis for emphasizing certain advantages of the method we are proposing over the usual pharmacological and electroconvulsion therapies.

Active therapy is connected to a number of inescapable disturbances in the organism, a part of which is indissolubly and intimately bound to the actual process of positive therapeutic action (this is expressed in the stimulation of the central vegetative apparatuses, which is connected to the desintoxicating action of electroconvulsion therapy already discussed in a number of earlier reports), while another part abets the onset of complications and interferes with the appearance of remission. It is necessary to take all measures that would reduce to a minimum these unfavorable factors and thereby work still further in the direction of making active therapy more humane.

Our method seems to make a contribution to some degree to progress of this kind.

A careful catanesthetic study of patients who had been treated with prolonged unbroken sleep in our clinic (Geshelina and Lyusternik) showed the tremendous effectiveness of this method of therapy. More than 60 percent of patients who had remissions remained in this condition for more than 10 years.

Treatment by prolonged sleep, initiated by us in 1935, received at that time the warm approval of I. P. Pavlov. In our method we see the efficient combination of the factor of sleep proven and tested ^{with} /electroconvulsion therapy.

As we have already indicated in our article dedicated to I. P. Pavlov, stimulation by electroconvulsion therapy first effects a change in the vital protopathic region and then irradiates for a very short period in the direction of the cortex of the brain. We succeeded in proving this quite convincingly by the method of conditioned reflexes. At the present time there is sufficient data to prove the physiological value of combined therapy from the point of view of I. P. Pavlov's teachings. At first glance the combination of stimulating and narcotic action would seem to be paradoxical. Besides, convulsion therapy not only does not contradict the protective inhibition theory but creates in itself certain tendencies toward the onset of additional protective inhibition as a result of the acute exhaustion that takes place during a convulsion attack. This, incidentally, expresses itself in such a way that sleep takes place immediately after the convulsion attack and it is this that we refer to when speaking of protective inhibition. This additional inhibition, induced artificially, is made use of in our proposed method of combined therapy.

[End of Article]