fat beef. Only a few years ago he was to dine with other friends at my house. Luckily I found out in time that all four of his taboos were on the proposed menu. He was a judge of wine, of which he had a careful and wisely selected cellar, much enjoying a good glass with friends. Cocktails and tobacco had no charms for him. When he took alcohol, he took it like a gentleman, in the form of wine, and with his dinner. He was a wide reader, with system in that, as in other things. He rarely slept after six, and got in an hour's reading before rising. Of the First Church he was an active member, serving on the Standing Committee for some time as Chairman, and on various other committees.

The society of his friends was a delight to him. He was always courteous and considerate of others, perhaps not quick to give his friendship, but once given it was firm as a rock. His social talents had wider scope as his time was freed from the Medical School, and the Hospital, and, finally, from private practice. Some of the leisure thus won resulted in his interesting "Sketches of My Life," and in his sketch of the Clarke-White family.

The last years of his life he passed the months of June to October at Islesboro in Penobscot Bay. His white house was on the crest of a ridge one hundred feet above the water, and contained collections of books, china, furniture, and pictures, which gave him great enjoyment, alike in collecting and in owning. The cupola, to which he liked to lead the way, commanded both east and west bays, and more than twenty towns, among them Belfast, his birthplace, some ten miles away. On his west porch he passed much time, delighting in the ever-changing views of the Camden Hills, and the activities of Gilkey Harbor. No yacht entered or left unnoted by him. Many friends will cherish many memories of this porch, and regret that memories alone remain for them.

Of sentiment he rarely talked, but he had it abundantly.

Some we call good are so negatively, rather than positively. Not so Dr. White. Virile, fearless, aggressive, he was a good fighting man, good man of medicine, good citizen, good friend. An unusual degree of these by no means synonymous forms of goodness was happily and rarely blended in him.

He was a knight, *sans peur et sans reproche*. In life he stood for all that was best. Is there any better preparation for death, anything which one of us could more wish said of him? Let us honor him by striving to follow his example.

REMARKS.

DR. SPRAGUE: I wish to add a few words of a personal nature to the tribute to Dr. White, as coming from an old friend and contemporary. Dr. White and I were fellow students

in the Medical School, where we had a pleasant acquaintance, and afterwards met in Vienna, in 1856, where we roomed together for the greater part of a year. At that time Europe was not the familiar ground which it has since become to the American traveler and student, and Vienna seemed especially remote and strange, in truth a far country. This tended to increase our intimacy, an intimacy that has existed and thrived through all these succeeding years, although our paths have, in many respects, been in different directions. Dr. White at that time showed the qualities that in later life carried him so far. He had untiring energy, great industry, was a keen observer, and possessed of excellent judgment. He was always self-reliant, and had a strong personality that was evident to everyone who came in contact with him. He had a most retentive and accurate memory, and was often called upon by his intimates to refresh their recollections. He thought clearly and wrote exceedingly well, with a clearness and conciseness difficult to surpass. He was a keen critic, but never indulged in a carping spirit. He was always fair and above-board, and he had a generous admiration for talent shown by others or good work done by them in any direction. He had an independence that made him more willing to confer a benefit than to receive one. He had high standards and lived up to them. In his death his associates have lost a true friend, a genial companion, and a sterling gentleman.

Original Articles.

EPIDEMIC POLIOMYELITIS. THE SYMPTOMATOLOGY AND DIAGNOSIS IN THE ACUTE STAGES.*

BY FRANCIS R. FRASER, M.B., NEW YORK.

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THE evidence at present available on the manner of conveyance of the virus of acute poliomyelitis points to the importance of personal communication of the infection.¹

Acute cases, recovered cases, mild cases, abortive cases and human contacts are all capable of conveying the infection. Any methods of isolation and quarantine that may be deemed necessary as preventative measures require for their efficient administration that all cases, including the abortive forms, should be recognized early.

The diagnosis of acute poliomyelitis is not of great difficulty after paralysis sets in, but is of

* An abstract from lectures delivered to the medical profession in the State of Vermont during the summer of 1915, at the request of the State Board of Health.

extreme difficulty in the preparalytic period and in mild and abortive cases. The acute stages may be divided into four periods. There is first a period of incubation, when no symptoms are present and when the patient is apparently perfectly well. The length of the incubation period is difficult to ascertain, largely because of the difficulty of determining the source and time of infection, but has been variously computed to be from two to ten days, and may be as long as three weeks. A study of the experimental disease in monkeys, which simulates the disease in human beings very closely, shows that in monkeys there is an incubation period varying from three to forty-six days or longer. The second or preparalytic stage is marked by a sudden onset. From the statistics of the Vermont epidemic of 1914, it is found that of two hundred and eighty-four cases, one hundred and seventy gave a history of excellent health before this onset; in ninety-seven the health is recorded as good, and in eighteen as poor. The preparalytic period may be entirely absent, and this is commonly seen in the sporadic cases, but in epidemics it is almost always present. In one hundred and twelve cases admitted to the Hospital of the Rockefeller Institute during the years 1911-1913, in whom the time of onset of the preparalytic period could be definitely ascertained, the average duration of this period was over two days. The longest period in this series was fifteen days, although in a few cases the preparalytic and general symptoms have disappeared entirely for a few days, only to return with paralysis. The third period follows the second immediately, and is characterized by paralysis or weakness of muscles, in addition to the symptoms that characterize the earlier period. The paralysis may be developed suddenly without further spread, or the further involvement of muscles may continue for an indefinite period, usually for a few days only, and seldom for more than ten days. In the fourth period no further spread takes place; the patient's general symptoms are still present but are subsiding. This period occasionally ends sharply, as if by crisis, but is more often prolonged, the symptoms disappearing gradually. It may be many weeks before the pain and tenderness and other acute symptoms disappear. With this period the acute stages may be considered to end, and it is then the results of the disease that have to be dealt with.

The lack of definition of these periods is to be expected since they are defined by symptoms which are only the outward evidence of the disease process that is taking place in the body generally, and in the central nervous system in particular.

Incidence.—All classes of the community appear to be equally affected, and although the disease is commonest under the age of twenty, there does not seem to be any limit to the age

of the persons attacked. Two hundred and ninety cases in Vermont in 1914, grouped in age periods, show:

Under 1 year.....	0 cases
Between 1 and 2 years.....	37 "
Between 2 and 5 years.....	88 "
Between 1 and 10 years.....	75 "
Between 10 and 20 years.....	63 "
Over 20 years.....	27 "

That a history of excellent health immediately previous to the attack is the rule, has already been pointed out. Seasonal incidence has been the subject of much statistical study, and, as in most epidemics in this country, so in the Vermont epidemic of 1914, the incidence was greatest during August.

Symptomatology.—I. Preparalytic and General. When the case is first seen by a physician the parents, as a rule, state that there was a sudden onset of feverishness, with drowsiness, general weakness, loss of appetite or vomiting, and perhaps irritability and restlessness. Frequently such a condition persists for two or three days before the attendants realize that something more than a mild disturbance of the digestion is present.

(a) Fever is always present at the onset in the epidemic cases. Temperatures as high as 104 and 105 are noted at the onset and in a few cases before death, but it is more usual to find temperatures of 101 to 103 swinging slightly, and gradually subsiding in the course of a few days. It is not unusual to find readings of 100 for many weeks after the acute attack is over and when recovery is well advanced. In a few cases, generally those in which the symptoms are indicative of lesions in the upper part of the central nervous system, a continuous fever of 103 or 104 is seen for three or four days, ending sharply in a crisis.

(b) The pulse rate follows the temperature, and any pronounced departure from this rule should lead to a search for some cause other than poliomyelitis.

(c) Gastro-intestinal disturbances are usually present and may predominate in the first few days. Loss of appetite is always present in the febrile stages, and the illness may be ushered in by vomiting. Profuse diarrhea is rare, and constipation is more often present and may be marked. The vomiting rarely persists after the first two or three days. Abdominal tenderness is often seen and is part of a generalized tenderness of muscles. This is especially the case where the abdominal muscles are paralyzed and, as with the paralysis, the tenderness may be localized to a part of the abdominal wall only.

(d) Preparalytic symptoms referable to the respiratory tract have been prevalent in a few epidemics, but this is unusual. It is not uncommon to find slight catarrh of the upper passages, and frequently the tonsils and pharynx have a slightly reddened and congested ap-

pearance. An acute tonsillitis and the formation of a membrane are so seldom seen that their presence would suggest another diagnosis. In cases where the pharyngeal muscles are paralyzed mucus and food collect in the pharynx, and by causing great distress may distract attention from the real cause of the condition. When paralysis appears, the respiratory system acquires a peculiar importance that will be discussed later.

(e) Frequently the first symptom to attract attention is a heaviness and drowsiness. In cases severely infected the patient appears to be in coma, but more frequently there is simply a desire to be left alone and a disinclination to play or to take part in activities of any nature. There is, however, no mental dulness, for when spoken to or aroused there is brightness and mental activity that is surprising. In fatal cases this mental alertness to the very end is a picture that is not readily forgotten when once seen.

(f) Accompanying this drowsiness there is an irritability, when roused, that is in striking contrast to the heaviness seen when the patient is left undisturbed. The child objects to any examination or handling, and the doctor is in more disfavor with his patient when dealing with acute poliomyelitis than with almost any other condition. This child may be ever so good-tempered and tolerant with strangers as a rule, but when suffering from acute poliomyelitis, the disposition is very constantly described by the parents as "cranky." With this mental irritability there is a physical restlessness. Sleep is broken and there is a constant tossing and moving from side to side. Delirium and convulsions are rare.

(g) Frequently the whole body jerks from time to time, but there are also seen sharp single jerking movements of a part of the body only—of one limb or of one side of the face—or of several parts. It is noticed that the parts that show such jerking movements are frequently the parts that later become paralyzed. Such jerking movements may be due to irritation of the anterior horn cells before the cells are so damaged as to cause paralysis of the part.

(h) A diffuse generalized sweating is commonly seen in the very severe cases, and may continue both day and night for many weeks after convalescence is established. It is more profuse at night in such cases. As a rule, when present it is only during the febrile period. Less common is a localized sweating seen in a part that later becomes paralyzed. This phenomenon may be related to the jerking movements described above and to the association in the anterior horns of the gray matter of the cord of the motor cells and the cells governing the sweat functions.²

(i) In the early period before definite paralyses are seen, there is apparently a general weakness of the musculature of the whole

body. When a patient recovers from the acute stage in a few days with little paralysis, the strength of the unaffected muscles is in marked contrast to the apparent weakness of the same muscle in the febrile period. It is difficult to estimate how much of this is due to lack of effort on the part of the patient, but this weakness is more marked than in other conditions with a similar degree of fever.

(j) Unlike other infectious diseases of childhood, acute poliomyelitis is accompanied by diffuse pain and tenderness. The child objects to being handled largely because of pain. There may be hyperesthesia of the skin, so that the lightest touch causes pain. In other cases, tenderness is not elicited until pressure is exerted on the deeper structures, especially the muscle masses. There is still a third degree of tenderness, when no pain is elicited until the part is moved, when stretching of the muscles, tendons and articular structures causes pain. The pain may be generalized throughout the body, or, as is usually the case, where passive movement is required to elicit it, it is present only in a part that is paralyzed or about to be paralyzed. Since the pressure of the bed or the attitude of the patient causes pressure on deep structures or stretches tendons and ligaments, it is difficult to ascertain that true spontaneous pain is present. Sometimes the most careful adjustment of a part to avoid pressure or tension fails to relieve the pain, even in older patients, who can coöperate so that the presence of spontaneous pain, as distinct from tenderness, appears to be demonstrated. Older patients who are able to analyze their symptoms, commonly complain of severe headache, and this may be the earliest symptom. The pain in such a case is usually not localized to any particular portion of the head.

(k) Pain in the back of the neck and in the back is an important symptom. This may be spontaneous, but is more often seen only on attempting antero-flexion of the neck and back. To prevent such flexion the muscles of the neck and back are held contracted and give the stiffness that is so characteristic and that early in the disease is suggestive of some lesion of the meninges or central nervous system. Opisthotonos may be present, but this degree of retraction is rare. The patient prefers to lie on one side so that the head may be held tilted slightly backwards, or on his back with a pillow beneath the shoulders so that the head falls back. The stiffness may not be noticeable until antero-flexion is attempted, when pain is complained of and the protective muscular contraction becomes evident. When the posterior muscles of the neck and back are paralyzed this important sign disappears. Kernig's sign is not, as a rule, present.

II. Spinal Fluid. The early pathological findings include congestion of the vessels of the meninges and a perivascular cell prolifera-

tion. The earlier clinical findings include stiffness of the neck and back and a moderate degree of retraction. In these early stages of the disease there is a meningitis. As might be expected, then, there are changes in the spinal fluid. Although the changes are not characteristic of this disease alone, lumbar puncture and examination of the spinal fluid are helpful in the diagnosis from many other conditions that show similar early signs and symptoms, and also in differentiating the disease from other types of meningitis. The fluid, though apparently increased in quantity, is not, as a rule, at greatly increased pressure, but may occasionally spurt out as in tuberculous meningitis. A slight opalescence and occasional flakes of fibrin have been described. The cells are increased in number, and there is an increase in the globulin content. Cell counts of over 1000 per c.mm. are found but they are rare, and counts of under 100 are more common. During the first few days polymorphonuclear cells and cells with irregular nuclei may be numerous, but after the first week the increase is due almost entirely to cells of the lymphocytic type. The globulin increase is found in half the fluids examined during the first week, and the proportion showing this abnormality increases to the third week.

In the first week after the appearance of the first symptom, nearly all the fluids show abnormalities in cell count, of globulin content, or both; in the fourth week about 50% are abnormal; and after the fourth week the proportion falls off very rapidly. The fluid does not clot and is sterile, and no organisms can be found in the centrifuged deposit. The changes in the spinal fluid seem to be independent of the onset of paralysis.^{3, 4}

III. Blood. The examination of the blood does not help to a positive diagnosis, as there is no change in the number of red cells, while the number of white cells is within the limits of normal variations. A slight increase in the proportion of polymorphonuclear cells may be seen with similar diminution in the number of lymphocytes.³ A blood count is of value in that any great departure from the normal would indicate a search for some cause other than poliomyelitis.

IV. Disturbances of Motor System. After a variable period of preparalytic symptoms, paralysis is seen, and the diagnosis is then greatly simplified. The pathological lesions may be very diffuse or may be localized. The paralysis may involve almost all the body musculature or may be limited to a muscle group or a muscle. The lesion may be severe, producing a permanent complete paralysis of the affected muscles, or may be mild, causing a partial paralysis or only a temporary weakness. A most thorough examination is, therefore, necessary, and the strength of every muscle must be tested. Changes may take place rapidly and in the course of a few minutes, and frequent examina-

tions may be necessary to establish a diagnosis and to determine the prognosis. The most characteristic lesion of the motor system is an involvement of the anterior horn cells, resulting in a flaccid paralysis of the corresponding muscles. The lesion may, however, be in the higher parts of the cord or in the brain. A spastic condition would then result, and this is frequently seen, though usually as a transient condition during the period of advancing paralysis. The centres in the medulla oblongata are also frequently involved, giving bulbar paralysis. The irregularity of the distribution of the muscles involved is very characteristic of the paralysis of poliomyelitis. Hemiplegias and paraplegias are not common, and simple monoplegias would probably be considerably rarer than statistics show if some instrumental method of examination of the other muscles of the body were employed.⁵ Even with the crude clinical examinations so far employed all the muscle groups of a limb are seldom equally involved. Weakness of a muscle of the eyeball on one side or a slight ptosis are not infrequent, and involvement of the muscles of facial expression was found in a third of the cases in one series. Seldom are the facial muscles on both sides paralyzed, and it is usual to find either the upper or the lower parts of the facial musculature only involved. The tongue, the palate, and the pharyngeal muscles must also be examined. The muscles of the neck and back and of the abdominal wall are important, as supporting apparatus may be necessary to prevent deformities if these groups are involved. Of greatest consequence to the patient is the condition of the respiratory muscles. Fatal cases invariably result from paralysis of the respiratory muscles. With the diaphragm alone, or with the serratus muscles alone, the respiratory movements may be carried out efficiently, but when both are paralyzed death results. From the first sign of weakness the spread to paralysis of both groups is sometimes very rapid, so that a careful examination is of the greatest importance. An estimate of the efficiency of the serratus muscles may be obtained by interfering with movements of the diaphragm by firm pressure on the abdomen, and of the diaphragm by the prevention of the expansion of the thorax by pressure there. Incontinence and retention of urine are both seen, and a flaccid condition of the anal sphincter is reported. Much information as to the condition of muscles can be gained from an inspection of the attitude of the patients as a whole, and of the limbs and by testing the tone of the muscles on passive movements. Isolated active movements are difficult to elicit in infants, and the coöperation of the mother is of the utmost value in completing a systematic examination.

V. Disturbances of Reflexes. Short of demonstrable disturbances in the functions of the muscles, disturbances in the deep reflexes are

found. In the early stages and in mild cases these may be the only indications of lesions of the motor mechanism, so that a careful examination of the reflexes is helpful. As in the case of actual paralysis, it is the asymmetry of the disturbances that is characteristic. Reflexes may be exaggerated one day and absent the next, with demonstrable paralysis not appearing until the day following; or, the reflexes may gradually be lost without any demonstrable paralysis whatever developing. Exaggerated reflexes in one part and absent reflexes in another may be present at the same time. Valuable information may also be obtained by the examination of the superficial reflexes.

VI. Disturbances of the Sensory System. It has been demonstrated that the earliest and most constant lesion in the experimental disease is found in the posterior root ganglia.⁹ These rarely go on to complete destruction of the ganglion cells, so that, although permanent disturbances of sensation are not to be invariably expected, temporary disturbances during the stages of congestion and edema and cell infiltration may be expected. These interstitial changes have been seen in the preparalytic stages in monkeys. The pain and hyperesthesia may be due to these histological changes. Because of the usual age of the patients and their general condition in the acute stages, an accurate examination of sensations is impracticable by the ordinary clinical methods. Definite impairment of sensation has been demonstrated in a few instances in older patients. It is possible that many of the cases that have been called "abortive" would show changes if more accurate methods of estimating muscle power and sensations were available. It is probable that many cases of doubtful diagnosis could be cleared up by such examinations.

Abortive Cases. It is difficult for medical men who have not had opportunities to observe acute epidemic cases of poliomyelitis, to believe in the presence of abortive forms. It was first pointed out by Wickman⁷ that abortive cases form a large proportion of all cases in an epidemic, and it has been suggested that they may even outnumber the paralyzed cases. It is of importance then, in taking any steps to prevent spread by quarantine, that the mild and abortive cases be recognized. The evidence in support of the occurrence of such cases is considerable, but owing to the nature of the condition it has not been possible to demonstrate the characteristic pathological lesions in a human case. The occurrence of every grade of severity, from the totally paralyzed rapidly fatal cases to the rapidly recovering cases, with at no time more than the mildest degree of weakness in one muscle, suggests that still milder cases, with general or perhaps meningeal symptoms only, must also occur. In most epidemics that have been carefully observed it has been pointed out that mild degrees of fever

and gastro-intestinal disturbances occurred to a greater extent than usual among the unaffected members of the community. In 1894 Dr. C. S. Caverly⁸ noted that during the epidemic of that year in Vermont, the infectious diseases of children were accompanied by nervous disturbances. Kling, Wernsted and Petersen⁹ demonstrated the presence of the virus of poliomyelitis in the throat washings of such cases. Changes typical of poliomyelitis have been demonstrated in the spinal fluid of such cases. Monkeys have been inoculated with small doses of the virus of poliomyelitis, and after showing the prodromal symptoms, have recovered, and their immunity demonstrated by their resistance to a second inoculation.¹⁰ Such cases are characterized by the preparalytic and general symptoms described above. They are usually mild and ambulant, but may show the pain and hyperesthesia and meningitic symptoms. If such a condition is suspected, lumbar puncture should be performed.

Diagnosis. In the preparalytic period and in abortive cases the diagnosis depends, to a great extent, on the presence of an epidemic and association with other cases. Under these circumstances, a history of sudden onset with fever, gastro-intestinal symptoms and perhaps pain, would indicate a careful examination for signs of stiffness of the neck and back. If any suspicion of a meningitic lesion is entertained, lumbar puncture must be performed, when the condition of the spinal fluid will clear the diagnosis in most cases. The differentiation from a gastro-intestinal upset is most difficult. The onset may be quite sudden, the fever and general condition identical, and there is frequently objection to being handled and to flexion of neck and back. The spinal fluid is, however, normal; diarrhea is more usual than constipation, and the vomiting more persistent. The other common infectious diseases commence similarly, but in them the pain and hyperesthesia is usually absent, the spinal fluid is probably normal, and a characteristic rash develops. Sufficient data on the spinal fluid in acute infectious diseases have not yet been collected for the findings to warrant an absolute opinion. Skin lesions have been described, but are not constant in character and are present in only a small number of cases. Acute rickets is easily mistaken because of the fever, the prostration and the tenderness. The spinal fluid, however, is negative, and in poliomyelitis pronounced enlargement of the liver is not found. Tuberculosis of the hip can be differentiated by the history of onset. Acute rheumatic arthritis may commence acutely and the fever, pain and disinclination to move be very similar, but the tenderness is localized to the articular structures, and in poliomyelitis there is no swelling of the periarticular structures and no synovial effusion. Meningitis due to the meningococcus, to the pneumococcus, to the influenza bacillus,

to streptococci and staphylococci give a spinal fluid with cell increase due to polymorphonuclears, and the causal organism can be found in smears and can be cultivated. In tuberculous meningitis and syphilitic meningomyelitis the spinal fluid is very similar to that of poliomyelitis, and the clinical findings do not differentiate until the case has been watched for a few days. In tuberculous meningitis the bacillus can be found by repeated careful examinations, and in syphilitic meningitis the spinal fluid gives a positive Wassermann reaction. A positive Wassermann reaction in the blood is not sufficient to differentiate, as it may be found in acute poliomyelitis as in other acute infections. Even when evidence of paralysis or of involvement of the motor system is found, the diagnosis may not be clear. Tuberculous meningitis and syphilitic meningomyelitis require as careful differentiation in the preparalytic period. Evidence of tuberculosis in other parts of the body and the absence of complete paralysis of muscle groups in a seriously ill child help to differentiate in the one case, and the signs of congenital syphilis in the development of the skeleton and the enlargement of the liver and spleen help in the other. Acute poliomyelitis is probably more often mistaken for cerebrospinal meningitis than for any other disease, especially as paralysis may occur in both, but the rash, the photophobia and characters of the spinal fluid should easily differentiate them. Brain tumors, tumors of the spinal cord, and many other conditions of the cerebrospinal axis have rarely to be differentiated. If physicians are alert and neglect no methods of examination that may help to a diagnosis, the abortive cases will be missed less often, and the frank cases will be recognized earlier and valuable help rendered in any attempts at prophylaxis by quarantine methods.

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ANATOMIC FORM AND POSTURE, IMPORTANT FACTORS IN THE TREATMENT OF PULMONARY TUBERCULOSIS.*

BY JOEL E. GOLDTHWAIT, M.D., BOSTON.

IN that which is presented to you tonight it is my hope that lines of investigation may be suggested that will be of help in understanding the conditions which lead to tuberculosis, with the natural effect which such understanding should have upon the control of the disease. That my remarks are made with much hesitation is not strange, in the light of the admirable work of the men of this community, added to the fact that the treatment of this disease, apart from its manifestations in the bones and joints, has received but little attention from me. My reason for venturing to speak to you is that in my twenty-five years of work with the chronic patient, a little of the wonderful spirit of optimism which your great leader, Dr. Trudeau, so largely possessed, has come through to me, resulting in the belief that all of these chronic diseases must be understandable by, and ultimately controllable through, the human intelligence. In the study which this spirit has forced, certain things have been revealed which have not only benefited the patients who turn to me for advice, but which seem of equal applicability in many other forms of disease. With the hope that some of these principles may be of benefit in your work, in pulmonary disease, I am venturing to address you.

In the first place, in attempting to fathom the nature of the chronic diseases it has been clearly shown that, despite the text-book teaching, human beings are not all made alike. That there are distinct types, showing differences in contour of body, form of skeleton, texture of muscle, shape and attachment of viscera, etc., etc., there can be little question, and all of this has been fully described in the Shattuck Lecture.[†] Not only do these types of anatomic form exist, but apparently each type has its own more or less definite potential of disease, and of these types the one which most concerns us, because tuberculosis is a part of its pathologic potential, is the slender type, which has been designated by different writers as the congenital viscerotonic, the carnivorous, the hyper-onto-morph.

Why this type is so commonly tuberculous is not, of course, wholly plain, but there are certain suggestive features. In the first place, the individual is usually poorly nourished, due perhaps in part to the fact that the length of the small intestine, from which the food must be assimilated, is much less than the normal, frequently not more than half. The blood pressure is usually considerably below what is con-

* Address delivered before the Saranac Lake Medical Society, at Saranac Lake, New York, Feb. 9, 1916.

† An Anatomic and Mechanistic Conception of Disease, Boston Med. and Surg. Jour., June 17, 1915.