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AN INVESTIGATION INTO THE MERITS OF THYROIDECTOMY AND THYRO-LECITHIN IN THE TREATMENT OF CATATONIA.*

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Among the large group of mental maladies that afflict the adolescent, one form is distinguished, by certain neuro-mental characteristics, that does not belong to any other of the sub-groups of this division of the insanities. More than three decades ago this sub-group was differentiated and described by the German physician Kaulbaum (1874), and from one of its most prominent symptoms—muscular spasm or rigidity—was named catatonia. It is a common form of mental disorder, affecting for the most part young persons between the ages of eighteen and twenty-five, yet, is not absolutely confined to these years, as, rarely individuals approaching the thirties are also affected by it.

It is a malady of fairly definite progression, and in the largest proportion of instances tends to a complete annihilation of all the mental activities, the sufferers in the end stages being relegated to an intellectual plane below that of the beast of the field; in fact, far below them, for they become incapable of speaking coherently, of feeding themselves, or of attending in any way to the daily needs of the body.

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This One

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In the larger proportion of cases, catatonics go through several definite stages before a complete or partial dementia is attained. Most frequently the malady progresses in the following order: First, there is a stage of onset, or prodromal stage, with entire alteration of the character, as well as of the patient's disposition; this eventually passes into a stuporous condition, or period of mutism, the passing from one to the other being attended by a leucocytosis of considerable intensity. The stuporous state lasts for a considerable period, it may be weeks or months, broken now and then by the sufferer waking up to partial or full consciousness of his surroundings. After a time a remission may come, in which the person returns to a more normal condition, yet is never quite himself, or the individual may pass from the stuporous condition into one of motor-mental hyperactivity, with poor ideation, a period of variable duration, after which he slowly and progressively dement. Like that of paresis the duration of the cycle may be a variable one. In some instances the entire cycle may be accomplished within a few months, or it may take years before the stage of dementia arrives.

In the above outline we have only typical cases in mind, the tendency with many being to wake out of the stupor for short periods, during which they may be coherent in thought; or short stages of excitement may be interspersed throughout the stage of catatonic stupor. Likewise, one occasionally sees much milder cases in which the motor symptoms predominate over the mental ones, and which do not run the typical course as given above.

The mental fatalities, in our experience of the disease in this region, have been so distressing, not more than three to four per cent recovering but a part of their mental vigor, that any means of relief, no matter what, would be gladly welcomed.

Many of the catatonics, in their school life, have shown the average intellectual activity, others have been above the average in intellectual attainments, still others have been of a lower mental level, descending to the grade of the imbecile.

This fact offers subject matter for consideration. If persons of presumably stable intellect are stricken with the disease equally with those of a lower intellectual plane, we may at once remove the malady from among the psychoses appertaining to the imbe-

cile class, and look for its origin among other than constitutional disabilities, or, better, separate it from those that belong to inherited tendencies derived from the protoplasm of mother or father.

Our local hospital records are not sufficiently trustworthy to be of assistance, and our private ones are insufficient to enable us to determine the degree of insane heredity in these cases. Certainly they do not show a greater percentage than one-half who have an ancestral tendency to the psychoses. Kraepelin and Bruce also give similar figures.¹ If, in the large proportion of one-half of catatonic cases, we are unable to establish even a trace of ancestral neurotic taint, we must certainly look further for a definite cause.

For a generation these cases have been ascribed by numerous writers to an auto-intoxication, but from what source, and how acting on the nervous system (in particular), as well as on the general body, no one has yet ventured an hypothesis, besides Kraepelin, who ascribes the mental changes to alterations in the activity of the generative organs about the age of adolescence.

For the past two years the writer (Dr. Berkley) has tried in a number of ways to promote a return to the normal in cases of catatonia, but with entire lack of success for a time. All manner of drugs that we thought might favorably influence the malady were used. Tonics of all sorts and descriptions, phosphorus compounds, especially the glycerophosphates, iron, manganese, arsenic, cod-liver oil, hyperalimentation, and lastly iodine. Of the entire list of medicaments iodine was the only one that had any effect, and it seemed to intensify the symptoms, even when the dose was small ($1/250$ gr. iodine, as iodized starch). Under the use of iodine such patients would wake up out of their stupor to some extent, become talkative and excited, and show increased dermatographia, more highly exalted reflexes, an increased hyperidrosis, as well as a higher pulse rate, but the mental condition did not mend perceptibly, and as soon as the drug was withdrawn they reverted to the earlier condition. It was distressing in the extreme to see a number of young men and women, at the advent of the most useful

¹ Wolfson (*Allg. Zeitschr. f. Psych.*, LXIV), the most recent writer on the subject; figures are not here included for the reason that he does not sharply separate the several forms of adolescent psychoses.

period of life, show the most profound alteration of character, stupor, excitement, and finally dementia, without being able to help them at all, so we persisted in our endeavors to find relief, always led by the belief that we were dealing with an auto-intoxication, since this hypothesis presented the best solution of the etiology of the malady. During the course of the investigation we compared, serially, the symptoms of Grave's disease with those of catatonia, and were able to find a certain resemblance between the two maladies, although it must be admitted that the resemblance was superficial, but sufficient to attract attention. Now, holding in view a possible thyro-intoxication hypothesis, we tried after the ordinary drugs had failed, a number of the glandular extracts as well as other animal preparations. Testicular, ovarian and thymus juices, various nuclein preparations, parathyroid, thyroid, iodothyrim, epinephrin, alcoholic solution lecithin, and others were used. From but two of the several preparations did we obtain any effects. Iodothyrim made the patients worse, as did the desiccated thyroid in the ordinary dose of five grains three times a day. As under the iodine the patient awoke out of stupor to some extent, or if the dried gland was pushed he became excited, with increased hyperidrosis and muscular and reflex reactions. The lecithin induced an increase of the leucocytosis, already present, while the red cells increased rapidly. The patients under the lecithin improved physically, but often, when the cases were at all old, without betterment in the mental symptoms. Early cases did much better so far as the mental symptoms were concerned.

In the early winter of 1907, a more systematic investigation was begun at the City Detention Hospital. The aim at first was to induce a high leucocytosis, with the design of producing rapid tissue metabolism, and, secondly, to observe the changes in the condition of the several patients, mentally and physically, during the treatment. This part of the investigation was principally through blood examinations (the urine was examined in addition, but developed nothing of importance), and was directly under the charge of Dr. Hala, of the House Staff, who, after a protracted series of examinations, using various drugs and the several nuclein preparations on the market, of French and American derivation, found that an alcoholic solution of lecithin was the most

certain and efficient medium to increase both red and white cells, thus confirming observations made at an earlier period.

Dr. Hala unfortunately was unable to complete his most interesting work, which, in the main, was giving results similar to those of Bruce of Edinburg on catatonic blood, and for a time this portion of the investigation lapsed.

As previously stated, we had come to the conclusion that in catatonia we had, possibly, to deal with a perversion of the functions of one of the ductless glands, in particular the thyroid body, the latter conclusion drawn from the passing similarity of certain symptoms common to both this malady and Graves's disease, and, in particular, the increased reflexes, the heightened mechanical muscular irritability, hyperidrosis, tremor, the skin changes, and profound loss of weight. Acting upon this hypothesis, we next tried the experiment of feeding our catatonia patients on small doses of desiccated thyroid, one or two grains each day, with the idea of supplying a small portion of normal gland to the bodily economy. Alternating with the thyroid, week by week, lecithin was given in the form of an alcoholic solution to keep up the leucocytosis and increase constructive metabolism.

We first fed four patients upon this regimen, giving all, in addition to the medicaments, large quantities of milk. One case, a quite early one, got well at the end of six weeks, and has remained so for eighteen months. A second case was well at the end of four months, and has not relapsed. A third example did well at first on the thyro-lecithin, but relapsed at the end of four months, owing to the accidental death of a brother. This lady is again, apparently, well, shows no signs of dimming of the intellect, but she is still at times inert, and complains of a feeling of "emptiness" in the head. The fourth, a much more advanced case, did not do so well, brightening up somewhat, but remaining inert and incapable. None of these cases were of any considerable duration, except the last, in which the symptoms of the malady had endured for more than a year. The earliest one was of not more than two months standing. In all of them the thyroid was given for one week, and then alternated with the lecithin for another week; after a time, as the patients grew better, the lecithin was given alone.

This thyro-lecithin treatment, while brilliant in its results when compared with that before obtainable, was not at all satisfactory with cases of longer duration, upon which it seemed to have little or no effect, so we sought further to determine if there was any other means of relieving them.

As we were now further impressed with the hypothesis that we were dealing with a perversion of the thyroid gland, we obtained permission, through the house physicians, from the relatives of several patients to have done upon them the usual surgical operation for exophthalmic goitre, with the hope of changing the quality of the secretion of the organ, or restoring it to a more natural state. Dr. R. H. Follis performed a partial ablation of the organ in ten cases, one in June, one in July, two in October, and one in December, 1907, one in January, three in February, and one in April, 1908. Of these, nine presented the typical form of catatonica as to symptoms, and with the usual mushy thyroid gland, peculiar to the malady, the other equally typical as to symptoms, but with a colloid goitre that had been present since puberty.

To our great surprise and pleasure the three earlier cases recovered their mental equilibrium within a few days or a few weeks after the operation, but there were differences in the manner of recovery. Cases II, III, and IV recovered slowly, little by little, and showed no tendency to relapse. Case I, on the other hand, progressed rapidly for a time, then the remaining half of the thyroid gland increased in size, and with the hypertrophy came a renewal of the mental symptoms, though the patient never became as apathetic and stuporous as before the operation. After a time the goitre decreased in size, and with the diminution came increased mental activity, as well as decrease of the motor symptoms. Finally the patient settled down into a normal condition, a state that has not changed for more than a year. (None of these patients had any drugs given them during the period of convalescence).

The fifth case did not do so well. He was an example of the disease far more advanced than the others, and the stage of mutism had lasted full five months at the time he was thyroidectomized, also in this instance but a small portion of the gland was removed, much smaller than in any of the others.

This patient brightened up after the operation, and for a time it looked as if he also would recover, but he gradually went back, though not quite to the original state, for he was no longer mute and untidy, spending the whole day in bed or on a settee, but spoke a little and that clearly, was tidy in his habits, and on occasion could be induced to play baseball with considerable interest. A second lobectomy was later performed on this patient, with complete recovery of the former mental attainments.

The results given by the pathological examinations made by Dr. McCallum are confusing and indefinite. In Case I, a definite pathological condition could not be made out other than that appertaining to colloid goitre. In Case II the condition was suggestive of exophthalmic goitre. In Case III there was slight fibrosis of the organ, and the same was present in Cases IV, V, and VI. In Cases III and IV a chemical examination of the iodine content was also made. Case III had a very high iodine content,³ while Case IV had a relatively low one.

Reverting to Graves's disease as the best known example of thyrotoxæmia, one finds certain resemblances between the mental and physical symptoms of that malady and catatonia that are interesting, if not significant. The three cardinal signs of the Graves's malady are only noticeable by their absence, also in catatonia the blood pressure is only high at certain stages of the disease, but in both there is rapid pulse, muscular tremor, hyperidrosis, over-active eye, as well as other, reflexes, increased mechanical muscular excitability, dermatographia, hyperidrosis, skin pigmentations, and rapid loss of weight, disturbance of the menses, and vaso-motor pareses.

In both there are psychical alterations, which though ordinarily less severe in Graves's are still quite noticeable. Especially is this true for the prodromal part of both disturbances, when insomnia, headache, vertigo, a change in disposition, and irritability are commonly noted.

The resemblance is far from perfect, yet there is a certain significant coincidence of symptoms, even though the main features of the two diseases are seemingly far apart.

³ Due to the fact that the patient had been on potassium iodide, up to two weeks before the thyroidectomy.

The state of the thyroid gland, during life, necessarily commands attention. One finds two conditions. First, an occasional gland that shows more or less hypertrophy, and has the general aspect of belonging to the ordinary colloid goitres. These instances of enlargement are few in number, and careful inquiry into their origin elicits the fact that the swelling of the gland began years before the advent of the mental symptoms. It is accordingly more than doubtful if the colloid form of goitre and catatonia have any relation to each other, and their coincidence is accidental. If the secretion of the organ is perverted, other disturbances of the glandular activities come into play at a later period than that in which the colloid matter begins to accumulate.

In the second, as well as far more numerous class of cases, the one that may be considered as typical of the malady, we find an altogether different state of affairs. The neck over the region of the thyroid looks full, while the gland to the finger is soft and mushy, with an occasional hard knot here and there noticeable in it, which is in contrast to the firm gland found in healthy individuals. Usually the gland is about the normal in size, sometimes it is below the normal. The varying position of the gland makes its quantitative presence uncertain, as occasionally the bulk of it lies behind the trachea.

Blood alterations are more constant in catatonia than in any other form of mental malady, hephephrenia and paresis excepted. In the earlier periods of the disease a leucocytosis of from 11,000 to 18,000 per cubic millimetre is fairly constantly found, which may rise at the beginning of the stage of stupor to a much higher figure (30,000 to 40,000). The relative proportions, between the several forms of white corpuscles, are also changed, and the percentages of childhood are again attained. The small lymphocytes are relatively high, the large forms are unaltered or low (occasionally the reverse condition is found, and the percentage of the large lymphoid cells may be as high as 40 per cent, in one instance up to 43 per cent), the neutrophiles vary from slightly below normal to a low point (48 to 50 per cent), while at certain times the eosinophiles are low, normal, or increased. Mastzellen are occasionally seen; myelocytes are not found so far as we have been able to determine, and are certainly not present in appreciable numbers.

Changes in the red cells cannot be spoken of with any degree of assurance. The Paoli method, it is true, shows a certain stainable body, by him termed *hemaglobigenic*, with constancy, but these bodies are found under other conditions, besides the technique of the method is not free from objection.

In examining patients suffering from catatonia, one is often impressed by their extreme pallor, and apparently anaemic condition, yet in blood examinations one always finds the hemoglobin relatively high, while the number of the erythrocytes is also comparatively high, and this, when every precaution is taken to insure outflow of blood from the ear without pressure. The explanation of this fact is, probably, in that the patients partake of fluids in very small quantities, as many of them have to be fed by the tube, while others refuse to partake of but small quantities of water.

After the partial ablation of the gland, in the few cases operated upon, the differential count has shown very considerable alteration in the relative proportions of the leucocytes, as well as in the general estimate of the total number of these cells. Within the first 48 hours there is a high leucocytosis, with (in the cases that recovered) a drop shortly afterwards, and then a gradual return to the normal proportions between the white elements.

Arguing from the fact that the administration of iodine preparations (in particular the iodized starch), as well as thyroid derivatives, results in some change in the condition of the patients, we might premise that in these cases there was a perversion of the thyroglobulin, with excess of the iodine content, but the chemical examination in the one case does not bear this out. Nevertheless, the excess of iodine content, if it should actually prove to be the case, cannot be all, as has been demonstrated by Hunt,⁸ who fed preparations of the thyroid gland of still-born infants and kids to mice, and found that this thyroid, from which iodine was absent, increased the resistive lethal power of animals to acetonitrile, though not by any means to the degree that the older iodine-bearing gland did.

It is guesswork to write of the activity or non-activity of the non-iodine bearing constituents of the thyroid gland in the present

⁸ Hunt, Relation of iodine to the thyroid gland. Jour. Am. Med. Asso., Oct. 19, 1907.

state of our knowledge, for clinically we have no means of differentiating them or getting at them.

CASE I.—Sophy S., æt. 19 years, white, single, native of Maryland. Diagnosis, catatonia.

Family History.—The father died at the age of 40 years of pneumonia. He had been intemperate. The mother is living, æt. 54 years, is healthy, but of hysterical temperament. Besides the patient there were eight brothers and sisters, of whom six are now living, all in good health. Two children died in infancy, one of "spasms" at the age of eight months, the other at 17 days of pneumonia. There was one miscarriage at six months. There is no history of psychoses in the mother's family. The ancestral history of the father is unknown.

Past History.—The mother was very hysterical during the fetal life of the patient, but the birth was quite natural. Measles at 11 years was the only disease of childhood from which she suffered. Menstruated at 15 years; regular, but attended by pain at times, and severe headache. Patient made good progress at school, which she attended for six years. A slight goiter was noticed about the time the menses began, but this did not increase in size. Has never used intoxicants, drugs, or tobacco. Has been employed as a saleswoman since fourteen years, to the beginning of the present illness, and until that time gave satisfaction to her employers. At home the surroundings were moral and pleasant.

According to the statement of the mother and brother of S., the first signs of a departure from mental health was in September, 1905, when she became depressed and had numerous crying spells, also she persistently blamed her mother for not raising her for a higher station in life, that she should have been better educated in order to meet the needs of her future life. These ideas were in part derived from the man to whom she was engaged to be married, who thought himself of a higher social plane than S. Later there were frequent quarrels, and finally the breaking of the engagement. To this some of the depression was due.

However, she remained at work until February, 1906, when she was advised by her employers to give up her position and rest for a time; the reason given was that she had become extremely forgetful and indifferent.

After this she remained at home, sometimes trying to work, more often not. All this time there was severe and protracted headache, which tended to increase as the depression deepened.

For several months longer she remained in about the same condition, reading the Bible and praying constantly, but on February 23, 1907, the condition rapidly changed; she became excited and unmanageable, and had grandiose delusions.

According to the family physician's statement, the girl was of normal mentality until January, 1906, when in consequence of the mentioned quarrels she became melancholic. During the spring of the same year this passed away, but she became very erotic. This had also passed by the early

fall, and only toward the end of February, 1907, did she become unreasonable, unmanageable, and destructive.

Present State.—Admitted to the Detention Hospital March 2, 1907. At this date she was mute, restless, apathetic, catatonic, with marked negativism. The clothing was untidy and unkempt.

Examination.—The patient is a girl of medium build, light complexion, fairly intelligent physiognomy, but with mask-like expression. She is apathetic and will not speak. Eyes do not protrude. Pupils, 2 mm. equal, reactive to light, sympathetic, and psychoreaction. Eyesight normal, retina and optic nerves normal. Tremor of tongue, hands and facial muscles. Head regular in shape, index 81, circumference 54 cm.

Nutrition only fair. Skin is without eruptions, but oily. Slight puffiness about the cheeks. Moderate dermatographia. Tactile and pain sensations uncertain, apparently slightly dulled. Deep and superficial reflexes overactive. Muscular mechanical excitability much above normal. Considerable sweating about hands and feet, and generally lowered vaso-motor state. Heart sounds, especially the second aortic, accentuated. Lungs normal. Pulse rapid, tension low. Temperature fractionally above normal.

The presence of delusions or hallucinations could not be determined on account of the mutism. A blood examination made the day after admission showed a leucocytosis of 20,000. The urine was negative.

March 3 to 12.—Patient has been considerably excited for several days. Hallucinations have been pronounced. There has also been much motor agitation, singing, dancing and shouting, and occasionally answering imaginary voices. Is very incoherent and rambling in response to questions. At times the language flow is so rapid that only single words, without connection, can be made out. Negativism and other physical signs of the malady are pronounced. S. is sleepless, refuses food, and hypnotics are necessary.

On the 15th of the month the patient quieted down, and again became mute, with the customary apathy, indifference and catatonic rigidity. She has gained slightly in flesh, while the face has become more puffy. S. will neither read nor work, and spends her days standing in a corner, without motion. When taken out of doors for an airing, she apparently does not notice anything around her. Is not theatrical or impulsive. Is untidy in her habits.

From the last date to June 27, when a partial thyroidectomy was performed, there was practically no change in her condition.

An examination made June 26 showed her to be absolutely mute and unresponsive to stimuli. The pupillary reactions, including psycho-reaction were plus. Mechanical muscular irritability, deep and superficial reflexes plus. Dermographia well-marked. Slight tremor, with occasional spasmodic jerking of the head, or occasional clonic spasm of the orbicularis oculorum. No eruptions or bronzing, but skin oily, especially about face and neck. Hands clammy with cold perspiration. Lowered vaso-motor condition. Blood pressure 170 mm. R. R.; pulse 87 to 90. Accentuation of second

aortic and second pulmonary sounds. The bronchocele is not larger than in March. Neck over goiter measures 33 cm. Thymus is absent. Area of splenic dullness normal.

Operation [Dr. Follis], June 27, at 3 p. m. About four-fifths of the right lobe of the thyroid gland was removed, the upper and lower poles being spared in order to avoid any possibility of injuring the parathyroid glands; also to avoid additional complications. The portion removed measured 6 cm. in length, 4 cm. in width, and 2.50 cm. in thickness. It presented to the eye the usual appearance of a colloid goitre. The gland was much congested. The portion removed was preserved in Müller-formol, and in absolute alcohol for microscopic examination.

By 6.30 o'clock, the patient had awakened from the ether narcosis, and talked fairly intelligently to the nurse. She soon became restless and excited and inquired for what purpose the "hard collar" was around her neck; also complained of it hurting her. Vomited once. Had hallucinations, seeing her mother in the room. At 8 p. m. was given a hypodermic of one-fourth grain morphia, and slept until 4 o'clock the following morning.

June 28.—Awoke and asked nurse to raise her head so that she could take a glass of orange juice comfortably; also asked that her mother be sent for. Seems perfectly coherent and oriented as to person and place. Pulse 147; T. 98.9°; R. 28. Was quiet and coherent during the day, but at 6 o'clock p. m. became loquacious, incoherent, and sang snatches of a popular song. Evening: pulse 130; T. 99°. Was given ¼ gr. morphia at 8 p. m. and slept well until morning. Awoke at 8.10 a. m. and said "good morning" to the nurse. Ate a good breakfast, but complained of everything tasting peculiarly. Said she felt splendidly.

June 29.—This morning the face is very red and somewhat swollen. Pupils 3.50 mm., hyper-reactive. Reflexes, muscular mechanical excitability and dermatographia, unaltered. P. from 120 to 130; T. 98° to 99°; R. 22. Conversed perfectly coherently to the physician in the afternoon, but was quickly wearied. Becomes mute at times. Wound healing nicely.

June 30.—Slept well without morphia the entire night, and conversed pleasantly and intelligently with the nurse on awakening. Asked for some work to do, and embroidered for a time, doing the work creditably. P. 110 to 130; T. 97°; R. 22.

July 1 to 4.—Sleeps well, appetite good, eyes bright, pupils 2 mm. Face shows a decided change, as it is no longer red and puffy. Hands not so clammy and perspiring. Patient takes lively interest in her surroundings, inquires about other patients, and was allowed to see her mother, with whom she conversed for some time. Talks little to the physicians, but is cheerful and answers questions to the point. Was allowed to go out of doors in charge of the nurse. P. 95 to 96; T. 98.6° to 99°. Wound healing rapidly.

July 5.—S. is much quieter and more apathetic to-day. Would not speak to the physician, but laughed in a silly way, or turns the head with a jerk to the side. Pupils are 2 mm., quite reactive. Dermatographia marked.

Deep reflexes not so exalted. Mechanical muscular excitability slightly lessened. Hand dry and reddish. T. 98.7° ; R. 21; P. 95 to 96. *The left half of the thyroid gland is beginning to hypertrophy.*

July 6 to 15.—The patient is quiet most of the time, apathetic, indifferent, sometimes mute for hours, sometimes talking incoherently. Laughs in a silly way, and is fast becoming untidy. The T. has risen to 99.2° ; P. 80 to 82. Wound entirely healed.

July 17.—Pupils equal, $2\frac{1}{2}$ mm. Deep and superficial reflexes much exaggerated. Dermographia and muscular mechanical excitability greater than a few days ago. Extremities cyanotic and bathed in cold sweat. Fairly constant twitching of face and lips. The head is jerked occasionally from side to side. Is mute the greater part of the time, but at others she talks incoherently, though she will reply to direct questions. If the questions are persisted in she becomes rambling and incoherent. The face is again becoming bloated. The hypertrophy of the thyroid gland is still increasing, the neck now measuring 35 cm., 2 cm. more than before the thyroidectomy.

It was decided not to interfere in any way with the condition of the gland, medically or surgically, under the belief that after a time the enlargement would subside of itself.

July 18 to 24.—The patient's condition is a little better. She now does some work and at times speaks consistently and coherently. T. 98.5° to 99° ; P. 95.

July 25.—The motor symptoms are about the same. Extremities cold and covered with clammy sweat. T. from 98.6° to 99° ; P. 97; R. 22.

July 26.—Is menstruating for the first time since admission. The general condition of the patient is good, and she has put on some flesh.

August 4.—Mental and motor state much the same as in last report. Is impulsive at times, swears freely, and is mischievous. The thyroid gland is beginning to decrease in size.

August 14.—Motor signs not so marked. There is no negativism or twitching of the facial muscles, or tremor of the tongue. Weight 134 lbs. The pulse has a low tension. The second aortic sound is accentuated. T. 98.5° to 99° ; P. 95.

August 20.—To-day there are more evident signs of mental improvement. Converses coherently and works well. The thyroid gland is still decreasing. P. 96; T. 98.6° to 99° .

August 23.—Pupils $3\frac{1}{2}$ mm. in diameter, reactive to light and sympathetic stimuli. Other motor phenomena unchanged. Hands and feet are warm, but remain somewhat cyanotic and perspiring. Negativism absent. Is now completely oriented as to place and person. There is no longer a tendency to impulsiveness. Sleep and appetite normal. Pulse contracted, tension low, regular in rhythm. Neck 34 cm. T. 98.6° to 99° ; P. 96; R. 22.

August 26.—Left pupil 4 mm.; right pupil $3\frac{1}{2}$ mm.; reactive. Weight 139 lbs., a considerable gain. Patient prevaricates constantly, but is coherent and anxious to go home. If closely questioned becomes loquacious and swears. Is again inclined to be impulsive.

August 27 to September 9.—Since the last note was made there has been marked improvement. S. reads a good part of the time, and can give a fair account of what she has read. Is anxious to assist her nurse in the ward work. Is seemingly quite rational and is well-behaved. There is also some change in the motor signs. The pupils are $2\frac{1}{2}$ mm., equal and normally reactive. The hands are cyanotic, but warm, also there is much less perspiration. The twitching of the facial muscles has almost subsided. Dermographia is present. Muscular mechanical excitability and the reflexes are normal. Shows slight mannerisms in speech. T. 98.6° ; P. 74 to 80.

September 29.—S. continues to improve. Is industrious, perfectly good tempered, and it is difficult to find any departure from normal mentality. The physical signs are about the same as when the last note was made. T. 98.6° ; P. 80; R. 20.

The patient was sent home, with instructions to report on October 8.

October 8.—Patient has been home for a week, and returns in quite normal mental condition. The mother states that she has been industrious, good-tempered, and that she sees no difference in her daughter between the present time and before she was taken ill. Her memory for the past has improved wonderfully; she is well-conducted, and in no wise erotic. The physical signs have not entirely abated. The mechanical muscular excitability is slightly plus, as is also the dermatographia. The deep and superficial reflexes are still somewhat exaggerated, though by no means so well-marked as in June. The pupils are 2 mm. reactive, though normally so, to light, sympathetic and consensual stimuli. The patient has gained considerably in flesh. The pulse is 80, with continued accentuation of the second aortic sound. On slight excitement it rises to 90 beats. The right thyroid is not palpable; the left half is considerably enlarged. The neck measures 33 cm. in circumference. The gland is firm. There is now a slight area of dullness, not more than 3 cm. in diameter, over the region of the thymus gland.

November 8.—Patient reported to hospital, but her condition remains unchanged.

December 7.—Patient is bright; memory good, especially for dates; is rather indolent at home; color good; weighs 158 lbs. Was shown to class. Neck over thyroid measures 32.5 cm.

The following letters show in some measure the differences in the patient's mental condition; the first one is incorrectly dated, the patient then being in the Detention Hospital; in the second the date is correct. Both are in response to requests of the house physician.

BALTIMORE, 2/16 1907.

Mr. C. K. Stewart.

DEAR SIR—Kindly inform me as to the condition of the state of my brother's health in regard to the supposed insanity by which he was conferred upon him by laws of the state of Md. On said date and refer him to the said doctor in case the condition improves. I will offer a reward of

\$100 and costs to said owner in case he improves. He was sent to Spring Grove Asylum on said date and declared insane. Any information regarding same kindly inform him.

Address City Hall,
Baltimore, Md.
Calvert and Saratoga
[Signed S. D. S.]

BALTO. MD. Sept. 20 1907.

DEAR DOCTOR.—I wish to thank you for your kindness for allowing me to go home, which I appreciate very much. I also thank you for your promptness and for being so attentive to me. Especially do I thank you for your kindness and courtesy immediately after the operation. Understand I appreciate every thing that has been done for me but my most earnest desire is that I shall never see this place again.

I remain,
SOPHIA S.

April 5, 1908.—S. has not relapsed to this date.

July 25, 1908.—Patient continues to be normal.

September 25, 1908.—There has been no change in the girl's mental state.

Thyroid Gland. Examination by Dr. McCallum. S. S.—The alveoli are distended with homogeneous colloid which, however, show some variations in its standing qualities. Some alveoli are filled with pale gray, others with pale pink, and others with bluish pink color. For the most part they are larger than normal and their epithelial cells are very low and flat. In some places, however, the large alveoli are surrounded by very small ones. There is in most instances no distinct folding of the alveolar walls. In one or two alveoli, however, there is a remarkable scalloping of the epithelium by its being uplifted by capillaries.

The above case represents one of the usual forms of the malady in this region, with a somewhat prolonged prodromal period. At the time of the partial ablation of the thyroid, the symptoms were entirely typical of the stage of mutism, and for more than three months there had been no improvement, but, on the contrary, a slow downward trend toward the final stage in the realms of a terminal dementia. Within forty-eight hours after the partial removal of the gland there was a complete change in the psychical manifestations, and a rapid return toward the normal in the motor symptoms. One week after the ablation, the left half of the gland began to show signs of an hypertrophy, and as this progressed, the mental-motor symptoms returned, almost with their former intensity. Nothing whatever was done to change in any way the progress of the thyroid hypertrophy, beyond feeding the patient liberally and attending to the alimentary canal; besides, the condition of the patient was daily watched.

After a time the swelling of the half-gland began to decrease in size,

and with the decrease came an alteration in the physical as well as motor reactions. Gradually there was a return to normal mental activities, so that by October 8, 1907, or 104 days after the ablation, the girl had returned to her earlier natural state, except for some remaining traces of too active reflexes and mechanical muscular excitability.

At the October examination a slight area of dullness was found over the thymus region, which had previously not been apparent. This could not be well accounted for except on the ground of a hyperplasia of the gland following the thyroid ablation. It was distinctly not present before the operation, as the thymus region was carefully examined for any dullness.

BLOOD EXAMINATIONS.—S. S.

Date.	Red cells.	White cells.	Hemoglobin.	Small monos.	Large monos.	Eosin.	Polys.	Masts.	Trans.	Blood press. (R. R.)
March 2, 1907*.....	3,000,000	19,600	60%	8.1%	10.1%	0.9%	80.9%	.0%	..	..
" 7†.....	3,290,000	18,000	68	11.2	9.8	1.2	78.8	.0	..	..
" 17‡.....	3,000,000	20,000	68	12.0	9.1	1.4	77.0	.5	..	..
" 27.....	3,200,000	17,200	70	18.0	11.8	1.0	74.2	.0	..	..
April 1.....	3,500,000	12,000	70	18.0	10.0	2.0	70.0	.0	..	..
July 28.....	4,600,000	17,800	75	29.0	1.5	2.0	66.0	.5	1.0%	115
Aug. 14.....	5,100,000	12,800	80	21.0	2.0	3.0	72.0	.0	1.0	126
" 21.....	5,250,000	9,600	80	23.0	2.0	1.5	78.0	.0	1.5	126
" 30.....	5,400,000	8,700	80	25.0	2.0	1.0	70.0	.0	2.0	126
Sept. 9.....	5,500,000	9,000	80	24.0	3.0	1.0	70.0	.0	2.0	126
" 13.....	5,800,000	8,200	80	28.0	5.0	1.0	68.0	.0	3.0	126

* Patient excited. † Patient quiet. ‡ Mute; marked negativism.

CASE II.—John Y., æt. 21 year, a native of Baltimore, by occupation a railway car cleaner, was admitted to the Detention Hospital, March 4, 1907. Diagnosis, catatonia.

Family History.—The father died of a pneumonia, as a result of alcoholic excesses. The mother is living and intelligent, but suffers from "asthma." The patient is one of five brothers and sisters. Of these two brothers died in infancy, also a sister of pneumonia at the age of fifteen years. The other sister is healthy, mentally and physically. A maternal aunt had three attacks of periodic insanity, dying during the last one.

Past History.—The patient's birth was natural. He suffered from diarrhoea and general disturbances of nutrition at the time of the first dentition. There had been no other illness from that time to the event of the present disturbance.

J. attended school for one year, and "was slow to learn." He was always quiet and reserved. Syphilis and gonorrhoea are negative. Tobacco and intoxicants have been used to a very moderate extent. Patient has been a car window washer for the past two years, and he has worked steadily. The home surroundings are poor, but moral.

Present History (statement of the sister).—The patient has always been a good boy, a steady worker, and has attended church regularly. He was always reserved, avoiding strangers, as well as persons of the opposite sex.

The evenings were always spent at home with the family, and not upon the streets.

The first symptoms of mental disturbance noticed by the family were on February 28, 1907.⁴ The man started to work at the usual hour, but returned at eight o'clock a. m. and stated that he wished to rest that day. When inquiry was made as to the reason he wished to rest he said he "did not expect to work every day of his life." Patient spent that day and the succeeding one in the seclusion of his room reading the Bible, but aside from this nothing was noticed in his behavior, or conversation, to indicate that his mental equilibrium was disturbed. At the supper table on the evening of March 1 he announced that he was going to "take Christianity to the church." When asked to explain he made no reply, but picked up a crucifix and went to a Catholic church in the neighborhood, where he asked the priest to baptize it. After returning home, he told the family that he was "the Son of God," but would not give any further information about himself, or what he had done when away from home that evening. The same night he was restless and did not sleep. On the following morning he complained that someone was whispering to him and telling him to do wicked things. Later in the day he became excited, proclaiming himself to be of divine origin. He then went to the Catholic church and assaulted the priest, who had him sent home. That night he showed much motor restlessness, was sleepless, could not be controlled, and on the following morning (March 4) was sent to the Detention Hospital.

On admission J. was loquacious and incoherent, but in a little while he became mute. Then again, after an interval of half an hour, he was gesticulating wildly, was incoherent and talkative, exhorting an imaginary audience, grimacing, assuming theatrical attitudes, jumping, crying, and swearing. Definite delusions could not be determined at this time. A few of the sentences spoken were: "Judge do your duty"; "let me go home"; "if you don't believe in me, you don't believe in God"; "won't you take this hand, gentlemen"? "I love you all"; "will you accept God"? "oh my God"; "holy saints"; "holy mother"; "holy disciples"; "holy angels"; and repetitions of the same character.

When admitted the patient was untidy and unkept, with clothing torn, and soiled with mud.

Physical Examination.—Skull regular, brachycephalic. Index 84. Circumference 56 cm. Nutrition only fair. Appetite poor. Actual disturbance of general sensation could not be definitely determined, though the sense of pain seemed to be dulled. Deep and superficial reflexes everywhere exalted. Mechanical muscular excitability much above normal. Pupils 3 mm., over-reactive. Psychoreaction positive. Tremor of tongue, fingers, and lips. Pulse 72, tension low. Slight arterio-sclerosis of the peripheral arteries. Heart sounds accentuated, especially the second aortic.

⁴The man after recovery stated that the mental indisposition began early in January, 1907.

Lungs negative. Lowered vaso-motor status, with cyanosis of all the extremities, and profuse sweating of the hands and feet. The skin is without eruptions, but moist and cool. There is marked dermatographia. No Romberg, von Graefe, Stellwag, or Babinski. Tongue coated and patient constipated. The thyroid gland is about the normal size, but soft and mushy to the finger. The neck looks rather full.

Urine.—Sp. gr. 1023. Color, amber, transparent; slight sediment on standing. The reaction is alkaline. No albumin, sugar, bile pigments, or indican. Skatol is noticeable as a faint trace. The sulphates as well as phosphates are increased. The microscopic examination showed uric acid crystals, triple phosphates, cylindroids, a few hyaline casts, also bladder epithelium.

Subsequent History.—March 20. The patient has been almost constantly mute since his admission. Is apathetic and indifferent, but is occasionally impulsive. Catatonic rigidity, with negativism, is well-marked. The reflexes and mechanical muscular excitability are far above normal. Dermatographia is well-defined. The skin is oily. The hands and feet are cyanotic and perspiring freely. The patient looks very anæmic and has lost considerable flesh since his admission. A blood count showed the erythrocytes to number 3,780,000; leucocytes 14,000; hemoglobin 78 per cent; small monos. 20.0 per cent; large 17.06 per cent; eosinophiles 3.30 per cent; neutrophiles 58.70 per cent; mastzellen .00.

March 27.—The patient is absolutely mute, negative and catatonic. The general condition is unchanged.

June 5.—J. has remained mute since the last note was written. The skin of the face is of an earthy tint and doughy. The other physical symptoms are unchanged, beyond that the tremor has increased. Pulse 80.

June 30.—The man has not improved at all since the last note was taken, and it was now decided to perform a partial thyroidectomy upon him.

July 1.—Examination preceeding the operation.

The patient has been completely mute for over three months, and no additional mental symptoms have been observed. He does not now resist handling. The iris reactions, to light and sympathetic stimuli, are over ready. The psycho reflex is present. There is no prominence of the eyeballs. Mechanical muscular excitability is much exaggerated, as are likewise the deep and superficial reflexes. Catatonic rigidity is present, but no negativism. Cutaneous sensations are, apparently, dulled. There is well-defined hyperidrosis with a lowered vaso-motor tone. A fine fibrillary tremor is noticeable about the lips and small muscles of the hands. The skin is pallid and doughy, especially about the face. The heart sounds are all accentuated, and especially is this true for the second pulmonic. The pulse remains at 80. Blood pressure 125 R. R. The thyroid gland is palpable, about the average in size, soft to the finger. The bridge can only be determined with difficulty. The neck over the thyroid gland measures 35.5 cm. There is no dullness over the site of the thymus gland. The testicles are firm. A blood examination showed, red cells 3,800,000;

white cells 10,800; hemaglobin 78 per cent; the differential count: small monos. 21 per cent; large monos. 15 per cent; eosinophiles 4.0 per cent; neutrophiles 60.0 per cent; mastzellen .0 per cent.

July 2.—Operation at 3.30 p. m. (Dr. Follis), under ether. About four-fifths of the right lobe of the thyroid gland was removed. The parathyroids were not injured. The portion removed weighed 4.95 grams, and measured in length 5 cm., in width 2 cm., and thickness 1 cm. The ether was not well borne.

Post Operative History.—The patient came out of the ether narcosis at 6.30 p. m. He was then restless and begged to sit up, as he said he was choking. By eight p. m. he was quiet and apparently sleeping. At 9 o'clock he was gasping and moaning. At 1 o'clock a. m. he was given one-fourth grain morphia by the syringe, and was then quiet until four o'clock a. m. He then asked the nurse "how I came here," and the name of the place; also if she was the Holy Mother. He then slept until 4 a. m. Then awoke and asked for a glass of water. When this was given him he remarked "that every one seemed to talk upside down"; also that he would rather be out working. He also asked what made him sick. He slept again from 4.30 until 5 o'clock a. m., then repeated the word "hell" several times, then asked the time. He then added that he did not like the people here, and would like to go home. P. 152 to 125; T. 98.8°; R. 40 to 30.

July 3.—The patient is drenched in perspiration this morning, and looks pale and anxious. Is not nauseated. The eggnog and milk given him are taken freely. He rested all the afternoon, sleeping most of the time. He refused any solid nourishment, saying that his throat hurt him. Later in the evening he was very restless, constantly attempting to get out of bed. At 1 o'clock a. m. he was given a quarter grain of morphia, but continued to be restless until 3 a. m., after which he slept until 6 o'clock.

July 4.—When the patient awoke he tried to speak, but could not talk louder than a whisper. He is apparently very weak, and is perspiring profusely. He slept nearly all the morning, but would start out of sleep at the slightest noise. The wound is healing well. The reflexes are greatly exaggerated, muscular excitability is plus, as is likewise dermographia. Negativism is absent. The patient is now completely mute. His mother saw him in the afternoon, but no attention was elicited by her presence or inquiries, except that when asked if he knew her he said "yes" in a whisper. At eight o'clock he was sleeping quietly, but awoke at half after eight, and so remained until half after 10 o'clock, when he was given a teaspoonful of paraldehyde. He then slept until early next morning. J. ate a good breakfast. When the wound was dressed it was found to be in good condition. P. 150 to 132; T. 102° to 97°; R. 30 to 24. Hyperidrosis profuse.

July 5.—J. awoke this morning and conversed freely and intelligently to his nurse. He particularly spoke of an empty feeling in the head and some cephalalgia, and said that he had been silent when addressed, be-

cause he could not decide upon a reply to questions. He also mentioned that he had seen imaginary people, but seemed to recognize that they were hallucinations. He added that at times queer ideas passed through his mind which he cannot comprehend, but thinks that these ideas are growing fewer since the operation. As the day advanced he again became mute, or occasionally spoke at random. The pupils are $2\frac{3}{4}$ mm. in diameter, equal, but are still too reactive. The dermatographia is not so pronounced. The activity of the reflexes is perceptibly decreased, though not normal. Muscular mechanical excitability has not decreased. The hands and feet are reddish and dry, but the face and neck are still perspiring freely. The skin of the face is not as doughy as before the operation. The heart sounds are accentuated, the pulse is irregular, the tension low, the rate 99 per minute. T. 96.6° to 97.8° ; R. 23. The man is recovering his appetite.

July 6.—The patient slept without hypnotics until four o'clock a. m., awoke complaining of pain in the throat, and only takes liquid food for fear of the pain. He asked the nurse if he was "Jesus," but seemed satisfied when told that he was not. Is still perspiring profusely. The hands are dry, somewhat cyanotic. Dermographia is still decreasing. The reflexes and muscular excitability are, perhaps, a trifle lowered.

J. rested quietly during the morning, and in the afternoon was quite lucid. At times he spoke of his delusions and hallucinations, and recognized them as false. The patient speaks in a low whisper, but answers questions concisely. T. 100° to 98.6° ; P. 97; R. 22.

July 7.—The general condition is about the same. In the afternoon he conversed with his mother for a few minutes. There is continued hyperidrosis.

July 10.—The general condition is improving. The man is sitting up, reading part of the time. The perspiration is less excessive.

July 11.—The patient slept fairly well during the night, but complained of headache in the morning. A small abscess in the neck was evacuated, and the temperature, which had risen to 103.2° then dropped to 100.2° ; P. 97; R. 28.

July 12.—The man speaks coherently to-day, but is inclined to be quiet. The excessive perspiration is decreasing. T. 100° ; P. 95; R. 22.

July 14.—J. is sitting up to-day, and is composed, lucid, and cheerful. Hyperidrosis has ceased. The reflexes, muscular excitability, and dermatographia are considerably decreased. A few drops of pus are still coming from the abscess. T. 98.4° ; P. 95; R. 22.

July 17.—Since the last note was made the man has gained rapidly. He speaks connectedly and is very willing to do whatever is told him. He sleeps well at night, takes considerable interest in his surroundings, also spends a large part of his time in reading books. The memory, up to the time of his mental indisposition, is good. He complains of feeling weak and speaks considerably about himself, worrying about having been insane. He attributes his insanity to masturbation. At this date there are no mannerisms, no posing, stereotypy, negativism, or impulsiveness. Redden-

ing on irritation of the skin is now faint, and disappears quickly. The superficial reflexes are still exaggerated, the deep ones are normal. Mechanical muscular excitability has much decreased, though it is still above the normal. The pupils are 2.5 mm. equal, normally reactive to light and accommodation, as well as to sympathetic stimuli. The hands and feet and still somewhat cyanotic, cold, and clammy. The pulse is irregular, compressible, with low tension, 120 R. R., 95 beats to the minute. The heart sounds are accentuated. Lungs negative. Bowels regular, appetite good. The patient reads a good deal, and is bright and willing. There is no longer difficulty in holding a conversation. The neck wound is completely healed, and there is no enlargement of the remaining half of the thyroid gland.

July 23.—There is complaint to-day of difficulty in micturition, also of pain in the abdomen. On examination, there is evident infection of the prostate gland, as the result of catheterization during the first few days after the operation. Cystogen 5 grs. t. i. d. T. 101.2°; P. 96; R. 22.

July 30.—A slight subcutaneous hemorrhage, not of traumatic origin, has come over night under each eye. The prostate gland is considerably swollen. T. 99.2°; P. 95; R. 22.

August 5.—J. refused breakfast this morning, and complained of severe pain when the bowels were moved, also that he felt weak and giddy. The temperature has risen to 102.2°, but the sensorium is clear, and neither delusions or hallucinations have appeared. The prostate gland is beginning to show signs of pus formation. T. 103.2°; P. 97; R. 28.

August 8.—The prostatic abscess ruptured externally with relief of the pain and distress. T. 100°; P. 98; R. 28.

The pupils are normally reactive, 2½ mm. Dermographia slight, reflexes slightly exaggerated. The patient is entirely oriented, coherent, and there has been no delirium. The neck over the thyroid gland is now 35 cm.

August 10 to 23.—The man is again steadily improving. Sleep is normal. He is in good spirits, converses pleasantly, and reads a good deal. The motor signs have markedly decreased; dermatographia is faint and disappears quickly. The reflexes are about normal, and mechanical muscular excitability has lessened. The hands are warm, though still clammy. The pupils are equal and normally reactive. There is still slight tremor of the hands and lips.

August 23 to 28.—There has been no change in the patient's condition, other than he is steadily growing stronger and mentally more capable. The memory is excellent.

Sept. 1 to 30.—J. has remained bright and cheerful to this date. He is in good spirits, assists in the work of the ward, and spends a good deal of his time out of doors. The motor symptoms are unchanged since the last examination. The patient was sent home on September 30.

October 8.—The patient reported for examination to-day. The mother says that he has shown no signs of abnormal mentalization, but has been somewhat inert. Sleeps well. Appetite good, memory excellent.

Pupils 2 mm., equal, the internal ocular reflexes normal. There is no protrusion of the eyeballs. Superficial and deep reflexes normal. Mechanical muscular excitability is slightly plus. The skin is warm and dry, and the hands and feet are no longer cyanosed. The vaso-motor state is normal. Dermographia is faint. The general nutrition is excellent, and the man is gaining rapidly in weight. There is no tremor. The neck, over the thyroid, measures 35.5 cm. Apparently there is no hyperplasia of the left half of the gland. Pulse 74. Blood pressure 150 R. R. The accentuation of the heart sounds has decreased. Testicles firm. Splenic dullness 6 cm. No dullness over the thymus gland.

November 8.—The patient has been working at his occupation for several weeks. He is now normal in every respect.

December 20.—J. reported to the hospital for examination. He has been working steadily for about two months, and has been regular and attentive to his duties. He has gained remarkably in flesh, and now weighs 25 pounds more than when he left the hospital. His muscles are full and well-nourished; he looks extremely well, and the face has a more open and intelligent expression. The physical signs of catatonia are negative, except that mechanical muscular irritability is still above the normal. The memory is good, and response to questions is quick and comprehensive.

April 8, 1908.—J. continues to be normal.

October, 1908.—Patient continues in good health.

MICROSCOPIC EXAMINATION (DR. MCCALLUM).

Thyroid.—The thyroid is rather fibrous-looking; strands of connective tissue subdivide it into lobules. The alveoli are for the most part large but very irregular in form with buds and infoldings. The epithelium is cubical, distinctly higher than normal, but not as high as that seen in exophthalmic goitre. There are numerous small alveoli associated with these larger ones, and these also have high epithelium. There are some scattered patches of lymphoid tissue through the thyroid.

BLOOD EXAMINATIONS.—JOHN Y.

Date.	Red cells.	White cells.	Hemoglobin.	Small monos.	Large monos.	Eosin.	Polyns.	Mastz.	Trans.
March 20, 1907.....	3,800,000	15,000	78%	20.0%	15.0%	4.0%	60.5%	.5%	..
April 6.....	3,820,000	13,000	79	22.0	16.0	3.5	58.5	.5	..
" 30.....	3,750,000	10,000	76	22.0	15.0	3.0	60.0	.0	..
May 5.....	3,780,000	11,000	77	23.0	16.0	4.0	57.0	.0	..
" 18.....	3,800,000	10,800	78	21.0	15.0	4.0	60.0	.0	..
July 28.....	4,000,000	10,000	75	22.0	1.5	1.0	78.0	.5	1.5%
Aug. 12.....	5,450,000	13,600	70	22.0	2.0	1.5	71.0	1.0	1.0
" 19.....	5,600,000	15,000	70	24.0	4.0	2.0	70.0	1.0	2.0
" 26.....	6,000,000	9,400	70	21.5	3.0	1.5	72.5	1.0	1.0
Sept. 2.....	5,500,000	10,300	75	22.0	2.0	2.0	71.0	1.0	1.0
" 11.....	5,600,000	10,600	80	20.0	2.0	2.0	75.0	.0	1.0
" 25.....	5,700,000	9,500	75	21.0	3.0	2.0	73.0	.0	.0

Blood pressure: July, 120 to 140; August, 135 to 140; September, 140 (R. R.).

CASE III.—Julia A., a negress, aged 28 years, a domestic servant, was admitted to the Detention Hospital, September 20, 1907. Diagnosis, catatonia.

Family History.—This was negative as to mental troubles, beyond that a maternal aunt suffered with epilepsy. The father died at the age of seventy-five years of some renal malady, the mother at sixty-four of pulmonary tuberculosis. The patient is a younger member of a family of twelve, four dying in infancy. The others are living and in good health. J. was never regarded, by her relatives, as bright.

Past History.—The birth was without instrumental aid. During childhood she suffered from pertussis and measles. At the age of ten years the patient developed attacks of vertigo, in which she would fall, but would not lose consciousness. These attacks occurred both diurnally and nocturnally. Five years later she began having convulsions at night with entire loss of consciousness, the seizures lasting as long as fifteen minutes. The epileptic attacks ceased at the age of twenty-five years.

The menses first appeared at the age of sixteen, and were sometimes irregular and sometimes profuse. Intense headache occasionally occurred at the time of the periods. J. attended school for only eight months, but in that time learned to read. She worked at housework in her own home until she was twenty-five years old; then hired out as a children's nurse. Alcohol, syphilis, drugs, are denied, and signs of luetic trouble are negative.

Present Trouble (sister's statement).—During the month of July, 1907, J. began to grow listless, inclined to be stupid, and was given to silly laughter without apparent cause. About the first of August she began to leave home and wander about the streets, and when questioned by her sister, as to her object in these aimless wanderings, would give no answer. After being well scolded by the family about her habits, she discontinued them, but became restless and impulsive. Later she would get out of bed during the night and break the panes of the windows, or would do other equally senseless acts. Within two weeks after this she became non-reactive to external stimuli, and mute to questions addressed to her. At a still later stage the muscles became spastic, and she became resistive to ordinary attention.

On admission to the Detention Hospital, September 20, 1907, the patient would not reply to questions, was negative, catatonic, and sat with her head fixed on her breast, staring at the floor for hours.

Physical Examination.—Skull dolichocephalic, cephalic index 79.4. Circumference 57 cm. The eyes are without intelligent expression, the face mask-like. The pupils are dilated but equal. The skin is oily. The face looks full. The posterior portion of the scalp is doughy to the feel and thickened, a condition that is also present in the skin of the cheeks. The hard palate is high-arched. The pharynx and tonsils are natural. The breath is foul and there is pronounced constipation. A trivial papular eruption is present on the chest. The mammary glands are shrunken. From the condition of the abdominal walls, the woman has borne children. The general nutrition is fair; the weight 120 lbs.

The peripheral arteries are slightly thickened. P. 70; R. 20; B. P. 115 R. R. Examination of the thorax is negative, except that the second aortic sound is accentuated. The neck over the thyroid gland measures 30 cm. The gland is palpable, about the natural size, but soft to the finger. The bridge can only be made out with difficulty. There is no thymus dullness. The spleen is of normal size.

The motor signs are well-marked. Dermographia is positive, as is also mechanical muscular excitability. The deep and superficial reflexes are exalted. The pupils are over-reactive to light, to sympathetic and consensual reaction, while the psycho-reaction is present. The pupils vary from 2 to 3 mm. in moderately strong light. The hands and feet are cold and clammy, but there is no general hyperidrosis. The vaso-motor tone is low. There is a well-defined fibrillary tremor of the hands and tongue.

The girl has been entirely mute since her admission, has shown no impulsiveness, but is apathetic, catatonic, and negative. If placed in one position she will retain it for hours. The patient is very untidy, passing urine and feces in her clothing.

A number of urinary examinations gave, sp. gr. 1025. Indican and skatol are in excess and cylindroids are present, but the examination was otherwise negative.

The patient was ordered 15 grs. potassium iodide thrice daily, but this was discontinued at the end of ten days, and hyperalimentation was ordered.

September 22.—The girl is steadily losing weight. She was ordered to be kept in bed in the hospital ward. There she spent her time staring at the ceiling, never addressing anyone, or asking for food or water. When the woman is spoken to or shaken there is no change in the mask-like expression, but if an attempt be made to open the mouth, or change the position of a limb, resistance is immediately encountered. The increased reflexes, muscular hyperexcitability, as well as the other motor symptoms, remain unchanged. Tactile sensibility is apparently normal. The pupils remain over-reactive. The appetite continues good, and artificial feeding is unnecessary. The total amount of urine passed is quite small.

On Oct. 2, 5 grs. of desiccated thyroid, thrice daily, was ordered. No improvement was noted, but the contrary, the woman becoming more untidy, and showed increased negativism when attempts were made to handle her. The thyroid was abandoned on October 14. No further change in the patient, up to October 31, was noted, beyond that she continued to lose weight, and occasionally made an impulsive movement. A partial thyroidectomy was now advised.

November 2.—The operation was begun at 3.30 o'clock, and about four-fifths of the right lobe was removed under ether (by Dr. Follis). Neither of the parathyroid bodies were injured, and the vessels were carefully spared. On the table the muscular rigidity was well-marked, but soon relaxed under ether. At the beginning of the etherization the woman struggled for air, and then became unconscious. The removed portion of the gland was dark in color from congestion.

Post Operative History.—J. came out from the anesthetic slowly, was much nauseated, vomiting repeatedly. At 6 o'clock she spoke to the nurse, slowly, coherently, and distinctly, the first words she had uttered since her admission. Afterwards, the patient became restless, the pulse weak, and strychnia and morphia had to be administered. At a later hour J. became excited and very difficult to control. The pulse again grew weak and rapid, 160 beats to the minute. The T. rose to 102° and the R. to 28. Some serum was expressed from the wound, after which she became quieter, and the pulse lower.

November 3 and 4.—There has been continued excitement, with constant loud talking, interrupted, at frequent intervals, by attempts to strike the attending nurse. The patient at all times has been most difficult to control. T. 100.8°; P. 130; R. 22. The pulse dropped to 110 beats after the expression of about a dram of clear serum from the incision, and shortly thereafter fell to 90 beats. The wound is healing nicely.

There is profuse sweating. The face is bloated and puffy. The woman now replies coherently to simple questions, and without any considerable hesitation. Menstruation has begun, for the first time since her admission to the institution.

November 8.—The woman is now up and about her room. The wound has practically healed. She speaks a little voluntarily, but her replies are coherent. Delusions or hallucinations have not been noted for some days, the excitement of the past few days having now subsided. The patient now notices closely what is transpiring around her, and has become cleanly in her habits. She voluntarily looks after her own room, and to the making of her bed. Weight 105 lbs. T. normal; P. 90; tension fair.

The motor symptoms have not perceptibly decreased, except that negativism is absent, and muscular rigidity is subsiding. The face is less puffy. The pupils are 2 mm., not so reactive to stimuli.

November 12.—Patient has been very well conducted since the last note was taken. She has conversed a number of times with her relatives, and intelligently. She does not tire readily and become incoherent. She has shown no signs of delusions or hallucinations, and takes considerable interest in the other patients. Dermographia is slight. The reflexes and mechanical muscular excitability are decreasing. The pulse is fuller, 80 to the minute.

November 16.—The patient has continued to do well. She is easily interested, but does not speak much. The muscular tremor has ceased. The other motor symptoms are abating.

November 17.—A change began to-day in J.'s condition. She is now apathetic and negative, besides showing some muscular rigidity. She is also untidy, mute, and shirks her work. The motor signs are also on the increase. The temperature has risen to 101°, and the pulse is also rising. The wound, which had almost healed, was irrigated.

November 18.—The woman's mental state is the same as yesterday. She is mute, catatonic, untidy, and non-reactive to stimuli. T. 101°; P. 145.

The left half of the thyroid gland is swollen, otherwise there is nothing to account for the change in the patient's condition.

November 19.—The general condition is unchanged from yesterday, beyond that the temperature is down to 99°, and the pulse to 110 beats.

November 22.—To-day signs of improvement are manifest.

November 23.—The improvement is progressive. The patient has again become tidy in her habits, and resumed the care of her room. She speaks a little, and is no longer catatonic or negative. The other motor signs have not decreased.

November 25.—The improvement is steady and continuous from day to day.

December 1.—The woman attends to cleaning her room, making her bed, and other small duties. She speaks coherently and clearly, though only when addressed. She is also gaining rapidly in weight. Muscular rigidity and negativism are absent. Dermographia has considerably decreased. The reflexes and muscular excitability are above normal, though again decreasing. T. from 98° to 98.6°; P. 89; B. P. 125 R. R.

December 2.—The improvement during the past few days has been so decided that she was allowed to go home on parole, and to-day her sister took her away with instructions to report progress every few days. The deep reflexes and muscular excitability are above normal. J. is absolutely clear in her replies to questions, speaks but little, and is industrious.

December 9.—J. has been bright, industrious, and cheerful, since her return home. She has attended to the cooking and other household work, and has done it well. Curiously, the family consider the woman as mentally more active than she has been at any time in her life.

December 28.—J.'s condition remains unchanged.

January 20.—There has been no relapse to this date.

February 28.—J. continues normal.

July 20.—The woman continues in good mental health.

HISTOLOGICAL REPORT (DR. MCCALLUM).

Julia H. Catatonia. November 2, 1907. 4/5 right thyroid. Removed 4.15 p. m. Received 6 p. m.

A part of the gland seems a little firmer than the rest and is more translucent. The gland in general is almost normal looking; it is reddish-gray and quite homogeneous. On section, rather translucent, with scattered points of yellowish opacity, which are visible only on most careful inspection. No distinct parathyroids seen. The mass weighs a little less than 7 gm. The portion dried weighs, now, when moist 5.03 gm.

PATHOLOGICAL LABORATORY, December 1, 1907.

Report on the iodine content of thyroid gland of Julia H., Bay View:

November 2, 1907.—Weight of dried thyroid 1.55 gm. Crucible negative, Gland treated with 3 gr. sodium hydroxide and ashed. Mass then treated with 3 gr. potassium nitrate and heated to whiteness. Taken up in water,

filtered, and diluted to 50 cc. 45 cc., or nine-tenths of total amount taken for test, was neutralized with 20 per cent sulphuric acid and treated with 5 cc. of chloroform. On shaking, an *intense* red color was obtained.

A standard was made up in the usual way and it required 20 cc. of the potassium iodide (1-5000) to match the color.

Now since 1 cc. is equal to .0002 gr. of potassium iodide, in the *entire* amount we found .00444 gr. of potassium, or .00342 gr. of iodine.

MICROSCOPICAL NOTES.

Thyroid.—Is composed of uniform, rather small alveoli usually rounded in form and showing no infolding of epithelium. The alveoli are lined with a flattened epithelium which is perfectly uniform and normal-looking throughout. The blood vessels show some evidences of calcification and hyaline degeneration in their media.

Except for the fact that the patient was somewhat older than is customary for the beginning of a catatonia, Case III offered the ordinary physical and mental signs of the malady, of fairly severe form. The intense excitement following the partial lobectomy was probably due to the use of too small a drain, and the woman suffered in consequence from the toxæmia of absorption of the thyroid secretion into the general circulation, with rapid pulse and general weakness. The recovery was uninterrupted until the usual time for hypertrophy of the remaining portions of the thyroid gland to occur, when there was an almost complete relapse, with a slow upward movement afterwards.

The blood examinations in this instance differed materially from a number of others, both those referred to in these pages, and unrecorded. The leucocytosis up to date of the thyroidectomy was not up to the average for catatonia; the increase after the operation was fair, but at the date of the last examination it was considerably higher than it should have been. Also the differential count at the time of discharge of the patient from the hospital showed that the blood had not then returned to a normal condition. Nevertheless there has been no relapse.

BLOOD EXAMINATIONS.—JULIA H.

Date.	Red cells.	White cells.	Hemoglobin.	Small monos.	Large monos.	Polyns.	Eosin.	Trans.	Mastz.	Blood press. (R. R.)
Oct. 2, 1907*.....	4,600,000	8,400	80%	27.0%	3.0%	67.0%	1.0%	1.0%	1.0%	155
" 4.....	4,300,000	9,200	80	30.0	2.0	65.0	1.0	2.0	.0	126
" 7.....	4,500,000	9,000	80	27.0	2.5	68.0	2.0	.5	.0	130
" 17.....	4,600,000	6,600	75	28.0	2.0	67.0	1.0	1.0	1.0	116
" 25.....	5,500,000	10,600	75	25.0	2.4	69.5	4.6	1.5	.0	130
" 30.....	5,200,000	9,800	75	24.6	4.2	66.8	1.6	2.8	.0	120
Nov. 1.....	4,700,000	16,000	75	36.0	4.5	57.0	1.5	1.0	.0	..
" 6.....	4,200,000	11,200	..	33.0	4.5	59.0	1.0	2.0	.0	..
" 16.....	3,950,000	7,800	70	31.5	5.0	59.5	2.0	0.0	.0	116
" 26.....	4,300,000	13,200	75	33.0	4.0	59.0	3.0	1.0	.0	126
Dec. 2.....			..	38.0	2.0	58.0	1.0	1.0	.0	..

* Patient mute, taking little fluid.

CASE IV.—Albert A., æt. 19 years, a native of Maryland, a factory hand by occupation, was admitted to the Detention Hospital, May 25, 1907. Diagnosis, catatonia.

Family History.—There has been no psychosis of any description on either the father's or mother's side of the family. The father is living, 45 years of age, and is of a somewhat neurasthenic disposition. The mother is also living, aged 39, and is healthy. The other member of the family, a sister, two years older than the patient, is intelligent and also physically healthy.

Past History.—A.'s birth was without instrumental aid. He had measles, whooping cough, also mumps, during childhood, but there has been no more recent illness up to the beginning of the present malady. A. attended the public schools for eight years, and reached the 7th grade in the primary department, indicating that he was less than ordinarily intelligent. The boy has usually been of a cheerful disposition. Gonorrhœa, syphilis, and the abuse of alcohol are denied, and signs are negative.

Present History (father's statement).—On March 1, 1907, A. came home from his work complaining of a sore throat, and remained in the house for two days, by which time the throat was well; he then returned to his occupation. A week later the throat again troubled him; he came home, went to bed, and remained there for several days. The cold soon improved, but the boy continued in bed until the middle of May. The father noticed no mental symptoms, beyond that his son was unusually quiet, until about the first of May, when he began to talk at random and was extremely slow in answering questions. A week later he became excited, swore roundly at every one who came near him, and afterwards would burst into paroxysms of silly laughter, often without apparent cause. If he was refused anything for which he asked, he would have "jerky spasms" and the back would become arched. A few days later he became impulsive, then sleepless, then mute. At times the mutism would be broken by a meaningless jargon. The appetite fell off, and at intervals all food was refused. He then became degraded, untidy, and on May 25, was sent to the Detention Hospital.

On admission he would not reply to questions, was apathetic, at times given to outbreaks of foolish laughter, and was untidy in his personal habits.

Physical Examination (April 26).—Skull brachycephalic, circumference 52 cm., index 82.8. The bowels are constipated, the tongue furred. The man is somewhat emaciated, and weighs 120 lbs. The special senses are, apparently, normal. The pain sense is dulled. The deep and superficial reflexes are greatly exaggerated, as is mechanical muscular excitability. There is a fine tremor of the hands, lips and eyelids, but in the tongue it is particularly noticeable. The pupils are 2 mm. hyper-reactive to light, consensual and sympathetic stimuli. The psycho-reaction is present. Dermographia is well-defined. There is pigmentation of the skin over considerable areas, especially pronounced over the lower region of the back. The peripheral circulation is sluggish, and the hands and feet are cyanotic, cold, and

clammy. The general circulation is also slack. The heart sounds are negative, beyond that the second aortic and second pulmonary are accentuated. The lungs, testes, spleen, and area of thymus dullness are natural. The thyroid gland is small, as well as soft to the finger.

Subsequent History (June 18).—A. has remained entirely mute, catatonic, negative, as well as untidy in his habits since his admission. Dermo-graphia remains very well-marked, as is also the excitability of the deep and superficial reflexes. Mechanical muscular excitability is far above the normal, the slightest tap of the pleximeter eliciting waves of contraction that pass into a tonic cramp of the muscular strands, or there may be a succession of muscular contractions. The spasms are most readily elicited in the muscles of the thenar eminences, or in the pectoral muscles. The tremor of the muscles of the head and hands continues. At times there are spasmodic jerkings of the head to one side. The emaciation is now extreme, and the weight has fallen to 100 lbs., and this despite enforced feeding. The skin from the waist to the mid-thighs has become deeply pigmented, reminding one of Addison's disease, but there are no tubercle bacilli discoverable in the secretions.

The extremities are cold, clammy, and covered with a disagreeable sweat. There is no swelling or boggy about the face. The hair on the face is scanty, that on the pubes well-developed.

The pupils are 2 mm. in diameter, equal, and hyper-reactive to light, accommodation, as well as the psycho-reaction.

The thyroid gland is not changed; thymus, spleen, testes, and lungs are natural. The heart sounds are unchanged. P. 90; B. P. 120 R. R. Leucocytosis 11,000.

During the summer the patient remained in the same state, except that he could be aroused out of the stupor sufficiently to smile and utter a few disconnected words. The facies is entirely devoid of expression. The man has gained somewhat in flesh. He has been kept out of doors the major part of the time; has been given an especial diet, on which he has gained five pounds, and has been carefully looked after. The pigmentation of the skin gradually disappeared.

November 2.—An examination to-day showed the mental and physical conditions to be practically unchanged, except that he has lost four pounds in weight. There are now impulsive movements, apparently, the outcome of delusions. Rigidity and negativism are marked. The man now smiles when spoken to, and occasionally there are paroxysms of meaningless laughter, lasting as long as a quarter hour. Unless compelled to go out of doors he will lie the entire day flat on his back, the face expressionless, the hands clinched, and the gaze fixed upon the ceiling. Rarely there are a few coherent words, then a lapse into mutism. A. is apparently beginning to dement.

As there seemed no possible chance for a recovery, a partial thyroidec-tomy was determined upon.

November 8.—Operation at 3.30 p. m. (Dr. Follis). Removal of 2.96 grm. of the right half of the thyroid gland. The organ, when exposed, was

small, congested, but otherwise normal. The upper parathyroid body was slightly wounded during the operation. There was considerable struggling, but no cries when the ether was administered. A. came out from the anesthetic at 5.20 p. m., groaned, and said, "Oh my God," and when asked whether his neck hurt him, replied, "yes." An hour later he cried out, "oh, it is coming"; then, "oh, its all over, and it's a little girl," evidently believing that he was in the pangs of labor. Later in the evening he became very resistive, and the nurse was obliged to confine his hands in muffs. T. 100°; P. 98; R. 20. By eleven o'clock he had quieted down, and slept until 4 a. m., when he awoke and asked for a glass of water.

November 9.—This morning A. has voluntarily spoken a good deal, usually about a number of delusional ideas. At times he swears or hums tunes to himself. Later in the day he became more coherent, as well as more readily managed, though he is still abusive. The patient no longer voids urine in the bed, but calls for the urinal. P. 100, feeble; T. 99.8°; R. 20. In the afternoon A.'s mental state varied considerably. Sometimes he would weep, then would sing a mixture of ribald songs and ordinary hymns. He complains constantly of the pain in his neck, and seems to have the idea that he is being tortured. Ice bags were for a time applied to the neck, but he became very restless, and they were finally removed, the ice being given, instead, by the mouth, which seemed to be grateful. During the rest of the afternoon the patient constantly spoke of delusions distressing him, the rambling talk being alternated with loud shouting and singing.

The hands and feet are perspiring freely. The motor signs are unchanged. The man slept fairly comfortably during the night. T. 100°; P. 98; R. 20. A fair amount of liquid nourishment has been taken during the day. The leucocytosis is 18,000.

November 10.—The cold applications to the throat were renewed this morning, but gave the patient a great deal of discomfort. He asked the nurse to read to him; also told her that he "hated the doctors." While the psyche is clearer than before the operation, there is still a great deal of mental confusion, and at times silly laughter and loud singing. When the incision was dressed to-day, it was found to be in good condition. In the late afternoon A. talked to his father coherently for a few minutes. T. 100°; P. 120.

This evening the patient had a spasm of the throat muscles, which was relieved by crushed ice. The man became cyanosed, and broke out in a profuse perspiration. After this he was restless and several times started to get out of bed. At 8 o'clock there was a second spasm of the throat, followed by cyanosis of the face and profuse perspiration. Parathyroid extract was now given. He slept restlessly all night.

November 11.—At 8 o'clock this morning the man was stuporous. A few minutes later he jumped out of bed with a start, and appeared to be choking, after which the breath came with a long sighing inspiration. The face and extremities became cyanotic, and a profuse sweat followed. P. 130 to 97; T. 100° to 99.2°.

A half-hour later he was entirely over the attack, and was eating his

breakfast. The parathyroid was continued, 1/10 gr. every four hours. The wound was also dressed, and found to be doing nicely. A. rested quietly during the day, but at 6 o'clock p. m. there was another laryngeal spasm. This seizure was light in comparison with those preceding it.

There has been no improvement in the mental condition during the day. If questioned the man answers "yes, yes" to everything. Patient is perspiring profusely. The saliva is retained in the mouth, making breathing difficult at times. He was very restless until 8.30 p. m., when he fell asleep, and had a fairly comfortable night. Evening: T. 100°; P. 130; R. 23.

November 11.—A. conversed with his parents to-day for a full half-hour and was coherent, though slow in speech. Reflexes, dermatographia, and muscular excitability unchanged. The hyperidrosis continues. Leucocytes 23,000. T. 100° to 99.4°; P. 98.

November 12.—The patient has to-day manifested considerable interest in his surroundings, and has asked the nurse a number of questions about her life, especially how she liked nursing. He also conversed with his mother for some minutes, though it took considerable urging on her part to make him speak. There is marked hyperidrosis. No change whatever in the motor symptoms. The wound continues to heal. T. 99°; P. 89; R. 20.

November 13.—Last night there was a good deal of rambling talk during sleep. This morning A. is inclined to be anxious and mute. From his actions it is evident that some hallucination is troubling him, as he points to a spot on the wall, and his face assumes a distressed expression. He would not speak to his mother this afternoon. The appetite and digestion continue good.

November 14.—A. slept well last night, but is mute this morning. The eyes, however, follow the nurse about the room. Later in the day he spoke a little, and said he wished to go home. T. 98.6°; P. 90.

November 15.—In the morning the patient laughed to himself in a silly way, but in the afternoon he talked sensibly to his mother for a few minutes.

November 16.—A. awoke this morning, after a sound night's sleep, but is inclined to be mute. However, when urged to answer questions, he does so slowly and collectedly. He has again commenced to take some interest in his surroundings, and observes whatever is transpiring around him. The appetite is ravenous. The dermatographia is fainter, but the pupillary and other reflexes are much too active. There is no rigidity or negativism. Delusions or hallucinations have not yet been noticed during the past two days. Leucocytosis 15,000. T. normal; P. 85 to 90. The wound is completely healed.

November 19.—No further change in the man's condition can be noted. He speaks slowly, coherently, and connectedly when he is questioned, but volunteers nothing. He eats and sleeps well, and is increasing in weight at a rapid rate.

November 21.—A. is to-day cross and disagreeable, but will give no reason for the change in disposition. He is more restless than ordinary

When his mother came to see him he talked with her coherently for some minutes.

November 23.—The patient to-day is allowed the liberty of his room, but will do no work and stands at the window gazing out at the prospect.

November 25.—Is to-day very restless and disinclined to speak, however, he told his father that he wished to go home. The pulse has risen to 120 beats, and the temperature to 99.2° , without any other apparent cause than *a slight swelling of the remaining half of the thyroid gland*. The weight is now 106 lbs.

November 26.—The patient has voluntarily spoken more to-day than on any day since he has been in the infirmary. He is mischievous and teasing. He talked with his mother for some minutes, and seemed quite pleased to see her. He is still perspiring freely. The motor symptoms have not materially changed, though the extremities are not cyanosed. The leucocytosis is still high. Appetite and digestion continue good. T. 98.6° ; P. 87 to 100.

November 27.—The man continues to progress fairly well, speaking coherently and rationally. Temperature and pulse are fractionally higher than yesterday.

November 28.—A. is again mute this morning, and his attention cannot be elicited. Some phlegm accumulated in his throat, when he became excited and had a choking spell. He then wept for some minutes. T. 99.6° ; P. 90 to 110.

November 30.—A. tore the bandage off his throat this morning, and seemed quite disoriented. Later in the day the constant humming of tunes began, but to questions he is mute, or only answers, "yes, yes."

December 1.—The man is quite restless this day, and only answers the "yes, yes" to questions. If the nurse is absent from the room for a moment, he is always found standing at the window. The man takes no interest in anything, and sometimes steals spoons and hides them under the mattress.

December 3.—The patient is brighter to-day, and most anxious to go home. He is also more readily amused for the past few days.

December 9.—A.'s condition has remained unchanged since the last note was taken. The motor and mental conditions have not changed, with the exception that hyperidrosis has decreased. T. normal; P. varies between 82 and 96. To-day he was sent home with the hope that a change of surroundings would bring an improvement.

January 10, 1908.—A.'s parents find that it is impossible to keep him at home, as he has been mute most of the time, inert, and would do nothing in the way of work. He is now markedly negative. The reflexes and mechanical muscular excitability have perceptibly increased. Dermographia is negative except for pilo-cutaneous ridging when the finger nail is drawn over the skin. The pupils are 3 mm., hyper-reactive.

The man replies to questions in monosyllables, and then only after urging. He is apparently rapidly dementing, although, when his room-mate takes him out of doors, he will play ball with some slight show of interest.

January 17.—As but a small portion of the thyroid gland was removed at the first operation, less than in any other case, it is determined to see what effect the removal of a larger portion would have upon his mental and motor condition. To-day a second partial thyroidectomy was performed (by Dr. Follis), and 3.50 grm. of the left half of the gland was ablated. The neck lymphatics had become somewhat enlarged since the previous operation. The patient spoke a little while he was being prepared for the table, but was entirely apathetic and showed slight muscular rigidity.

January 20.—No reaction of moment followed this operation, nor did the man brighten up immediately. He always submitted quietly to having the wound dressed.

January 26.—For the past three days, A. has been fairly coherent, is dressed and about his room. He talks a little to the attendant nurse, and that coherently, but will not speak at all to the physicians.

Pupils 3 mm., reactive, equal. Dermographia is again quite marked, and cutis anserina is elicited by the slightest stroking of the finger. It comes out as a wave-like flash and quickly disappears. Mechanical muscular excitability is well-marked in the pectoral muscles, but has diminished in the forearms and thenar eminences. Reflexes exalted.

January 28.—The patient to-day asked the nurse to take the muffs off his hands, voluntarily saying that he would not disturb the bandages on his neck. The wound is almost healed. He kept the promise.

February 3.—The patient seems brighter than usual, and spoke coherently for a part of the morning. When asked how he felt, he replied, "all right, how are you?" The general condition is good, the appetite is fair, and the man is gaining in flesh, now weighing 120 lbs. Leucocytosis 13,600.

February 10.—The man's condition is unaltered. He is coherent but inert, and no delusions or hallucinations have been noted for several weeks.

February 17.—The weight is still increasing, but the intellectual gain is nothing, or even a falling off, as he now replies to questions at random, and sometimes not at all.

March 13.—During the past three weeks the man has gained greatly. He is now able to reason coherently, and holds a conversation without apparent fatigue. One week ago he was sent home, and has continued to improve, taking quite an interest in his surroundings. The parents report that he is in about his normal condition. The following letter gives a fairly accurate idea of his present state, and is the first one he has written for more than a year.

BALTO., MD., March 16, '08.

Dr. Philips.

DEAR SIR.—It affords me great pleasure to sit down today and drop you a few lines. I have improved very much. Thank you very much for your kindness toward me when I was a patient in your care.

Respectfully yours,

ALBERT A. . . . ,

709 35th Street.

April 7.—The patient continues to improve. The father reports that he is active both mentally and physically. The weight is now 134 lbs., a gain of 34 pounds from the lowest point.

April 14.—A. reported to the hospital to-day. He speaks freely, intelligently, and sustains a prolonged conversation without apparent effort. With the exception of slight mechanical muscular excitability, the motor symptoms have all abated, and to all appearances the man is quite normal.

May 12.—There has been no change to date.

July 20.—The man has not relapsed, but has continued in a normal condition.

September 27.—There has been no return of the mental indisposition.

The following is Dr. McCallum's report as to the microscopic examination and iodine content of the removed portion of the gland:

Albert A. Catatonia. Portion of right thyroid removed, weighing 2.96 gm. Small mass of soft tissue, homogeneous and uniform in appearance throughout. On cut surface the tissue is moist and glutinous, grayish-red. No apparent excess of fibrous tissue; no nodules. No parathyroids seen. 2.1 gm. of the thyroid preserved for drying and estimation of iodine.

MICROSCOPICAL NOTES.

Thyroid.—Is composed of alveoli of moderate size, very round and smooth in outline and of fairly uniform size. They contain a good deal of homogeneous colloid. The alveoli are lined with flattened epithelium which is entirely uniform in character. The connective tissue forms some quite coarse bundles throughout the gland, which carry abundant blood vessels, but on the whole it does not seem to be markedly increased in amount. There is no unfolding of the epithelial layer.

Iodine Content.—Weight of dried gland .7 gm. Crucible negative. 11.7 cc. of 1 to 5000 solution of potassium iodide required to match the color of the gland solution. Amount of KI. present .00234 gm. Amount of iodine present .0017784 gm.

Second Ablation, January 17, 1908.—Weight of thyroid tissue 3.46 gm. The specimen was hardened in alcohol.

Microscopically the alveoli are distended with colloid which is thin and pale, staining sometimes lilac, sometimes pink. The alveolar walls are thin and the epithelium is low and flat. The alveoli in general are larger than in the first specimen. Some of them are surrounded by small columns of other alveoli of smaller size, but there is no direct evidence of infolding of the epithelium. The connective tissue is abundant.

From the standpoint of the mental symptoms, Case IV showed few variations from the ordinary type of severe catatonia. Among the physical ones the extensive areas of bronzing of the back thigh and flank were much more pronounced than is often seen. This bronzing almost completely disappeared during the summer and did not recur when the weather

became colder. When the first partial lobectomy was performed, the case was, to all appearances, hopeless, as the brand marks of a dementia with profound cachexia had begun, and accordingly we were not surprised at the small amount of improvement that followed the operation, but, rather, on the other hand, were encouraged by the partial improvement in the mental processes that followed the period of customary initial reaction. It is to be noted that a gain in weight began shortly after the partial section, though the diet was little changed from what it had been before, apparently showing that a reduction in the quantity of the thyroid hormone thrown into the general circulation was productive of increased metabolism. So far as possible the conditions were the same both before and after the section, as to food and attention, the man on both occasions being in bed.

For a considerable time after the second lobectomy, about two-thirds of the left half of the gland now being removed, there was no mental improvement, only a steady gain in weight, and only after the man had reached, approximately, his normal weight did the mental attainments rise to anything approaching their normal level.

BLOOD EXAMINATIONS.—ALBERT A.

Date.	Red cells.	White cells.	Hemoglobin.	Small monos.	Large monos.	Polys.	Eosin.	Trans.	Mastz.	Blood press. (R. R.)
Oct. 22, 1907.....	5,700,000	11,200	75%	21.8%	3.0%	72.2%	1.0%	1.4%	.0%	120
" 30.....	5,860,007	10,200	75	24.0	2.6	66.4	2.5	1.0	.5	120
Nov. 1.....	5,560,000	11,800	..	26.0	4.0	65.0	1.4	2.6	.0	120
" 6.....	5,100,000	16,200	..	19.5	3.0	75.0	1.5	1.0	.0	115
" 9.....	5,300,000	18,000	75	25.0	2.0	71.0	2.0	1.0	.0	115
Jan. 20, 1908.....	5,460,000	15,000	75	23.0	3.0	70.0	1.0	3.0	.0	..
Feb. 4.....	5,200,000	13,000	..	27.0	3.0	67.0	1.0	2.0	.0	115

Contrasted with all previous results in the treatment of catatonia, the preceding serial four cases seem most remarkable in that they should all have recovered their mentality and that none of them should have relapsed within a period of months. Equally remarkable is the manner of recovery, in two the restoration of the mental powers was within a few days, while with others a number of weeks elapsed before there was a return of any degree of mental vigor. With the one exception all of them did well up to the time of the beginning of hypertrophy of the remaining half of the gland, and then there came mental recessions, and thereafter a varying return to health.

The results were so remarkable that we considered them too good to be true, and there was the possibility that we had chanced upon exceptional cases. The cases, though in the Public Deten-

tion Hospital, were given more attention than had they been private patients; they were assigned a faithful nurse especially versed in the management of such cases, and whose attention was un-failing, they were fed both before and after the operation with large supplies of nourishing and easily digested food, and a portion of the favorable result must be attributed to these accessory causes.

The available material within the walls of the Detention Hospital being exhausted, we asked permission of the Medical Superintendent of the Second Maryland State Asylum to examine the catatonic patients in his institution, to determine if a few patients suitable for the operation could not be selected from among the large material there.

About 40 persons in various stages of the malady were examined, and from these three were chosen, two women and a man. None of these cases were early ones; in fact, all were of greater duration than those previously lobectomized.

In none of the three cases did permanent results follow. For a few days after the operation there was increased reaction to external stimuli, and then they slowly returned to their previous mute, catatonic state. With the man this might have been expected, owing to the long duration of the malady, but with the girls, though as already mentioned, they were of greater length than any of those in the Detention Hospital, a favorable result was expected.

CASE V.—Julia K., æt. 22 years, admitted to the hospital January 25th, 1907. Diagnosis, catatonia. On examination, February 6, 1908, has mask-like expression, extremities rigid, negative, resistant, absolutely mute. Eye reflexes, including psychoreaction, hyperactive. Superficial as well as deep reflexes exalted. Hyperidrosis, cyanosis, dermatographia. Muscular mechanical irritability plus. Is seated during the daytime in a chair, motionless, with clinched hands.

Partial Lobectomy, February 20 (Dr. Follis).—On February 22, two days later, the face is not so devoid of expression, and the patient is somewhat reactive to external stimuli, though she will not speak voluntarily, but only when loudly questioned. The general condition is good, and the incision is healing nicely. T. 102° to 99°; P. 110 to 104; R. 20. She takes food readily.

Further than this the patient did not improve; the pulse decreased in frequency, though still remaining somewhat elevated. Leucocytosis in this

case was low, 6600 per cm., with erythrocytes 4,700,000. What little gain there was, was gradually lost, until at the date of writing she is now in the same state as before the partial lobectomy.*

CASE VI.—Lillian S., æt. 23, admitted to the hospital January 24, 1907. Diagnosis, catatonia. At the date of examination (February 6, 1908), there had been no change in the mental condition for many months. She sits with bowed head in her chair, motionless, with mask-like face. Both kinds of reflexes are exalted. Mechanical muscular excitability is above normal. Dermographia, profuse sweating, and cyanosis are present. The eye reflexes are too active, but the psycho-reaction could not be elicited. Is rigid and resistive.

*Partial Lobectomy, February 20, 1908 (Dr. Follis).—*The patient was excited and restless on coming out of the ether, but quieted down in a few hours. The temperature rose to 102°, then dropped to 99°. The pulse varied from 120 to 104. Respiration 16 to 18.

February 22.—The girl lies in bed with eyes closed, the lids occasionally twitching, but entirely mute. The face is to-day puffed and flushed. Dermographia and the other motor signs are unchanged. The patient did not improve at all afterwards. Pre-operative leucocytosis 10,200. Erythrocytes 2,716,000. Urine negative.

CASE VII.—Burton B., æt. 20 years, admitted to the hospital October 15, having been insane for a number of months. He was regarded as a bright boy at school. At the date of February 6, 1908, was catatonic, negative, with all the ordinary motor signs.

Partial Lobectomy, February 20.—After the operation he became restless, slightly more reactive to external stimuli, and for the time rigidity and negativism were absent. T. 102.4° to 104°; P. 108 to 88; R. 16 to 20.

February 2.—Reflexes, deep and superficial, unchanged; other motor symptoms unchanged. The man now speaks on urging, coherently, but is constantly muttering a string of disconnected words. The patient did not improve perceptibly during the succeeding days, and gradually lapsed into the old catatonic state.

Pre-operative leucocytosis 8600. Reds 5,504,000.

The failure of the partial lobectomy in these three cases may be attributed to one of several causes. First, the duration of the malady in all of them was longer than in any of those previously operated upon; secondly, the amount of the thyroid gland removed may not have been sufficient to induce decided changes in the

* *April 20.*—This patient has lately shown considerable signs of improvement, and is certainly in a much better mental condition than before the operation—sufficient to allow of her being sent to her home.

metabolism, as in Case IV of this series. None of these patients has gained in weight like the others, and this should always be the rule, the increased nutrition coming, *pari passu*, with the mental improvement.

The next case was seen through the kindness of Dr. E. N. Brush, of the Sheppard and Enoch Pratt Hospital.

CASE VIII.—Luke M., æt. 25 years, a native of Marland, single, express driver by occupation, was admitted to the Sheppard-Pratt Hospital March 5, 1908.

Family History.—The father died of spinal meningitis at the age of 52 years. The mother died of organic heart disease, aged 48 years. There is no history of insanity or nervous diseases of any kind in the forebears. There was also no history of consanguinity, epilepsy, or of ancestral alcoholism.

The patient is the youngest of four children, a sister aged 30, healthy; a brother 29 years of age, married and in good health; a sister aged 26, healthy, and the patient 25 years old, who has never before been subject to mental disturbance.

Past History.—M. passed through the usual diseases of childhood. He attended the public schools from 7 to 14 years, and got along fairly well, reaching the seventh primary grade. At the age of 14 he was employed in a canning factory, where he worked for 2 years. At 17 years he was employed by Belding Bros. in their silk house. For the past 5 years he has been with the United States Express Co. in the capacity of driver, and has given perfect satisfaction, and held his position to the beginning of the present illness, which dates from the last week in October, 1907.

M. took an occasional drink, but rarely became intoxicated. Patient was of rather a jovial disposition, and attended the theaters regularly, but kept very good hours.

There is no suspicion of a luetic infection.

In the latter part of October, 1907, he suffered from a severe cold and muscular aching, probably a form of *la grippe*, which was prevalent at that time, and he remained under treatment for about three weeks. On December 14 it was noticed that he was unusually quiet, and sat for several hours in the evening without entering into the conversation. On December 16 he decided to go back to work, although he was still feeling ill. He left the house at 6.30 a. m., and did not come back until 10 o'clock the following day. When he did return, M. was unable to give an account of where he had spent the night, or to remember anything of what he had done on the previous day. To the other members of the household he appeared to be stupid, and later became mute. He also refused nourishment, so that it became necessary to feed him artificially. Since December 25 he has changed but little. After considerable stimulation he responded to questions in monosyllables, could be persuaded to eat his meals, seemed per-

fectly willing to remain in bed, and like a child required to be dressed and be attended to. If placed on a chair he remained there until someone came to change his position. He never resisted attention, nor was there any apparent muscular rigidity.

On his admission to the institution he was put to bed and given the usual routine treatment. After considerable urging he told his name and address to the examining physician, but further than this it was impossible to obtain any response.

March 7.—The patient has slept very well since his admission, without the aid of hypnotics. He will reply to questions only after some urging, and then in monosyllables. Is somewhat resistive. There are occasional outbursts of incoherent laughter. Usually he lies quietly in bed, and so far is tidy in his habits. The facial expression is blank. An examination of the cutaneous sensations showed considerable anesthesia and analgesia; even a pin-thrust through the ear meeting with no response. M. has to be urged to eat, but it is sufficient to place a fork in his hands and the food before him.

Patient is a poorly-nourished man, weighing on admission 116 lbs. (normal weight 135 to 140). The skin and mucous membranes have a good color. The palatal arch is high.

Pupils regular in outline, 2.5 mm., reacting over-promptly to light, accommodation, consensual, and McCarthy reaction.

Lungs negative. Heart sounds somewhat accentuated, both at apex and base. Pulse 80 to the minute. There is a light degree of peripheral arteriosclerosis.

Abdomen negative.

Thyroid gland somewhat enlarged, especially the left lobe. No other glandular enlargements.

Genitalia negative; cremasteric reflex present.

The superficial and deep reflexes are everywhere very active. Muscular mechanical excitability above normal. Dermographia slight but persistent. Slight hyperidrosis of the hands.

March 20.—There has been no change in the patient since the last note was made.

April 20.—M. has continued in the same inert, mute condition as during the past month. On considerable urging to answer, he will reply in monosyllables. He also goes through the prescribed gymnastic exercises, but displays no interest in them. He smiles a great deal without apparent cause, and frequently gives vent to loud laughter. He never asks for anything, and is apparently contented with his surroundings. If left alone he will remain in bed or will sit wherever placed for hours. He will not eat except after urging. Occasionally he is uncleanly in his habits.

April 25.—After a close examination into the man's physical state a partial thyroidectomy was decided upon.

Blood Examination.—Red cells 6,500,000. Leucocytes 5000. Differential count: Neutrophils 67.4 per cent. Small monos. 23.00 per cent. Large

monos. 8.00 per cent. Eosinophiles 2.40 per cent. Basophiles 0.40 per cent. Hemaglobin 92 per cent.

Previous to the determination upon an operation, the patient had been treated with 16 gr. of thyroid extract, daily, for several weeks. On its administration there was a rise of the bodily temperature of several degrees, also an increase of the pulse rate, both of which fell after the first week. Mentally, during this period, there was little change in the man's condition; perhaps a little more dullness.

April 30.—Partial thyroidectomy about 5 p. m. (Dr. Follis), about four-fifths of the left lobe of the thyroid gland being removed, the parathyroids and blood vessels being carefully spared. Macroscopically the excised portion of the gland seemed firmer than natural, especially in two places, where it gave the finger the feel of a firm nodule the size of a bean. On section of these firmer places nothing could be delimited from the surrounding portions of the gland, though there was seemingly a lessened amount of colloid material in these places.

May 1.—After recovering from the anesthetic, M. was sleepless and restless. Later was given a quarter grain morphia, after which he slept until morning. When visited by the house physician at 10 o'clock a. m. he talked rationally and rather freely, and said that his "mind felt clear."

Patient's memory this morning is good. He gives dates correctly up to about Christmas, and explained his mutism by saying that he felt dull and indifferent, also that at times he tried to speak, but could not. Patient is quite cheerful, makes joking remarks, and seems to be appreciative of his entire illness, as well as of his present condition. No definite delusions or hallucinations can now be determined.

Interrogative.—Q. How long did you work for the Adams Express Co? A. United States. Q. How long at the United States Co.? A. Five years. Q. Were you in the store? A. Wagon. Q. Always on the wagon? Shakes head. Q. How are you feeling? A. A little sore. Q. Can you talk better than before the operation? A. Yes sir.

May 3.—Blood count: Leucocytosis 10,400. Neutrophiles 73 per cent. Small monos. 17 per cent. Large monos. 8.5 per cent. Eosinophiles 1.2 per cent. Basophiles 0.3 per cent.

May 4.—The stitches were removed from the wound to-day. Mentally the patient is not so active as the morning following the operation. He answers the majority of the questions fairly well, however, and promptly. He is also appreciative of what is going on around him, and shows some interest in the other patients, about whom he makes jocular and pointed remarks.

Later in the day M. related a number of incidents in his past life. He spoke of having a peculiar sensation when in his stupid condition, also that he thought he was in foreign countries, mentioning Africa; that there were savages around him, and that in some way he was controlled by these savages. He then returned to the peculiar sensation referred to above, which was as if he were "pushed up and up" until he was on the top of a

high tower, then he would suddenly fall "down, down," after which he would be fighting for his life until finally he was "broke up" and went off into "nothing." Patient slept badly last night and was disturbed by noises.

May 5.—M. is mute this morning, but after urging, responded in monosyllables. In the afternoon he spoke freely to the house physician, and showed but slight mental retardation. Leucocytosis 9700. Neutrophiles 71.8 per cent. Small monos. 14 per cent. Large monos. 11 per cent. Eosinophiles 2.0 per cent. Basophiles 0.2 per cent.

May 9.—The wound is entirely healed. Mentally the patient shows increased retardation over that of four or five days ago, but there is considerable variability during the day, as he sometimes responds much more promptly than at others.

May 12.—To-day the patient is talking much more freely. He now takes the initiative, and shows a marked interest in his case, as well as very good insight into his mental condition.

Interrogative.—Q. When were you operated on? A. Friday. Q. How many days is it now since the operation? A. Twelve. Q. What is to-day? A. Tuesday (correct). Q. You are feeling a lot better, are you not? A. I can't kick. Q. Do you not remember what has happened to you in the past three or four months? A. No! like when I was taken sick I had a bad fever and laid on the bed, and that was the last I remember until I came to again. Q. When did you come to? A. They say it was a couple of weeks; don't know whether they operated on me or not. I know at one time I was seeing everything from a lamp post to a freight car. Q. Do you know that you were away from home for a night and a day when you were first taken sick—do you remember anything about it. A. I remember that I walked and walked for a while, and then I came back and went into the house, and I heard somebody say, "who is it?" I must have looked so dog-gone bad they didn't know me. I took some coffee before I went to bed, and that is the last thing I remember. I had periods when I went off. Q. How long were the periods when you felt all right? A. Like to-day I would feel all right, and to-morrow I would feel half dumb—not exactly a lunatic—just felt like you didn't care what happened. Q. Had you been drinking then? No sir, not a drop. I admit I have drank, and have been intoxicated more than once. I had fever—just like my head was going round—just like I was intoxicated—like my brain was on fire. Q. Did it come on suddenly while you were at work? No. During the night I was taken that way, and when I started to work I was just about half crazy, and I just wandered about, and they said I didn't come home until the following day. Q. You had some ideas of suicide, didn't you? A. I tried to. I felt distressed. Q. Over your condition, because your mind was confused? A. Yes, that was it, and I knew that I would never be the same man again after what I had gone through. I know that I am not the man now I was—before I was taken sick.

May 19.—Leucocytosis 8200. Differential count: Neutrophiles 62 per cent. Small monos. 31 per cent. Large monos. 4.1 per cent. Eosinophiles 2.2 per cent. Basophiles 0.2 per cent.

May 20.—Since the last note taken, M. has gradually gone backward and is now in about the same mental condition as before the operation. He is mute, does nothing whatever to occupy himself, has to be urged to eat, and at times it is necessary to feed him, and remains in one position for hours at a time.

May 26.—During the past week the patient has gained four and a half pounds, also, now, after considerable urging, he will respond to questions, and is gradually becoming a little brighter.

May 28.—Interrogative: Q. M. what are you reading? A. With Lee in Virginia. Q. Is it interesting? A. Just started it. Q. How much have you read? A. Where the negro, he gets on the boat and starts away to England. Q. Is that all? A. He was a run-away slave. Q. What trouble did he have? A. It was just about why the Civil War broke out—he was beaten by an overseer of the place, was helped away, and escaped by (the aid of) the son of the man that owned the place. Q. How do you feel? (pause). Q. Does your head ache? A. I feel pretty good. Q. Appetite good? A. Yes sir.

May 30.—M. was again reading a book his sister brought him, and was able to remember the run of the story so far as he had read, and after considerable urging would answer questions about himself.

June 26.—M. is progressing slowly, is gaining weight and is slightly more active mentally. A few days ago he was placed on lecithin and milk.

Interrogative.—Q. You are feeling better, are you not? A. Yes sir, I feel pretty good. Q. Gained in weight? A. Yes sir. Q. How many pounds in the last two weeks? A. About ten.

M. is gradually gaining in weight. He responds to questions readily, and for the past week has shown marked improvement in his mental condition. He takes an interest in games, reads the papers and magazines, and puts new life into his gymnastic exercises. Patient plays an exceptionally good game of checkers, and seems to enjoy it. The deep reflexes are nearly normal, the superficial ones are still exaggerated. Mechanical muscular excitability is still plus. Dermographia has vanished.

July 6.—Leucocytes 5500. Neutrophiles 54.5 per cent. Small monos. 41.4 per cent. Large monos. 1.5 per cent. Eosinophiles 1.6 per cent. Basophiles 1.0 per cent. Blood pressure 120 mm.

July 14.—The patient is steadily gaining in weight, and has attained 130 lbs., nearly the normal. There is great mental improvement, though some thought retardation remains; besides the facial expression is not natural. The eye and superficial reflexes are still too active. The lecithin and milk are being continued.

August 30.—M. has gradually improved since the last note, and has continued to gain in weight, though more slowly. He responds to questions promptly, and gives a fairly accurate account of his illness since his arrival at the hospital, but has complete amnesia for a number of weeks previous to his admission. He remembers leaving home, a few weeks before Christmas, with the intention of going to work, but is unable to

give any account of himself for the next two days, and now does not recall going home.

The memory for remote events is good. M. now reads the papers, plays checkers and baseball, and shows a fairly good grasp on current events, also remembers accurately what he reads.

When asked for his reason for not replying to questions during his illness he states that he was unable to think quickly, also that he believed that there was a war going on between the Protestants and Catholics, and that in consequence he was despondent and contemplated suicide. At the same time he realized that his mind was affected, also that he felt that he would not recover.

He now thinks that he is perfectly well, and daily growing stronger, also that he will soon be able to take up his work. The judgment seems good.

Interrogative.—Q. Do you think you are as well now as before your illness? A. Yes sir, I feel perfectly well. Q. Do you think as quickly as you did before your illness? A. Yes sir. Q. And as clearly? A. Yes sir. Q. Interested in everything? A. Yes sir, I am—you mean take notice of things? Q. Interested in things in general as previously? A. Yes sir. Q. What do you intend doing when you go home? A. Knock around for a couple of weeks, and get used to walking over those cobble-stones (smiling), and then go to work. Q. Is your position still open? A. The boss came up to the house a couple of times, and said any time I came back it was open to me. The fellow that has my place falls back into his own when I go back. I don't like to knock him out, but number one comes first. He goes back on single wagon when I go back, at least that's what the boss told me. Q. You think that you are perfectly well do you? A. Yes sir, I feel all right. Q. Do you realize that you have been pretty sick? A. Yes sir, I felt that I would never eat another Christmas dinner. I feel all right now, feel that I could do a little work, in fact I think when I get back to work I will feel better—get my mind down to working. Q. Do you remember being tube fed at home? A. No sir, I don't remember that, that's when I seen stars I guess. I remember I felt at one time like someone was banging me around from post to post. I'll try and forget all that part of it when I get back (smiling), (pause), you certainly did fix me up, and I appreciate it—you could not have done any more (somewhat embarrassed).

Discharged, September 17, 1908.

December 3.—M. reported to-day. He has been working steadily from 6 o'clock a. m. until 8 p. m. since October 1 for the express company. He is mentally normal, the memory excellent, and reaction time good. He also has plenty of energy.

The man weighs 133½ lbs. (height 5 ft. 7½ in.). The neck over the thyroid gland is 32½ cm. There is no area of thymus dullness, nor evidence of persistent hypertrophy of the remaining half of the thyroid gland.

The reflexes and mechanical muscular excitability are rather above the

normal. Dermographia and hyperidrosis have entirely disappeared. The circulation is good. P. 74.

The man was warned against over-exertion, and instructed to take a larger allowance of milk than he had been doing, also to eat more regularly.

HISTOLOGICAL EXAMINATION OF THE THYROID TISSUE (DR. CLARENCE B. FARRAR).

The only divergence from the normal was the distention of practically all the follicles with colloid material. The lining epithelial cells are obviously much flattened, there being nowhere any cylindrical cells. Many follicles were of considerable size, and obviously represented confluences of several follicles. In many instances the distended follicles occupied the microscopic field, the inter-follicular connective tissue fibers being reduced to a minimum. In themselves, the connective tissue and blood vessels showed no pathological changes, also, there was no evidence of any inflammatory process.*

LECITHIN IN CATATONIA.

The very excellent results that have followed the administration of the alcoholic solution of lecithin in many cases of nervous asthenia (not cerebrasthenia), as well as in a few cases of exophthalmic goiter, for of the latter malady I do not see any considerable number of examples during the course of a year, has led me to try the same remedy in a few cases of early catatonia.

Curiously, the neurasthenics and goiter cases, despite the nauseous and disagreeable smell of the alcoholic solution of lecithin, cling to the remedy as an opium habitue does to the latter drug, and never seem to tire of it until the nervous symptoms are allayed, and the gain in weight approaches the normal. Again, all the goiter and asthenics patients, who are on lecithin, state that an hour after the medicine is taken "their nerves" are quiet, and for a time there is cessation of the active symptoms, such as the tremor, and a slow return after some hours. Some of the cases compare its tranquilizing power to that of the bromides, but state that it is much greater. I have had a number of cases of asthenia

* A ninth case, a young woman of 24 years, was operated on December 10, 1908. A month afterwards there was a return to the normal of all the corporeal signs, while the psychical symptoms were progressively diminishing, the only thing remaining being a hardly perceptible mental retardation. This case is still under observation.

placed for alternate weeks on lecithin, and a compound preparation of the glycerophosphates of sodium, calcium, iron, manganese, with or without the glycerophosphate of quinine and extract of gentian, only to find them lose weight, with increase of the nervous phenomena on the glycerophosphates, and a gain in weight with abatement of the nervous symptoms while on the lecithin. In both weeks the hyperalimentation remained the same, so that nothing could be attributed to differences in diet.

It is naturally not to be expected that either asthenic nerves or the Graves's malady is to be cured within a week or a month by these remedies, and, again, it is often not possible to place the patients on the lecithin when they first come for treatment, for the disordered digestion, or other accompanying ailment must first be treated before the lecithin can be administered. As a rule, it acts far better when the hemoglobin is below 70 per cent, Gowers, and the coagulation of the blood is slow. Again careful attention to the diet should never be forgotten, remembering that every individual has idiosyncrasies toward certain food products that must be respected, also that patience and the careful notice of trivial symptoms, as well as the judicious treatment of these, will repay in increased comfort for the patient.

None of the patients with asthenia or Graves's who were placed on lecithin were subjected to the full rest treatment; at first, they are compelled to stay in bed until nine or ten o'clock in the morning, and the remainder of the day is spent out of doors, practically idling. After the gain in weight becomes pronounced, and the nervous phenomena show signs of abatement, they are encouraged to again take up the lighter portions of their duties, and if they still gain, more and more of the ordinary occupations of life are gradually added, though for a time active exercise is always restricted.

A few words on the action of lecithin in exophthalmic goiter. I only cite from a few examples. A patient with the typical symptoms of the malady, who had been through the hands of a number of reputable physicians without benefit, was discharged at the end of three months with entire abatement of the symptoms and large gain in flesh. Another who had lost 69 pounds before she was referred to me, gained 27 pounds in the course of five months

with entire loss of the nervous phenomena. At the end of this time she was subjected to severe mental strain, lost three pounds under it, and showed a slight return of the heightened reflexes and hyperidrosis, but on being again placed on the lecithin these phenomena subsided. Another case of unusual severity is entirely well after a year's treatment, though she still has to avoid over-fatigue to the date this is written.

Though lecithin is a constituent of every cell of the body its action as a medicine is, as yet, not fully understood. As an erythrocyte producer, with *pari passu* increase of the leucocytes, as we have already seen in the earlier portion of this article, it has no equal, iron, manganese, as well as other ordinary tonics falling far behind it. It is evident, however, that it has other and more essential properties than a blood inducer.

We have shown in quite a variety of maladies that afflict the human being, in which there is reason to suspect the presence of a derangement of the functions of one of the internal secretory glands, that lecithin acted as an antihormone to this glandular secretion. This is rather singular, when it is remembered that the active chemical constituent of the product is phosphorus, which, along with iodine, is usually regarded as a stimulant to the secretions, especially of the glands in question.

Now we find the reverse action, the phosphorus nullifying the activity of the thyroid hypersecretion, or better, and to put it differently, we find the phosphorus compound stopping the active nervous symptoms in two maladies, Graves's and catatonia, that we have some reason to believe, is due to a perversion of the internal secretion of the thyroid gland. The most plausible explanation of its action is that it stimulates to greater activity the resistive powers of the tissues themselves, aids in inducing a regenerated blood formation, and increases the phosphorus content of the white corpuscles of the blood.

When the symptoms of nervous derangement is asthenia or Graves's malady have abated, we have found arsenic the best agent to keep up the action of the lecithin, yet the two chemicals are apparently antagonistic in their action. Evidently we have not yet arrived at an unequivocal knowledge of these several agents, and a more widely extended investigation should be made, includ-

ing that of the chemical laboratory, indeed the purport of this article is entirely suggestive, and not intended to be assumed as positive.

THE THYRO-LECITHIN TREATMENT OF CATATONIA.

Even more than thyroidectomy in catatonia this form of treatment is as yet in its early infancy, but the fact that three cases at least have gotten well under it, leads me to believe that there is some future for its more extended use. If it can do no good, it can at least work no harm.

I cite but four cases of the malady that have been subjected to the lecithin treatment combined with the thyroid extract in two grain doses given in alternate weeks. The thyroid extract in small doses apparently acts as an excitant to the bodily metabolism, and its service otherwise can be disregarded.

CASE I.—The first in which it was tried was Miss G. M., æt. 20 years, a well-educated young woman, one of more than the average intellectual ability. She had not passed beyond the first stage of the malady when the treatment was begun. She showed the characteristic motor signs, and from having previously been active and intelligent had grown indolent, anergic, difficult to arouse in the morning, with marked lesion of attention. The thyroid was soft, though about the usual size. P. 92, lacking in tone. There was also slight accentuation of the second aortic and second pulmonary sounds, but no arterio-sclerosis.

The blood examinations were different from any case we have yet had examined, and resembled more closely the hebephrenic than catatonic blood.

February 10, 1907.—Hemoglobin 89 per cent. Leucocytes 11,000. Large monos. 43 per cent. Small monos. 8 per cent. Neutrophiles 46 per cent. Eosinophiles 1 per cent.

February 17.—Lecithin one week. Hemoglobin 90 per cent. Leucocytes 11,200. Large monos. 22 per cent. Small monos. 32 per cent. Neutrophiles 42 per cent. Eosinophiles 3.2 per cent.

February 27.—Thyroid extract. Hemoglobin 90 per cent. Leucocytes 14,500. Small monos. 36 per cent. Large monos. 8.5 per cent. Neutrophiles 54 per cent. Eosinophiles 1 per cent.

May 20.—Small monos. 45.5 per cent. Large monos. 8.1 per cent. Neutrophiles 42 per cent. Eosinophiles 3.5 per cent. Mastzellen 9 per cent.

September 21.—Large monos. 4.8 per cent. Small monos. 19.2 per cent. Neutrophiles 72 per cent. Eosinophiles 3.6 per cent. Mastzellen .4 per cent.

March 20, 1908.—Red cells 4,278,000. White cells 8260. Small lymphocytes 22.6 per cent. Large lymphocytes 1.0 per cent. Transitionals 5.3 per cent. Neutrophiles 65.3 per cent. Eosinophiles 4.1 per cent. Mastzellen 0.5 per cent.

The variations in the differential count is most remarkable, yet some allowance must be made for the several methods of the various men who have made the examinations.

This case has undergone a great variety of alterations. During February, March, and April she was lethargic and catatonic; in May and June excited and erotic. In July and the subsequent months to November, she appeared to be normal; in November there was some slight return of the catatonic symptoms (she had not been given lecithin for several weeks). From November to the present date she has been normal, so far as can be told from her conduct and letters. I cannot positively state that the case is cured, only the characteristic symptoms have entirely abated, and letters show that there is no lowering of the mental acuity, whereas in the ordinary course of events there should be beginning dementia.

CASE II.—G. M. R., a boy of 19 years, was first seen on May 9, 1907. For the previous two months he had been showing alterations of disposition, difficulty in facility of thought, a complete change from his usual active habits to indolence and apathy. There was also great difficulty in getting him out of bed in the morning, and if left alone he would lie there indefinitely. Definite delusions or hallucinations could not be determined, and the boy would reply to questions only in monosyllables, and then after repeated urging. Previous to the beginning of the attack he had stood well at school. The physical examination showed the usual motor signs of catatonia, including emaciation, hyperidrosis, and exalted reflexes. The thyroid gland was about the normal size, but soft, and there was no area of thymic dullness. This boy was treated for six months by hyperalimentation, and alternating weekly thyroid extract with lecithin, and at the end of that period was entirely well, and has continued to remain so.

An examination at the beginning of the treatment showed: Red cells 4,200,000. Leucocytes 11,000. Small lymphocytes 26 per cent. Large lymphocytes 6 per cent. Neutrophiles 68 per cent. Eosinophiles 2 per cent. Mastzellen 0 per cent.

CASE III.—Was a female in the Detention Hospital, with clearly-defined, but well-advanced catatonia, and beginning to dement. Her age was 23 years. The lecithin treatment had absolutely no effect on the progress of the malady.

CASE IV is given in more detail than the others, as the patient was in full control in the hospital, and daily notes and examinations could be made.

CASE IV.—Emma L., single, æt. 20 years, was admitted to the Detention Hospital, June 1, 1907. Diagnosis, catatonia.

Family History.—The parents are of German extraction. The father is living at the age of 63 years, and is in good health. The mother died at the age of 57, of unknown causes. The only known nervous malady in the family was that the grandfather died after a paralytic stroke. L.'s father is a moderate drinker, mainly of beer. Patient has three brothers, and two sisters, all in good health, except that one of the brothers is a heavy drinker. Two of the children are younger than the patient.

Past History.—The birth was normal. The only malady of childhood was measles. L. attended the public schools for five years, and was looked upon as an industrious and intelligent girl. Menstruation began at the age of thirteen, was regular, and not attended by disturbances of the nervous system. The girl has never been addicted to alcohol or other drugs. She has always led a quiet life, keeping house for her father.

Present History.—The first indication of a variation from normal mentality was about four weeks ago. She then began to grow listless and dull. In the morning it was difficult to arouse her, and at a later stage she refused to get out of bed at all, and remained there the entire day, requiring to be fed and neglecting the bowels and bladder. Within a few days she became markedly negative, resisting all attention, and if placed on a chair would remain there the livelong day motionless. On the day preceding her admission to the hospital she became very restless and difficult to control.

On admission, June 1, she was excited, incoherent, loquacious, but the idea-flow was impoverished. Speech was rather slow. Delusions were vague, and hallucinations were not determined.

Examination.—Skull conformation regular, 53 cm. in circumference. Index 79.4. The general condition is good, and the muscles are not flabby. The skin is sallow, but there is no bronzing or eruptions. The eyes are not prominent; the iris is hyper-reactive to light, sympathetic, consensual, and psycho-reactions. Pupils 2 mm. The palate is high-arched.

Pain and tactile sensations are apparently normal. The deep and superficial reflexes are markedly exaggerated. Mechanical muscular excitability is equally exaggerated. Dermographia is well defined. Tremor is present about the small muscles of the face and tongue, but is not marked.

The extremities are cold, clammy, and bluish. There is slight accentuation of the second aortic sound, but otherwise no abnormality in the heart's tones. P. 88; T. 99°. Physical examination of the viscera showed nothing abnormal. The thyroid gland is of normal size, soft in consistency. There is no area of thymic dullness.

No hallucinations could be noticed during the examination, and the delusions are vague and unsystematized. Muscular rigidity is present, though not particularly well-marked. Negativism is present. The urine was negative, except for traces of indican.

The girl was kept under observation for a period of two weeks before

any treatment, other than hyperalimentation and an occasional purge was given. For a week after admission she remained excited, with a good deal of motor restlessness, and occasionally an impulsive outbreak, but for the greater part of the time she was anergic, stuporous, though the depth of this was never so great but that she would respond to simple questions in monosyllables if shaken and the questions repeated over and over again. In no way did the symptoms vary from those of an ordinary mild case of catatonia.

On June 26 the patient was sent to the hospital ward and placed upon alcoholic solution of lecithin, one fluid drachm, t. i. d., alternated with thyroid extract in 2-gr. doses, with increased alimentation.

July 2.—A re-examination to-day showed that the motor symptoms to be about the same as when the girl was admitted to the institution. The deep and superficial reflexes are much exaggerated, and mechanical muscular irritability is equally so. Dermographia is well-marked, is readily elicited, and remains for a number of minutes. There is no cutis anserina. There is little cyanosis about the hands and feet, but excessive perspiration is noticeable.

Some of the members of her family visited her to-day, and after their visit she became much excited, weeping and crying to go home. Later, she talked incoherently to herself. L. takes food well, and sleeps profoundly. Is apparently pleased when the nurse takes her for a walk on the grounds, and takes some interest in watching the other patients and in the music. T. normal to slightly subnormal. P. 96 to 110.

July 9.—Thyroid extract was begun in 2-gr. doses daily, this morning. The girl has been very nervous, as well as excitable, for the past two days, and has had hallucinations of sight. The pulse has also been high, mounting to 128 beats. T. 98.6° to 98.8°. Is inclined to be constipated and the appetite is not so good.

July 12.—Hallucinations are occasionally noted. T. 99°; P. 115; B. P. 130 R. R.

July 14.—The troublesome hallucinations have not been present to-day, and the excitement has abated, but in place she has become quiet, taciturn, and is beginning to neglect the small amount of work that has been given her to do about the ward. She has also begun muttering constantly to herself. Leucocytosis 12,000. Red cells 4,000,000. B. P. 140; P. 100 to 110; T. 99°.

July 14.—Patient was returned to the lecithin solution, given as before. To-day, L. is again restless, easily startled, and when frightened screams loudly and beats her head with the hands. Appetite very poor. T. 99°; P. 112.

July 16.—The girl is to-day talking in a loud voice, screaming, gesticulating, and gritting her teeth together. The motor symptoms are unchanged. Appetite improving and vegetative functions normal. T. 99°; P. 112.

July 20.—L. is to-day much more quiet, and is talking slowly and co-

herently. She told the nurse that she was ashamed of herself for acting so badly during the past few days, and recognizes that her mental condition is not a normal one.

July 21.—To-day the girl is excited, talks incoherently to herself, and constantly picks at the skin of her hands. Thyroid extract, 2 gr. per diem.

July 23.—The general symptoms are unchanged, except that attempts at masturbation are made from time to time.

July 28.—L. has been brighter, is coherent at times, and has resumed her duties about the ward. T. normal; P. 95; B. P. 130; leucocytosis 12,300.

July 29.—Was returned to the lecithin to-day. Is working a little, but without much energy.

August 4.—Continues to be somewhat brighter. Motor symptoms unchanged. There are occasional attempts at masturbation.

August 6.—Thyroid extract, 2 gr. per diem.

August 10.—The girl is now doing much better than at any time since admission. She is brighter, more intelligent, has shown no delusions or hallucinations, and takes considerable interest in her work, as well as in the other patients. The motor symptoms are little changed; perhaps the reflexes are not quite so exalted. The leucocytosis is rising, and varies from 13,000 to 17,000.

August 12.—Lecithin as before. L. speaks sensibly, coherently, and collectively. Appetite ravenous and vegetative functions normal. The extremities are not perspiring so freely. T. 98.8°; P. 80 to 96; B. P. 140; leucocytosis 12,000. An examination of the motor functions showed dermatographia to be marked, reflexes and mechanical muscular excitability considerably above normal. Pupils 2½ mm. Hyper-reactive to light, sympathetic, and psycho-reactions. The second aortic sound is accentuated. There is slight arterio-sclerosis. Muscular rigidity is present at times. There is no negativism.

August 18.—L. has shown considerable mental confusion during the past three days, and is again inclined to sit still and weep, though she now tries to conceal her emotional state from her fellow patients. She is again inapt and indolent, and talks to herself a good deal. P. 90 to 95; T. normal; leucocytosis 12,000.

August 20.—Thyroid extract, 2 gr. per diem. L. has been better to-day, is well-conducted, sensible in her conversation, and is working about the ward assisting her nurse. Is also sewing at some embroidery. Is cheerful, and looks forward to a return to her own home. She maintains a conversation quite well, and the orientation is good, which has not always been the case. Memory for past events fair. Pupils 2½ mm., slightly hyper-reactive. The hands and feet are warm, not perspiring much, and are not cyanotic. Reflexes and muscular excitability abnormally active. No tremor of lips and fingers. No negativism or muscular rigidity. Sleep and appetite normal.

August 26.—There has been no especial change with the patient since

the last note was made. The facial expression is more natural. There has been considerable gain in weight since admission, and especially in the past month.

August 29.—Lecithin as before. L. is bright and lively; now reads a good deal, and takes pride in having her dresses clean and orderly. B. P. 130; leucocytes 10,200; P. 91; T. 98° to 98.6°.

September 2.—L. continues to be cheerful, intelligent, entirely oriented, and the memory for past and present events is excellent. Thyroid extract, 2 gr. per diem.

September 6.—Patient is menstruating for the first time since her admission. The sensorium is clear, the woman is cheerful, neat, and working well, and is acting as assistant to the ward nurse. Appetite, digestion, and sleep are natural. T. 98.6° to 98.8°; P. 90; leucocytosis 9000 to 12,000.

A physical examination showed: Pupils 2½ mm., normally reactive. Reflexes deep and superficial, normal. Extremities warm and dry. Tremor of the tongue and fingers is hardly noticeable. Dermographia present, though not vivid. No mannerisms, no stereotypy, no muscular hyper-tension. Muscular mechanical excitability somewhat above normal.

September 9.—Lecithin t. i. d. The even return to mental health continues. Patient is willing, cheerful, industrious, and is showing herself more and more capable. When not at work she spends most of her time out of doors reading. There is now a steady gain in weight.

September 17.—Thyroid extract, 2 gr. per diem. There is uninterrupted improvement.

September 24.—Lecithin. There has been no return of mental symptoms. Patient continues to be cheerful and industrious, working steadily from 6 a. m. to 4 p. m. The leucocytosis is now diminishing, varying between 7000 and 9000 per cm. Deep and superficial reflexes are not so exalted. There is no tremor. Mechanical muscular excitability is diminishing. Dermographia is less marked, and perspiration has ceased entirely. Neck 33 cm. Thyroid palpable; no noticeable change in its size, but it seems a little firmer. L. now weighs 125 lbs. T. normal; B. P. 125. Is looking rosy and well-nourished. Her general conduct is all that could be desired.

September 24.—Thyroid extract discontinued; is now on lecithin alone. There has been no change in the mental disposition since the last note. Memory is excellent, and she is most industrious. On September 30 was sent home, with orders to report to the hospital at the end of the week.

October 8.—L. reported this afternoon for examination. The members of her family say that the girl has been quite herself, and has shown no sign of disturbed mentality. The patient herself converses intelligently, and sustains a conversation without apparent effort. Weight 130 lbs. Color good. Neck 33 cm. Thyroid palpable, possibly a little firmer to the finger than when she was admitted in June. There is no area of dullness over the site of the thymus gland. Dermographia markedly diminished. The reflexes and muscular mechanical excitability are close to the natural. No hyperidrosis, no muscular tremor.

November 20.—L. has shown no signs of relapsing.

December 27.—L. is still normal, though at home she has had to contend with the brutalities of an intemperate brother.

January 20.—The girl has continued in her normal state, working hard, and attending generally to the duties of a housekeeper.

April 5.—There has been no relapse.

July 20, 1908.—There is no alteration of the mentality.

September 20, 1908.—Patient remains in excellent health.

BLOOD EXAMINATIONS.—EMMA L.

Date.	Red cells.	White cells.	Hema-globin.	Polyns.	Small monos.	Large monos.	Eosin.	Trans.	Mastz.	Blood press. (R. R.)
July 30, 1907.....	3,223,000	12,300	65%	68.0%	26.0%	3.0%	2.0%	1.5%	.0%	130
Aug. 1.....	3,696,000	11,200	65	67.5	26.0	2.0	2.5	1.5	.0	135
" 5.....	3,720,000	9,000	70	64.5	27.5	4.0	2.0	2.0	.0	130
" 10.....	4,750,000	8,660	75	70.0	23.5	3.0	3.5	.5	.0	130
" 20.....	5,400,000	9,700	75	72.0	23.0	2.5	2.0	.5	.0	140
" 24.....	5,800,000	9,700	75	72.5	24.0	3.5	1.0	1.0	.0	130
Sept. 8.....	5,700,000	9,000	75	74.0	22.0	2.0	1.0	1.0	.0	130
" 12.....	5,750,000	9,100	80	67.0	25.0	2.0	1.0	2.0	.0	125
" 21.....	5,700,000	7,000	75	64.0	30.0	3.0	2.0	1.0	.0	125
" 30.....	5,700,000	9,000	75	70.0	24.0	3.0	2.0	1.0	.0	125

CONCLUSIONS.

I. That the number of cases thyroidectomized are, to date, insufficient upon which to base conclusions of a definite character.

II. That the results of the histological and chemical examinations have been inconclusive, as to whether or not we have to deal with a perversion of the secretion of the thyroid gland in catatonia.

III. Nevertheless, it is possible, from the symptoms, that in catatonia we have a perversion of the secretion of that organ, and that partial thyroidectomy induces a return to the normal in the secretion of the remaining portion of the gland. The return to the natural state of the reflexes, the decrease of the mechanical muscular irritability, as well as of the dermatographia, the loss of pigmentation, also of the doughy, pasty character of the skin (most noticeable in the prodromal and stage of mutism), and the later return to the normal both of the mental as well as physical state, are at least suggestive that partial ablation of the gland is a factor, and has something to do with the rapid recovery.

IV. It is possible that the secretion of the parathyroid glandules nullifies, in a way unknown at the present time, the activity of the

thyroid hormone, and that the ablation, in part, of the thyroid gland, helps in promoting the function of these minute bodies. After the operation, all the blood supply that formerly went to the entire half of the thyroid body is now diverted to but a small remainder and the supply to the parathyroid glandules must be enormously increased.

V. It would be exceedingly difficult to find eight successive cases of catatonia, that recovered their mental integrity under any previously known treatment, as these eight cases have done. In Case I, the rise and fall of the mental and motor symptoms, as the remaining half of the thyroid hypertrophied and then decreased in volume, is, to say the least, very suggestive that an alteration of the secretion of the thyroid gland is a very material factor in the causation of the symptoms. This clouding of the mental faculties, when the remaining portions of the gland began to hypertrophy, has been noted in several of the other cases.

VI. The partial ablation of the thyroid gland may produce unknown changes in the general metabolism of the entire body, induced, first, by a relatively high leucocytosis following the operation, equally with a withdrawal from the general circulation of a portion of the thyroid hormone that is known to induce destructive metabolism. In all the patients that have had a sufficient time to fully recover, a marked change in the nutrition has supervened (both after the thyroidectomy as well as after the thyro-lecithin treatment), so that within four or five months after the ablation, or the completion of the thyro-lecithin treatment, there has been the enormous gain of from 30 to 50 pounds added to the weight, and this not confined to the adipose tissues but equally noticeable in the muscular system.

VII. It is hardly possible that chance could have favored us in the selection, at random, of eight successive cases of catatonia, for such favorable results.

VIII. The thyro-lecithin treatment is productive of constant results only in the prodromal state. It acts probably by increasing constructive metabolism, but may also act by nullifying the thyroid hormone, just as iodine increases its activity.

IX. Partial thyroidectomy may be of avail in cases of catatonia only before organic changes, such as have been described by

Alzheimer, and more recently by Zalplachta, have begun in the brain tissues.

X. The operation is not free from danger to the life of the patient, unless the utmost care is taken to insure unusually free drainage; also the chances of an infection, or of a broncho-pneumonia, or bronchitis, are always considerable, the low vitality of the patients having to be taken into account. Though the gland in these cases is of approximately normal size, it takes a surgeon of previous experience in the school of exophthalmic goitre to properly perform the operation, and to judge, from the size of the gland, just how much of the organ should be removed to insure effective results.