

tastes and smells to an objective rather than a subjective source and subsequently forming delusions. However, unless we are dealing with the paranoid form the delusions are fragmentary, transient and absurd.

Hebephrenia.—This is a progressing mental enfeeblement, terminating usually in deterioration, and without showing marked peculiarities in thought or action aside from the progressing deficiency. The patient appears in general inactive, lacking in energy and ambition, indifferent, depressed, incapable of much concentration and hence the efficiency becomes progressively impaired until he is unable to accomplish anything. From time to time there may be periods of confusion, depression, passivity, at other times periods of excitement.

Catatonia.—In this form the general symptoms are similar to those of the simple type above described with the addition of the special symptoms referred to as catatonic excitement and catatonic stupor. The excitement period is manifested by an unrest and monotonous activity, stereotyped actions and speech, the patient constantly repeating some act, such as moving the hand, foot or head over and over again in the same way, or repeating the same word or phrase indefinitely. This occurs apparently involuntarily, the actions being automatic in character. The patient who has been in a semistuporous state may pick up a glass or chair and without show of emotion break it against the wall. In catatonic stupor the patient may show in the lighter degrees a simple loss of interest and feeling with sluggish reaction to stimuli, or a profound inactivity and stupor in which state he cannot apparently be reached by any stimuli; nevertheless, he apparently retains consciousness. In this type we observe the interesting symptom of negativism in which the patient always does the opposite of what he is requested, or refuses outright to obey any command. There may be a refusal of food so that the patient has to be fed by a tube, mutism may be present, the patient may go for weeks or months without saying a word; stereotype of attitude results in cataleptic poses and rigidity, in which the patient may maintain any particular pose for a prolonged period of time, and if placed in some other attitude may similarly retain the new attitude for a long time. This constitutes the so-called wax like rigidity, the patient reminding one of a wax figure. Pathologic suggestibility occurs in which the patient imitates movements, or repeats words and phrases that are spoken or performed before him.

Paranoid Form.—In this type delusions predominate and are characterized by variability, inconsistency, illogicality and transitoriness on the one hand, with many gradations to the opposite extreme

where they become more or less fixed, and often dovetail into each other forming apparently a systematic whole. They tend to be usually of a persecutory and hypochondriacal character and in later stages when the mind is distinctly weakened are often of a grandiose type. Sometimes the patients have some kind of explanations for them and at other times none whatsoever, and they are often curiously dissociated from the emotional accompaniment. The patient may state there is poison in his food, in an indifferent tone of voice or even with a laugh; he may claim that his teeth are all set in wrong and offer no explanations to these obviously false ideas. The patient commonly thinks that somebody "has it in for him," someone will do him mischief, will kill him, that people are talking about him and criticizing him, everything that he hears or reads he thinks has some bearing on himself, so-called "delusions of reference." Hallucinations may be present, the patient hearing voices, or receiving impressions or ideas which he claims come from without. These external impressions he misinterprets as voices or forces which are accusing, threatening and slandering him. Later on, the patient tends to change from the depressed persecutory stage to an expansive one, when he claims he is some celebrated person, king or president, or pope. The impairment of the judgment is clearly demonstrated in these cases since the patient who may claim to be the king of England may beg the attendant to change his place at the table or for a postage stamp.

Pathologic Anatomy.—This is obscure. Since a certain proportion of cases recover, there can evidently be no degenerative changes at the outset, though some cases deteriorate fairly early, others only after several years. In some chronic cases there have been observed degenerative changes in the cortical cells.

Diagnosis.—First, the common age of onset during puberty and adolescence, fourteen to twenty-four in the vast majority of cases, this being the only common mental disease occurring during this age period. Second, the progressive character terminating in mental enfeeblement or deterioration, that is "dementia" proper. Third, the evidence of defect or deficiency symptoms indicating that the patient's mind has altered in the sense of deterioration from its former normal condition, whereas, in imbeciles or idiots the mind has failed to develop in the first place. Fourth, in the earlier stages particularly the marked dissociation of the brain powers, some being well maintained as memory and orientation (that is knowledge of time and space), others being weakened, such as judgment, power of attention and the like. Fifth, the early appearance

of the emotional defect, a remarkable indifference and apathy of the patient to people and surroundings, the patient being unsocial and taking no interest in anything. Sixth, all the peculiar motor reactions, which are mentioned above under the catatonic head, and which very rarely occur in any other mental disorder. Seventh, the delusional content nearly always refers to the patient's exterior, forces outside of him, people or things which are exerting an unfavorable influence upon him, delusions of persecution and reference. The patient practically never accuses himself, as is the rule in cases of true melancholia, never blames himself, but always the other party or the other force outside of him. Eighth, the delusions of grandeur are usually indicative of a stage of deterioration.

Prognosis.—Some authorities are inclined to doubt if any case ever completely recovers, claiming that in apparent recovery it may have been a question of mistaken diagnosis, or that the recovery is more apparent than real, that the patient is not truly well, or will have a relapse, so that a permanent cure will be impossible. Other authorities admit the possibility of recovery though in a very small minority of cases. The statistics of the Still-Hildreth Sanatorium, covering more than two-hundred fifty cases show total recoveries of at least one-third. This includes all types and all stages of progress, many being advanced on entrance. Of the less advanced cases and those of not more than two or three years' standing there have been some fifty per cent recovery. Many cases make improvement or become stationary in greatly improved condition, but are not included in the thirty per cent. Of the three types, the catatonic offers the best prognosis, the hebephrenic the poorest, while the paranoiac occupies an intermediate position.

Treatment.—Of the etiologic factors above mentioned, that of autointoxication, resulting possibly from endocrine disturbances or other sources, is most generally accepted in the medical world and agrees excellently with the osteopathic point of view. Spinal lesions are regularly found more particularly in the dorsal region, which are quite capable of disturbing the innervation to the glands; therefore, their nutrition and activity. A correction of these before the disturbance has continued too long, and hence before deterioration has set in, should theoretically normalize the glandular condition and therefore prevent deterioration and enable the patient to recover. Such is the probable explanation of the results, and in many cases the recoveries were obtained in patients previously considered hopeless.

Remarks by Dr. Hildreth

In a great majority of the cases the cause lies in the interference between the fourth dorsal vertebra and the eighth, which analyzed means a disturbance of the great splanchnic nerves, through whose interference would be caused the toxic condition and even the sexual disturbance described in so many cases from standard authorities. The same lesion, if deep seated enough, could produce an interference with the vasomotors and reflexly interfere with the circulation to the brain. In many we also find a first, second or third cervical lesion. The effects of these lesions on the equilibrium of the circulation to the brain are easily traced through the superior cervical sympathetic ganglia. These lesions, namely, the mid-dorsal and upper cervical, especially when corrected in the earlier stages, have thus far proven to produce successful results. In a lesser number of cases we find the cause to be from the first to the fourth dorsal vertebrae; our reasoning here being that the interference or the physical disturbance must be so deep that it reaches and interferes with the deeper nerve currents, both downward and upward, thus disturbing the equilibrium of the circulation to the brain. We have found this class to be the hardest to respond to treatment; however, that may be due to the fact that the physical defects at that point are harder to correct. Osteopathic treatment applied to the lesions above described without question offers therapeutics of intrinsic value to this class of patients.

Delirium, Confusion and Stupor

This clinical group has become well established, not only in its recognition from the dominant symptoms as indicated above, but also from rather definite causes. The immediate cause seems to be an abnormal blood state, or so-called toxemia, which may result from infectious diseases, or states of exhaustion, or autointoxications, or foreign poisons; the poison acts as an irritant to the brain. In states of exhaustion so-called "fatigue bodies" are formed and are apparently toxic in character. The autointoxicants may have various sources, such as chronic kidney disease, or diabetes, and the like. The most important of the foreign poisons are alcohol and morphine. This morbid group is further characterized not only by a toxic cause and dominant symptom complex of delirium, or confusion, or stupor, but by a similar onset and course. The onset is usually acute and the course somewhat wave like, gradually reaching a climax and subsiding, or resulting in death or becoming chronic. To emphasize the clinical symptoms of confusion which is so important

the term "acute confusional insantiy" has often been used, or "amentia," according to the common German terminology. Hallucinations also play a prominent part, particularly those of vision; hence, another common appellation, "acute hallucinatory confusion." Heredity is mentioned at most as creating a predisposition, though often the personal and family histories show no such evidence whatsoever. Intellectually there is a definite lack of orientation, the patient is unable to identify himself or his surroundings in time and space. He cannot clearly understand what goes on around him, that is, consciousness is "clouded;" the clouding may be of such extreme degree the patient's mind becomes blank, due to complete psychic inhibition. This is referred to as stupor. The emotional life plays a secondary role subordinate to the intellectual content. The patient may be greatly excited for example, resulting from a frightful hallucination. The hallucinations are mainly of the visual type and are almost always present. The patient lives in a perpetual state of sense deception as if he were constantly dreaming; the hallucinations for the most part are of distressing, disagreeable or even frightful character. These may give rise to delusions, which are manifold, often fantastic and usually transitory.

Physical changes are always found associated with the disturbed mental status. If it arises during the active stage of an infectious process there is of course the high temperature and all other physical signs of fever. In a certain number of cases with temperature no definite signs can be found indicative of any of the well known fevers, hence has been called by various names, such as "Bell's Delirium," "Acute Mania Gravis," or "Acute Febrile Delirium." This ordinarily runs an acute rapid course with very high temperature, very marked delirium, followed by stupor and usually death from exhaustion. Even though no temperature be present the physical condition reminds one very much of that found in fever diseases. There is the lost appetite, resulting emaciation and malnutrition, insomnia, exhaustion, etc.

Osteopathic Theory.—While it may be admitted that the various factors mentioned above may take part as exciting or predisposing causes, it is obvious that in numerous instances mental disorders do not arise whatsoever, even when the patient is subjected to these factors. There must necessarily be other elements essential to produce the psychosis. The osteopathic theory comes in at this point to fill in and complete the chain of causes and to initiate the onset by the introduction of the idea of nutritional and circulatory disturbances resulting from the spinal lesions.

The records of the Still-Hildreth Institution show 18 of the toxic type, in which the poison is derived from without, who were treated, with 17 recoveries. There were 25 cases connected with the infection and exhaustion group, with 20 recoveries.

Remarks by Dr. Hildreth

In this group we have to do with blood disorders, resulting from the infections, conditions producing exhaustion, and the various toxins, or poisons, whether originating within the body or derived from without. These disorders are largely functional in character, resulting from brain irritation due to the toxemia or disturbance to the centers of nutrition. The main object of the osteopathic treatment, therefore, is to aid elimination and regulate and build up the nutrition. In most of the patients the physical lesions are found in the mid dorsal area, chiefly from the 4th to the 7th, and in the cervical region, the 1st to the 3d. In aiding the kidneys in elimination the 10th and 11th dorsal vertebrae must be looked after. These conditions commonly respond very rapidly to the treatment and represent one of our most successful groups so far as results are concerned.

Manic Depressive Psychoses

The psychoses which are brought together under this classification include mental disorders which at first glance would appear to be of very wide variation, namely, conditions of maniacal excitement and those of depression. Further consideration, however, reveals the very evident reasons why they should be united as sub groups under the one head. The fact that these two mental states of seemingly opposite characteristics often appear alternately in the same individual, that in certain cases of each type there is a wave like feature in the nature of the attack and the frequency with which they tend to recur, together with other points of similarity in respect to duration, prognosis, etc., tend to point to their very close relationship. Kræpelin was the first to draw attention to these facts and advocate the present convenient and widely accepted classification of these disorders.

The outstanding feature is the disturbed emotional state which dominates and overshadows all other symptoms and is fundamentally the same whether expressed through the excitement of mania or the depression of melancholia.

Etiology.—Heredity is considered an important factor. Various authorities claim to have demonstrated direct hereditary influences in

as many as eighty per cent and more of cases. Individual predisposition resolves itself into a matter of constitution and temperament in which there seems to be a greater tendency among those who are subject to the emotional extremes.

Early adult life is by far its most frequent period of onset, though it may arise also somewhat later. In certain cases the beginning of the disorder dates from some psychic or emotional shock. Just what importance these factors have as causes is little known since other cases develop in which the constitutional element alone seems responsible and no immediate exciting cause can be demonstrated.

The osteopathic viewpoint emphasizes the all important influence of spinal lesions as exciting factors. In individuals who have a tendency to this reaction their presence disturbing the cerebral circulation and nutrition may act as the direct causative factor.

Manic Phase.—The manifestation of this condition is brought about by the release of the inhibiting influences which normally govern all psychic function. Various terms as hypomania, acute mania, delirious mania, etc., have been used to differentiate the different degrees in which the symptoms appear.

In the milder types we find the following symptoms present. There is a marked feeling of well being. The patient, having lost sight of his personal limitations, feels a consequent exalted opinion of himself. His conduct is often rather boisterous, he talks a great deal, often swearing and using obscene language. He is inconsiderate of others and tries to impose his will upon those about him. There goes with this a certain unstability of the emotional tone as manifested by the quickly changing feeling of good humor, irritability and anger. There is a rapid flow of ideas with a marked loss in the ability to concentrate and direct thought. The ideas which pass through the mind do not coordinate themselves toward a definite goal, but deviate from the course of consecutive thinking by any passing association. Again there is a restlessness and activity beyond all normal bounds. The individual feels strong physically and mentally. The appetite is unusually good and if activity is not too extreme there may be a gain in weight. The period of sleep is diminished and the feeling of fatigue is reduced.

In the more exaggerated cases the flight of ideas becomes more marked, the associations are more rapid and superficial and the attention is focused but momentarily. Illusions and delusions may be present due to the imperfect preceptions from inability to concentrate attention and from abnormal associations. Rhythmic speech, disconnection of

phrases and even apparent incoherence are often present. The state of mind may be such that the patient tears his clothing, breaks up furniture, jumps, dances and shouts and often will not take time to eat. The most extreme cases which refuse food over some period of time progress rapidly to exhaustion and measures to conserve strength become imperative.

Depressive Phase.—In this phase of the disorder are encountered manifestations which are in direct contrast to those presented in the manic phase. In place of the exalted emotional state there is a depression. There is a tendency to worry over trivial matters of the daily routine and of instances in past life. Introspection is the predominant mental attitude and the whole outer world is colored by the inner feeling of worry and uncertainty. Replacing the rapidity of thought in the manic phase there is a distinct slowing of mental processes in the depressive phase. Thinking is more difficult and labored, questions are answered slowly and with an apparent effort and there is usually a tendency to avoid social life.

Again replacing the excessive activity in mania the depressions show a retarded action. There is disinclination or disability toward any effort either motor or mental. The patient feels weak and incapable of effort, the body assumes a bent attitude and the facial expression is one of despondency. The appetite is usually impaired with resultant loss of weight, the bowels are sluggish, the period of sleep reduced.

In the more exaggerated cases the retardation may be complete. Introspection is carried to the degree where the patient tries to take unto himself the responsibility for all the sin in the world. He himself is the arch sinner and he feels himself the subject of punishment by divine wrath in a manner in which no other individual was ever punished. Also the introspection tends to produce various hypochondriacal ideas. The patient may feel that he has contracted some incurable disease and that certain bodily functions have ceased operating.

Mental processes become not only retarded and difficult, but actually painful, a symptom which has been termed psychalgia. Suicidal tendencies are also quite frequently present.

In extreme conditions the patient may become so retarded in thought and activity that he apparently receives no stimulus from the outer world. He lives in a more or less stuporous state, even requiring that food be administered by tube.

Circular Insanity and Mixed Forms.—In addition to the conditions in which simply mania or melancholia are manifest there are cer-

tain cases which show variations and combinations of these forms. A common type is that in which there is an alternation of the manic and depressed conditions. The patient may pass directly from one state into the other, or there may be an intervening period of lucidity. The term circular insanity has been applied to this type. Other variations are those in which there are recurrences of the manic or depressive attacks often at more or less regular intervals, each recurrence being a practical repetition of the preceding.

There is also possible a considerable intermingling of the characteristics of the two types. In the manias may occur difficulty of thinking, passing feelings of depression and even almost stuporous conditions. In depressions there can exist a marked degree of restlessness and activity and a rapidity in the flow of ideas.

Prognosis.—The outlook for recovery from the individual attack is good. The attack may last from a period of days to one of a number of months and recovery comes with rarely any evidence of mental deterioration. There is a tendency to recurrence of the trouble. In fact recurrence is the rule rather than the exception. In the osteopathic handling of these cases it has been the endeavor to demonstrate that the correction of lesions had a tendency to lessen the duration of the individual attack and reduce the tendency to recurrence. Judging from the experience thus far gained in the observation of cases under treatment during the attack and the comparative few recurrences reported both of these aims have been attained.

Treatment.—The osteopathic measures are aimed at the correction of the spinal lesions, especially those located in the upper dorsal and the cervical regions. Some reflex effects from lesions in more remote areas may have their influence so that it is wise to look to the correction of any other structural variations when present.

Remarks by Dr. Hildreth

The mental disorders of this type are purely functional and may cover a broad scope as to causes; however, from the osteopathic viewpoint a great majority of them seem to have as their specific exciting cause, lesions in the upper dorsal and upper cervical regions. The treatment should be applied specifically to the cause which may range anywhere from the 1st to the 8th dorsal, or from the 1st to the 3d cervical, covering the nutritional and circulatory centers and thus controlling the nutrition and circulation to the brain. There can be no question but what the osteopathic theory of adjustment of physical defects forms the

basis of permanent cure, since many of our recoveries had been previously under other methods of treatment without results. Our records cover over 200 cases with recovery in more than two-thirds, and very few recurrences up to the present.

Involutional Psychosis

In the mid years of life, between forty and sixty, a decline begins, which in the older years results in decay; it is especially true at this period of the sexual life and the organs underlying it. While these organs undergo a very definite change constituting the so-called climacteric period in women, it is not at first sight so evident in men; however, the evidence is that a somewhat similar process, though much slower, tends to occur in the male. Associated with the decay of the sexual organs is a disturbance presumably of the internal secretions; if this latter disturbance takes place slowly and evenly the body may not notice any marked changes; on the other hand, if it takes place more quickly, or unevenly, it may give rise to distinct symptoms which indicate a disturbance of the nervous system in general and often even of the mentality. Hence, the significance of the term, *Involutional Psychosis*. In a large majority of cases the mental disorder is marked by the dominance of depression and is frequently referred to as *melancholia*. For a long time it was considered that this represented a special mental disorder having little or nothing in common with other psychoses. In recent times Dumas has studied this group very carefully and shown that it in reality has very much in common with the depressed phases of the *Manic Depressive Group* of psychoses. Kraepelin himself, who was the first to demonstrate the unity of the *Manic Depressive Group*, has accepted the conclusions of Dumas and incorporated the *Involutional Depressions* as a sub type of his *Manic Depressive Psychosis*. Among etiologic factors have been mentioned hereditary elements, which have been claimed to have been found in at least fifty per cent of all cases, forming presumably a predisposition; it is also stated that a predisposition may be acquired through various debilitating causes. Exciting factors are claimed to be present, such as mental shock, grief, worry and the like. The disease would then seem to occur when we have a combination of exciting factors and predisposition. Careful consideration will show, however, that no such mental disturbance occurs at this age in many people who show evidences of such predisposition and of exciting factors, therefore it would seem that still other causes were necessary; if we consider the suggestion above mentioned that there are atrophic processes taking place in the sexual

glands leading to a loss of the internal secretions and if we further consider that this may take place unevenly and in an unbalanced way, thus aiding in giving rise to the symptoms, we will find a definite point of contact for the osteopathic conception. Osteopathically considered, we may say that the spinal lesions lead to a disturbance of innervation and nutrition to the ductless glands, and therefore produce disordered secretions in those patients developing the disease, whereas such a condition may not be present in others who at the same age period do not develop the psychosis.

Symptomatology

The emotional tone of depression dominates the picture. Associated symptoms are anxiety, fears, particularly of impending danger, the loss of interest in the external world, with a concentration of attention upon self; psychic distress is usually present, often to an extreme degree, leading apparently to real mental pain, so-called psychalgia. Delusions are usually present and manifold in variety; they mainly refer to the patient himself and are of a self-accusatory nature; they frequently refer to notions of sins having been committed, also unworthiness of the patient, of poverty, nihilistic ideas, either about his own body or external things. He may claim for example that he has no stomach or kidney, or heart, that the external world is unreal and the like. His motor reactions become retarded, or even in the more extreme cases inhibited, producing a form of stupor. The inefficiency which results along with the psychic pain and distress may determine suicidal tendencies which are very frequent. Orientation is usually good, the patient remaining aware of his own identity and that of his surroundings; the judgment of course is impaired so that the patient is unable to appreciate the unreality of his delusions; as a result he sees no hope in the future and on account of present sufferings prefers death to life. The patient may remain in a perfectly passive mood, giving the appearance of extreme depression, paying no attention to the surroundings, possibly mute, giving no regard to the necessity of the toilet, paying no attention to his clothing and the like. This may continue for hours or days. Food often has to be forced on him, possibly even by the tube; the result is usually more or less emaciation and may result in marked malnutrition; similarly the sleep may be seriously interfered with, even though the patient is quiet. The resulting loss of sleep and malnutrition sometimes lead to the death of the patient. On the other hand, the patient may moan and wring his hands in anguish, walking up and down, crying

out that he is a sinner and that he wants to die and the like. This is the so-called melancholia agitata.

The physical symptoms of importance are sleep disturbances, poor appetite, with emaciation, cyanosis, often a subnormal temperature, low blood pressure, slowed heart action and weakened circulation. The hair may become gray, the skin dry and harsh and indeed any of the signs of senile decay may appear.

Diagnosis and Prognosis.—These depend partly upon the mental symptoms, partly upon the physical. On the mental side is to be emphasized marked depression, with the relatively clear orientation, resembling the depressed phase of Manic depressive insanity; also the dominance of the self-accusatory delusions. On the physical side the age period, and the evidence of previous attacks, even though very slight. The prognosis from the study of the mental symptoms depends on the presence or absence of signs of defect, or deterioration, as for example foolish and silly delusions. On the physical side the presence or absence of conditions like kidney or arterial disease; in general, it may be said if the physical findings are negative and the mental symptoms show no deterioration there should be a good outlook, particularly if the condition has not become too chronic.

A favorable outlook is always possible if the disease is treated early and the lesions disturbing the activities of the glands and of nutrition and the circulation are corrected and if the other physical findings are negative and signs of deterioration absent.

Since this is probably only a sub-group of the Manic Depressive Psychoses, as has been mentioned above, the results obtained under osteopathic treatment are noted under the Manic Depressive group.

Remarks by Dr. Hildreth

Our experience with this class of cases invariably lead us to the nerve centers which regulate and control the process of nutrition and circulation; it is a matter of keeping up normal equilibrium of all organic life and especially the circulation to the brain. The basis of the treatment therefore is to be found in the nutritive centers, as well as those centers which control the circulation to the brain, the ductless glands, etc.

Senile Dementia

Senile Dementia may be defined as an abnormal weakening of the mind arising in old age. As the word dementia implies, the intellectual change is quantitative rather than qualitative, the prime characteristic of the disease being mental loss rather than mental perversion.

It is commonly stated that a most important cause of the disease is the general malnutrition incident to age. Since only a small proportion of the aged develop dementia, this is probably only a cooperating factor. Other causes mentioned are overwork, emotional strain, traumas, intoxications (especially alcoholism), cerebral arteriosclerosis and perhaps heredity.

Pathologic Anatomy.—The disease is organic, the brain exhibiting definite pathological tissue changes. There is an atrophy of many nerve cells and a proliferation of neuroglia fibers, so that the cerebrum becomes shrunken and hard, with thickened meninges and thinned cortex, and shows a loss of weight. The cerebral arteries may or may not exhibit sclerosis, thrombosis, or miliary aneurisms, with resultant areas of softening. The cells show pigmentary degeneration and many of the association fibers have disappeared.

Onset.—The onset of this dementia is usually very gradual, the condition not being recognized until rather marked. It occurs mainly in the seventies and later and in the late sixties, being rare before sixty. It often follows financial reverses, emotional shock, or various diseases. The earliest symptoms are a change in the person's disposition, slight disorders of memory, and trivial lapses of various sorts.

As the disease progresses the symptoms become more marked and fundamental, involving not only the intellectual but also the emotional and volitional phases of consciousness. Interest in the outside world begins to flag, attention to wander, perception to be incomplete and inaccurate, association of ideas to be slow, memory to weaken and judgment to be impaired. Memory of the most recent incidents is the first to be lost, of recent years next, and then of middle age so that the patient may not recognize his own children or know, for example, that his wife is dead; finally the memory even of youth is lost and the patient is to all intents and purposes a child, his condition being an exaggeration and aggravation of that commonly known as "second childhood."

Several forms of Senile Dementia exist, of which the most common is probably the simple or non-delusional type. Other forms are fundamentally the same as the simple, but with certain superimposed symptoms. Fairly early in this type it becomes unsafe for the patient to continue in business. Due to impairment of memory and judgment he is apt to lose his property. Soon his work is poorly done or neglected entirely. He becomes garrulous and annoys his associates with tiresome repetitions of childish reminiscences, continually wandering from one subject to another. His speech becomes incoherent and his sentences

fragmentary. He grows untidy and indifferent to the ordinary niceties and conventions of life. His appetite is either poor or voracious; in the latter case the weight may keep up fairly well. He may be either apathetic or turbulent. If the former, he seems stupid, indifferent, and sleepy. He is credulous, docile, and very suggestible. Patients of the turbulent type are restless and always moving about, either depressed or elated, giving unreasonable orders and then contradicting them. Sleeping poorly, they are apt to get up and wander about the house at night. In men, prostatic disease may cause a recrudescence of sexual feeling. Patients of either type eventually become filthy, soiling their clothing, etc. Even in well advanced cases, however, senile dementals are often able to perform well certain habitual activities, such as signing their names, or playing certain games, such as checkers or dominoes.

Confusional Type.—Another form of Senile Dementia, which may in severe cases usher in the attack, but which usually, when present, is sequent to the simple form, of which it is a more severe grade, is the confusional. The additional symptoms of this type are probably due to defective elimination and the consequent toxicity. Usually unsystematized delusions, and sometimes hallucinations are present. Except for a possible occasional period of remission the confusion is continuous. It varies greatly in degree, now being mild and passive and again active, perhaps developing into delirium. Orientation as to both time and place may be lacking. Such patients may ask for dinner a few minutes after a meal, go to bed at noon, be unable to find their own room, or to recognize their own children. They are apt to be obstinate and peevish. Delusions vary in type but both these and the hallucinations are usually painful and, being referred to the patient's associates, give rise to the thought that they are trying to kill or otherwise harm him.

Delusional Type.—A third type of Senile Dementia is the paranoid form. Dementals of this type, owing to delusions of persecution and auditory hallucinations are sensitive and suspicious. Such cases may sometimes show good orientation, apparently unclouded minds, and little evidence of senility, requiring careful study to differentiate the condition from true paranoia. A patient may, on account of hallucinations of taste and smell, refuse food in the belief that it is poisoned. Members of his family who are devotedly caring for him are suspected of designs on his money, and this suspicious attitude frequently leads to unjust wills. The delusions and suspicions may be entirely concealed from the family. Wealthy paranoid dementals are peculiarly apt to become the prey of scheming adventuresses, particularly in case of the

above mentioned sexual recrudescence, and marry them. Opposition of the family is regarded as part of their general persecution or as due merely to their desire to get the estate. Some patients merely appear odd, suspicious, untidy, peevish, and childish. Some have expansive delusions and exhibit the euphoria so frequently found in syphilitic dements.

Senile Delirium.—A fourth type has been described by some psychiatrists under the title of senile delirium. This may appear as the initial form of the disease or as an acute attack in one of the above forms. It is characterized by great incoherence and restlessness, entire absence of orientation, and numerous rapidly changing delusions and hallucinations, the condition resembling delirium tremens. It is probably due to some somatic cause, such as nephritis, pneumonia, or cystitis, which is often fatal.

Complications may arise in Senile Dementia, such as apoplectic strokes, hemiplegia, epileptiform seizures and aphasia.

Prognosis.—It is evident from the pathology of the conditions that the prognosis is not at all good when the disease is well advanced. It is a chronic disease and usually progressive until death, which is due to one of the complications, malnutrition, or especially pneumonia. However, many cases have shown improvement, and in incipient stages recovery. A cure of advanced cases being impossible, the important consideration is prevention or arrest in its incipency.

It is evident that this can be done only by preventing, or removing as far as possible, the predisposing causes. A glance at the list of these shows that much depends upon the cooperation of the patient by regulating his habits of life. Physical and mental overstrain must be avoided, deleterious habits, such as the use of intoxicants or narcotics given up. Much can be done by osteopathy to eliminate the effects of these upon the organism. Cardiovascular and renal symptoms are very important and should be watched for in order that early treatment may check the process initiated. To this end the patient's habits and diet must be regulated and treatment instituted to relieve toxicity and promote elimination. Lesions must be corrected, special attention being given to the lower dorsal that affect the kidneys, the upper dorsal that affect blood pressure, and both the upper cervical and upper dorsal that affect the blood supply and nutrition of the brain.

Arteriosclerotic Dementia.—This is a mental enfeeblement arising sometimes in the fourth, but chiefly in the fifth, decade of life, and associated with symptoms of arterial hardening.

The cause is arteriosclerosis, which may be secondary to some form

of nephritis. The arterial hardening may be general or may be confined to the arteries of the cerebrum. It is likely that the arterioles supplying the cortical cells are especially involved in an atheromatous condition. The disease is organic, chronic and progressive. Hemorrhage, embolism, or thrombosis may occur, producing focal lesions and areas of softening, with hemiplegia, aphasia, etc.

The earliest symptoms may be headaches and dizziness. The blood pressure is usually found to be high but not invariably. An atheromatosis may be present in some one of the palpable peripheral arteries, such as the radials. Further symptoms on the physical side are quick fatigue, loss of energy, numbness and paresthesias of the extremities, and somnolence in the daytime or perhaps insomnia at night. Strokes may occur, usually slight and temporary, probably due to spasm in a degenerating artery or perhaps to serous effusion. Toxic symptoms appear, due to disorder in kidneys, liver, and other organs. Epileptiform seizures are possible. Mentally the patient shows impairment of memory, and perhaps some confusion and hallucinations. Rarely stupor occurs. He may be agitated and irritable or melancholy and depressed. Suspicious and persecutory ideas of the paranoid type may appear; also hypochondriacal ideas.

Osteopathic Theory.—In these psychoses of the older years of life the termination is usually dementia, which means mental enfeeblement, and which results from degenerative changes in the brain substance. As has been shown it is largely a nutritional question and the nutritional condition varies tremendously in different elderly people; it is well known that many old people preserve their brain powers fairly well to the end; on the other hand others fail relatively early, some even in the fifties; these cases of earlier failure are referred to as the "presenile type." The osteopathic conception would be to find out the source productive of the nutritional disorder and correct it at the very outset, therefore making it quite possible to prevent the disease process from taking place. The prognosis then in the earlier stages is very good.

Remarks by Dr. Hildreth

While many cooperating factors may be found in the causation of the mental disorder of elderly people, our experience shows there is always very definite disturbance of nutrition and the nutritional centers. We find chief physical interference between the 3d and 8th dorsal vertebrae, most definite as a rule at the 4th, 5th and 6th, with the corresponding ribs on the right side. Contributing causes may be found

in other areas, associated with the disturbances of the heart and circulation and of the kidney. In the cardio circulatory disorders we find abnormal spinal conditions in the upper dorsal region and especially the 5th rib on the left side. In the kidney disorders we find the lesions usually at the 10th, 11th and 12th dorsal. The above mentioned areas in general represent the centers of control of the splanchnic nerves and therefore the important processes of digestion, metabolism and assimilation. Specific treatment applied to these points is very helpful and results in marked improvement and indeed in relieving the patient's symptoms completely when in the earlier stages of the disease.

DEFECTIVE CHILDREN

By RAYMOND W. BAILEY

It is our purpose here to impress on osteopaths the almost unlimited possibilities in the study and treatment of mental conditions of children, which heretofore have been considered hopeless. Osteopathy has demonstrated that it has much to offer to this class of defectives but the profession has not thoroughly appreciated its great possibilities. It has been the custom to send these children to institutions where they have received care with some attempt toward education but with absolutely no effort being made through physical treatment to overcome their debility. We shall show that the osteopathic lesion is of prime importance in these cases, and that we have been slow to realize the efficacy of osteopathic treatment for such seemingly hopeless children. We cannot emphasize too strongly the importance of accepting and treating these cases wherever possible.

The mental diseases are considered under two general heads: (1) Inherited, and (2) Acquired Tendencies.

1. Inherited Tendencies.—In this class are those cases arising from poor endowment of the protoplasmic structure through lowered vitality of the parents or other progenitors. These taints may come from either parent, or both, and may exist in the offspring from some preceding generation. Such diseases are constitutional and are amenable to supporting treatment in direct proportion to the amount of endowed energy inherent in any given organism.

Of the inherited tendencies, we have two kinds:

1. Congenital Diseases, (a) From any influence of an inherited nature not directly acting on the environment of the parent while the fetus is in utero, and

(b) From any influence which directly affects the development of the ovum through imperfect fertilization coming through either parent or both.

2. General Impairment.—This condition exists (a) Where a similar defect has existed in foregoing generations and is strictly hereditary;

(b) Where general vitality is diminished from such causes as neuro-pathic parents, or where there have existed constitutional defects, such as tuberculosis, syphilis, epilepsy, alcoholism, abuse, overwork, strain,

acute inflammatory diseases, and poor health of the mother during gestation; also consanguinity.

(c) Premature birth tends to impairment physically and mentally of growth of organism and frequently leaves its manifestations of marasmus, rachitis and other nutritional disturbances.

(d) Prolonged labor may leave its mark on the child where more or less asphyxia has occurred resulting in obstruction to cerebral circulation.

Causes acting after birth to the already impaired germ cell and resulting in many of the afflictions of early life, both mentally and physically, are

1. Traumatism.
2. Convulsions.
3. Rachitis.
4. Infectious fevers.
5. Meningitis.

All of these seriously affect the metabolism within the newly-born, a process which is begun, doubtless with difficulty, and susceptible to easy derangement, and the same effect magnified with growth into its subsequent mental and physical deformity.

2. The Acquired Tendency.—In this the second great class are those conditions arising subsequent to conception where germ plasm is healthy but growth is arrested by some external factor either intra- or extra-uterine. Thus the acquired tendency may be given to the fetus in utero and not be considered congenital as in case of injury affecting health and growth of otherwise healthy conception. In short, the acquired has its beginning at conception or subsequent to it while the congenital is previous to conception or already inherent in the germ plasm leading to conception.

Any influence which retards the

1. Inherent capacity of cell for growth or,
2. Adequate blood supply either in quantity or quality results in enfeebled offspring and these causes are enhanced by

- (a) Traumatism or Injury
- (b) Drink or Abuse
- (c) Dirt or Unhygienic surroundings
- (d) Depravity or Ignorance

Factors entering into acquired tendencies affecting offspring direct are divided into three classes, those:

I. Before birth such as

(a) Abnormal condition of mother's health during pregnancy as in disease of any nature, mental or physical or

(b) Injury to fetus direct by blow, fall of parent, or instrument.

II. During Birth from:

(a) Abnormal labor from any cause.

(b) Primogeniture.

(c) Premature birth.

III. After Birth.

(a) Traumatism.

(b) Toxic causes such as scarlet fever, whooping cough, meningitis, measles, mumps and exanthemata.

(c) Convulsions.

(d) Nutritional disturbances.

Consanguinity or intermarrying of blood relations, or in-breeding results in:

1. Instability of the nervous system.
2. Intensifying of constitutional defects.
3. Decrease in size of offspring.
4. Predisposition to disease through lowered vitality.
5. Impairment of reproductive function.

Immediate consanguinous offspring may manifest a high degree of intellectual or physical attainment but successive processes tend to neurotic types and are prone to physical weaknesses and insanity. This practice is found among Quakers and Jewish peoples, inhabitants of the Islands north of Scotland, in isolated rural localities, and among African tribes.

Mental Deficiency in Children

Synonyms.—Amentia; feeble-mindedness.

There are three grades of amentia:

1. Morons: those whose mental age corresponds closely to their chronological age or is nearly normal.

2. Imbeciles: those in whom there is a wide disparity between the mental age and the chronological age.

3. Idiots: the lowest form of arrested mentality or those whom it is impossible to teach.

Definition.—Mental deficiency is a pathological stage in which the mind has failed to attain normal development.

Various degrees of intelligence or mental capacity in man lie between:

- (1) **Genius** such as Bacon, Newton, Plato, Galileo, Shakespeare.
- (2) **Lesser Ability** but still conspicuous in development such as our great leaders in science, literature, reform and the arts and medicine, furthering, each their respective causes. These merge easily into
- (3) **Average** mass of mankind.
- (4) **Dullards** or those of inferior intelligence.
- (5) **Feeble minded**, merging imperceptibly into
- (6) **Imbeciles** and by insensible gradation into
- (7) **Idiots** and gross idiots.

The mentally defective is wholly incapable at maturity of adapting himself to his environment or local conditions in order to maintain existence independent of any external support.

Dementia is a disease of the mind or that which was once possessed, and by some neuronc disturbance is lost totally or partially.

Insanity is a disturbance of neuronc function which may or may not end in degeneration of brain tissue.

Physiology.—The normal brain begins its development shortly after fertilization of the germ cell, by the expansion of the anterior end of the rudimentary spinal cord into four primary cerebral vesicles. These develop into a series of elaborate infoldings, each with multiple cells around them. At or about the sixth month of fetal life this embryonic brain assumes the shape of the adult brain, minus the secondary fissures and convolutions which are characteristic of full development.

At birth there are sometimes many convolutions and the brain weighs from 280 to 330 grams. Growth is then rapid and at six months it weighs from 560 to 680 grams;

At one year, 750 grams. It continues to increase until

At 12 to 14 years it weighs 1150 grams in the female, and 1300 in the male;

At 20 to 21 years the weight is 1244 grams in the female and 1374 in the male.

Growth is slow from this time until at 25 to 35 years the average weight of the brain is 1269 grams (45 oz.) in the female, 1421 grams (50 oz.) in the male.

This growth of the brain is due, first to the rapid multiplication of nerve cells and, secondly, to the individual enlargement of each nerve cell. These cells arise from the floor of the four primary vesicles and are each similar to its fellow. They finally show differences in feature and

become characteristic in size and shape which process continues throughout life. This process of differentiation of nerve cells results in the peculiar laminated appearance of the brain cortex. At the period of lamination, the nerve cells throw out delicate processes which pursue definite directions throughout the brain mass constituting a system of association fibers which link together in a most complicated manner all parts of the brain, and are called the association fibers of Flechsig. Projections from these cells form the various pathways by which the brain is connected to the various parts of the body.

Nerve cells in the different parts of the brain mature at different periods, those areas which have to do with the highest intellectual functions, viz., the frontal and parietal regions, maturing last.

At the seventh month of intra-uterine life the brain cell is a small round type of neuroblast, undifferentiated, lying in a matrix. The cells increase in size until about the second week (extra-uterine) of life, tiny processes begin to develop. At the third to fifth year these cells are mature and possess axons, dendrons and geminules. These communicate, forming the above-named association system conveying impulses to and from all parts of the cerebrospinal system. They multiply and elaborate after puberty into a complicated system up into middle life after which growth ceases and they slowly diminish.

Greatest Growth is between the first appearance of the primitive brain and the end of the sixth month of life (extra-uterine), hence it is during this period that any adverse conditions relative to development of nerve cells may cause the greatest damage.

Mind and Brain.—Whatever may be the connection between these two, we know that the former develops with the growth of brain cells and fails with their decay. **Amentia** is associated with the incomplete development of brain cells and **Dementia** is coincident with their degeneration and death.

Pathology—Brain.—Structural abnormality of the brain tissue may exist without variation of mentality or defect. Early observers gave these gross defects as a cause for amentia. However, it has been demonstrated beyond doubt by microscopic examination of cerebral neurosis that cellular changes occur and that imperfect and arrested development exists and is an essential basis of amentia.

Histology—Blood Cells.—Cortical blood cells in the ament are

1. Numerically fewer.
2. Irregular in arrangement.
3. Imperfectly developed.

4. Microscope reveals changes proportionate to the deficiency during life.

Blood-vessels in Amentia show no marked changes from those of the normal brain. Hyaline degeneration may be present; also pigmentation. These conditions are not constant in amentia hence cannot be considered causal.

Neuroglia in Amentia.—Sclerosis and hypertrophy occur in a large proportion of cases. This is diffuse throughout the brain, with here and there certain circumscribed areas forming nodules.

Nerve Fibres of Cortex in Amentia.—Association system fibres are always diminished in number and not so complicated.

Clinical Varieties of Amentia.—There are two varieties of amentia and conventionally for sake of study we must arrange them into those from

(1) Congenital causes and (2) acquired causes.

Among those which arise from congenital causes we have the microcephalous and Mongolian types. In both cases there exist constitutional taints through successive or immediately forgoing generations of such diseases as syphilis, tuberculosis, epilepsy, and acute alcoholism affecting proper collaboration of germ cells previous to fertilization and hence impaired germinal endowment through a weakened nervous system.

Those arising from acquired causes are from injury to mother or fetus.

Microcephalus.—A person whose skull measures less than seventeen inches in its greatest circumference. This class comprises less than 10% of all aments.

Cause.—The type is neither a freak reversion of the species to a lower grade of development nor accidental, but due to an inherited blight on the nervous system arising from constitutional disease, alcoholic and sexual excesses, consanguinous unions and too numerous latter-life pregnancies in undermined health states. They come entirely from neuropathic stock and their brothers and sisters are degenerates. Many dwarfs exhibit this type.

Characteristics of Microcephaly.—(1) Circumference of skull diminished; (2) Brain smaller; (3) Stature small (5 feet); (4) Rarely live to advanced age; (5) Die of tuberculosis; (6) Mostly imbeciles and idiots (few morons).

They have their sensory impressions intact and are generally vivacious and muscularly active, even restless. They have good sight and hearing and are highly initiative but have not the ability to any sus-

tained effort. They are actively observant and the majority are affectionate and well behaved. Some are unsteady in walking, others are helpless, and about one-half are subject to epileptic fits.

Mongolian Amentia (Mongolism).—This type (Kalunk or Tartar variety) received its name from Dr. J. Langdon Down from their facial resemblance to members of the Mongolian race. They number about 5% of all aments including the semi-mongols who have only a few of the characteristics of this type.

Cause.—Eleven out of twenty-five are from syphilitic origin. Glandular or nutritional defects are suggested as a cause. They will show negative Wassermann test and positive tuberculin tests. Uterine exhaustion and ill-health of mother during gestation are factors suspected of entering into this condition. The latter-born of large families are frequently affected.

Pathology of Mongolian Idiocy.—The brain of the Mongolian ament is considerably under-sized and has less convolutions and is more shallow. The pons, medulla, and cerebellum are about half the size of ordinary feeble minded types. The cells by microscopic examination show an immature condition. This lack of brain development results in deficient expansion of base of skull, hence the characteristic physiognomy. There is no glandular abnormality.

Description of the Mongol Type.—This type is distinguished by characteristics of skull, eyes and tongue and is usually observed at birth

1. The skull (Brachycephalous) is rounded and diminished in size particularly through the antero-posterior diameter. The face is flattened, there being no recession of frontal and supra-occipital regions.

Eyes.—The palpebral fissures are narrow and slope obliquely downward and inward. Lids inflamed.

Tongue protrudes, is large and marked by large papillæ and scored by transverse fissures due probably to tongue sucking, predisposing to inflammation of the mucous membranes.

Ears are small and round and have poorly developed and irregular lobules.

Nose is short and flat and has triangular nostrils.

Teeth are soft and ill formed and tend to decay.

Hair is usually scanty and wiry and very dry.

Cheeks are flushed. Palate is high and narrow and mouth is open, and lips are cracked. Adenoids exist in all cases.

Hands and Feet are broad and clumsy. Flat foot and knock-knees are common. Skin is rough, coarse and dry.

Abdomen is large and mushy. Umbilical hernia often present.

Circulation is rarely good, causing blueness and coldness of extremities, with sores and chilblains. Heart lesions are frequent. Lesions of a chronic inflammatory nature in respiratory and digestive tracts exist. Nasal and bronchial catarrh and diarrhea are common. Mongols die early (about 14 years) usually of phthisis.

Available statistics show the various types and variations of these conditions in great detail; however, the above will enable the reader to classify and properly diagnose in given cases. It is not the writer's intention to portray here what is easily a treatise by itself.

Osteopathic Consideration of Amentia.—During a period of five years, observation of the various types has led me to believe that much can be done to correct circulation to cerebral structure with consequent development of brain tissue and function, where discoverable trauma exists. From all available sources there is traumatic interference in from 15 to 45% of these cases, according to different authors. Where history involves constitutional findings (syphilis, tubercular, glandular and chronic alcoholism) I have treated them with the intent of relieving only until the next phase of the condition would appear. Where trauma alone exists and the family history is good, I know the case is in the field of osteopathy alone, and can be developed to a degree limited only by the intelligent care of those having the case in charge. Especial attention should be given to discipline, housing, sanitation, personal hygiene and general environment.

Lesions.—Atlas, generally rotated. Rarely posterior but frequently resting beneath a posterior occiput. Lateral mass on the posteriorly resting portion of misplaced atlas will become interlocked with transverse process of axis in a few instances, combining the amentia with a progressive inflammatory tendency to the middle ear which by successive abscesses ultimately destroys structure and function; possibly traumatic epilepsy, and surely catarrhal inflammations in all mucous membranes of the head.

Many bony and ligamentous irregularities exist in the various types of mental defective where the cause is inherited weakness, nutritional diseases or kindred sources. Spinal luxations exist singly and in series, causing various palsies, spastic muscles, and deformity. Postural defects, particularly of ribs and costal cartilages cause functional disturbance throughout the thorax and abdomen.

Treatment.—Invariably the care of aments entails wisdom of procedure. Reconstruction is the prime object in every instance, hence time and number of treatments must not be considered. Treat to **correct structure; teach** as far as possible; **train** always.

Deft and intelligently applied technique are certainly required in the correction of these cervical lesions. Treatment should be given thrice weekly (never less than twice for progress) with definitely established mental tests before, to discern the mental level, and at succeeding periods of three months each, noting progress, if any. The Binet-Simon scale or some other available mental test should always be made and record carefully kept of each case for your own benefit as well as the patient's. After six months, if no appreciable gain is shown treatment is discontinued and the case must be cared for in another manner as beyond your special field of effort. Usually it is apparent by the end of the third month if anything can be done to improve the mentality. The physical advantages, in some cases warrant continued treatment where there is no appreciable mental gain. Institutional care of these types is the only practical means of handling them properly from an osteopathic standpoint, as it requires some one properly equipped to make your tests and keep your record;—it is sufficient for the doctor to do the work demanded. They can thus be classified and progress systematically shown. The higher grades must be taught and though self dependence may never be attained they can in many cases by training be capable of useful pursuits and quite frequently remunerative work. It makes for happiness at least to keep them busy and forestalls the mischief that would otherwise result. Even imbeciles can help in routine work of an institution or home, and idiots may, by training, gain some power of self help and cleanliness. Training depends on the individual capacity for such in each case—his habits, and general character of his propensities. Prevention of their marriage should be positive and for prevention of their propagation this and their sterilization by operation are the only two measures at hand. Sterilization, however, is repugnant to some elements of society and could be abused, hence the segregation of aments would appear to be our only solution at present. The ultimate intention of treating any case is to use any measure tending to stabilize the nervous system. Corrective effort alone is not sufficient but these osteopathic endeavors in conjunction with proper discipline, good food, regular rest and personal hygiene both mental and physical and a scrutinizing restriction tending to any kind of excess is rendering the osteopathic procedure in such cases rapidly indispensable for the treatment of amentia.

POST-OPERATIVE TREATMENT

By GEORGE A. STILL

At the convention of the American Osteopathic Association held in Boston in 1918, I gave a short talk on the above subject, and during the day after I had given the lecture, two women and one man, graduate osteopaths, asked me if I really meant to convey the impression that we actually gave osteopathic treatments to recent surgical cases. I do not know whether I convinced them or not, but I do know that they convinced me that there are people practicing osteopathy who have absolutely no concept of its merits and underlying principles.

To my surprise I have found that a great many osteopaths who consider themselves absolutely "pure" are just a bit startled at the thought of handling post-operative complications by treatment. These are invariably fellows who have had most of their experience in office work, and who do not come in contact with acute cases. Still it is difficult to conceive how a man can believe that osteopathy is specific for certain diseased conditions and not for others. As a matter of fact osteopathic treatment has not proved itself more satisfactory in any field of therapeutics than it has in post-operative conditions.

The common post-operative conditions are pneumonia, pleurisy, backache and headache, nephritis, vomiting, neuritis, phlebitis.

Taking up these subjects and discussing the least serious first we would of necessity discuss pneumonia last, as it is the most serious, and is less influenced by other conditions. It will also serve to illustrate many of the details in treatment.

We will therefore briefly take up the other conditions and then discuss pneumonia more fully.

Vomiting

We believe there is no question that a good part of the prevention of anesthetic vomiting is in the preparation of the patient, including a good cleaning out of the bowels without debilitating cathartics. In other words, the vomiting is increased if the alimentary tract is loaded, or if on the other hand it has been irritated to the extent of losing its tone. Combining a careful preparation with a straight ether anesthesia and osteopathic treatment to the neck and splanchnics we have been able to eliminate any serious post-operative nausea. I do not recall a case in the last few years that vomited on the following day unless the con-

dition for which they were operated was one that essentially in itself would cause vomiting; for instance if the patient had peritonitis and had been vomiting due to the toxic ileus. They might even vomit after the abdomen had been opened. This could hardly be called "post-operative" vomiting.

The improvement in our records in post-operative vomiting is in proportion to our increased faith and use of the osteopathic treatment. Time and again patients have told us that they had taken anesthetics before and were sick from three to five days and even a week. Invariably we have been able to surprise these patients by the fact that they were sick less than a day.

The usual treatment with bismuth sub-nitrate, cerium oxybate, sour wine and the other usual remedies were not used in any case or in any amount. No drugs whatever were employed.

Backache and Headache

There is practically no difference in the post-operative headache and the office headache. There is of course the usual multiplicity of causes, and as a matter of fact in this condition treatment can more nearly approach the ordinary office treatment, and the results are about the same. As for backache, we find that speed of operating and not keeping the patient under the ether too long has a marked influence. Also we have a four inch Seely mattress on the operating table which helps some. Treatment does the rest and does it effectively. For this complication even the ordinary nurse knows enough to give a treatment of some sort.

Neuritis

Nine times out of ten the post-operative neuritis is really a local osseous lesion, a slipped innominate, rib, vertebra, clavicle, biceps tendon or something of the sort, and responds quickly to a specific treatment.

Phlebitis

This complication usually comes on quite late after an operation and at first it is sometimes hard to differentiate it from a neuritis. Absolute rest of the involved part with lower spinal treatment gives relief, but under no circumstances should the affected part be freely moved while there is active inflammation. The reason for treatment of the lower spinal area is that practically always one of the saphenous veins is involved.

Nephritis

This complication is to a very big extent eliminated by a careful urinalysis prior to the operation, and careful preliminary treatment in indicated cases, and in other cases the postponement or if necessary completely elimination of the operation where it is not a case of life and death. Where the condition does appear we have found it the hardest of the post-operative complications to control. Indeed it is the only one that we have not found very easy to manage.

We do not vary the treatment for a post-operative nephritis from what we would use in any ordinary case of nephritis. We have observed treatment of this condition in many cases under medical management, and while we are satisfied with the osteopathic treatment comparatively we are not yet satisfied that we have it developed to its greatest efficiency.

Pleurisy

This condition in nearly every instance can be corrected with one or two treatments of a twisted rib unless it is the pleurisy of a beginning pneumonia. As far as the pain is concerned the simpler type hurts as much as the one that is going to develop a real complication. For this reason relief obtained by a single treatment often seems little short of miraculous to the patient.

Pneumonia

When I took charge of the surgical work at Kirksville, osteopathy was not used in post-surgical treatment. Post-operative vomiting was treated medically, as were other post-operative conditions, including pneumonia. Cases of a real major surgical nature rarely got an osteopathic treatment.

The idea seemed to be that osteopathic post-operative treatment had to be along the same lines as it would be for such an illness as lumbago, brachial neuritis, or ordinary pneumonia, and other non-surgical conditions where the patient could be placed for giving a treatment in a position that was not permissible following an operation, as it would work great harm to the wound.

It seemed to me that if osteopathy was effective in a case of ordinary non-surgical pneumonia, it should certainly be good for a case of pneumonia that was post-operative and that all we had to do to handle the condition was to apply a new technique of treatment that could be used on a patient who had a surgical wound. All we had to do was to so

manipulate the spine that we would get the results locally, and yet handle it in such a manner as not to affect the wound.

Many laymen, and even some physicians of our own school, express surprise at the suggestion that we do much osteopathic work in the after care of surgical patients. But the fact is we have worked it out so that now, except for pain, during the immediate after effects of the operation drugs are absolutely not used in our hospital for any of the post-operative complications. The opiate immediately following the operation, is really a follow up of the anesthetic, and we use that as rarely as possible. Needless to say, there are cases such as un-united fractures, extensive adhesions, etc., where the emergency conditions positively call for some relief of the pain for a short while, but that is the only condition that we cannot control with mechanical treatment.

I am very glad that I had the confidence to give this an early trial and a thorough trial, without being afraid to leave off the drugs. The big field, however, where osteopathic treatment has won the most impressive success and proved itself a most absolute specific, is in the field of post-operative pneumonia with which I am proud to announce a one hundred per cent. success for combined osteopathic treatment in my fourteen years continuous surgical work. Not to have lost a single case is partly due to luck. In other words, with any series of serious cases, it is impossible but that there be some fatality finally.

Post-operative cases have one advantage along with their disadvantage. While they have the shock of the operation to contend with, and the weakened condition from the disease for which they were operated, still except in extreme emergency they would not have been operated on unless they had a good heart and good kidneys and a good blood pressure, so that in cases in which we are most concerned in combatting pneumonia, we usually start with a patient who has those organs in a healthy condition.

First Post-operative Pneumonia Cases Treated Osteopathically.—At the Chicago Convention in 1911, I reported the first post-operative pneumonia cases that had been treated osteopathically. I believe at that time that there had been only three cases. At that meeting I mentioned the fact that some of the doctors and some of the internes who treated those cases felt sure that they were not treating them properly because they could not get away from the idea that pneumonia needed strychnin and other drugs. One of these cases got well in three days from the developed lobar pneumonia symptoms. The results were so miraculous that the young man treating it began to doubt

whether it could have been pneumonia. He could not understand how he, a senior student, could overcome this dreaded disease by merely working on the spine. He could not believe that osteopathy, a science that he had been able to learn himself, so easily could cure a condition that he had thought must be almost necessarily fatal.

One of the weaknesses of osteopathy is the fact that there is no mysticism about it. It is so simple that any person with ordinary intelligence can learn to use it, and yet it is so simple that it takes an unusual intelligence to be able to grasp the fact that it is the therapeutic discovery of the age. Many, many times I have had young internes and students cure genuine lobar pneumonia and do it with such obvious ease that it caused them to wonder, in a way, if it really could be pneumonia. It is bred in our very tissues to look for some mysticism, something impossible to understand, something supernatural, something connected with the Unknown associated with the treatment of disease and accordingly it is just human nature to find it difficult to believe, even when we see it, that a simple method of treatment can actually effect a cure.

Real pneumonia, as we understand it, is a consolidation of the lung tissues characterized by fibrosanguinous exudate into the pulmonary tissues and spaces, associated with one or more particular germs as exciting factors and proved by the physical tests and the character of the expectoration. How many cases have been cured that had not entered consolidation I do not know because up until the time of actual consolidation there may be a question as to whether or not they would have had pneumonia. I know that many cases with marked symptoms of pneumonia have failed to develop under treatment or the case has been aborted.

Pneumonia lacks a great deal of being a self limited disease. The number of cases with beginning symptoms that fail to develop is too great to be ascribed to coincidence. Of course I know that some of these might have been only pleuritis, some only neuritis, etc. However, in giving the statistics of pneumonia cures we will give only those in which pneumonia developed and showed a hardening or consolidation of the lung tissue. In these cases there can be no argument as to whether there was pneumonia.

When we have an acute condition associated with the symptoms of consolidation, we can hardly be confused as to the diagnosis. We may make a mistake in our physical findings, but hardly after a little experience, and certainly when we are sure of the physical findings there will be no trouble in naming the disease.

The Clinical Findings.—Post-operative pneumonia is a little different from the common pneumonia. It always comes on a little more insidiously. One has to watch for post-operative pneumonia more closely than he would for the attack that we may meet in ordinary practice. A patient may have considerable pain from his wound, may have some pain in the back from the position he is in; there may be headache, and an upset feeling from ether; and the pain comes in the chest. All these symptoms are forerunners of pneumonia, but the pain in the chest is not noticed until it gets quite severe. In other words, there are other things to annoy the patient as well as the attendant, and at first, this condition does not cause complaint. A strong and healthy individual who feels a pain in his pleura, which is the forerunner of pneumonia, knows it at once, because that is the only distress he has. His entire attention is attracted and he asks for a physician's help. But in the post-operative case, the physician has to keep a look out in order to prevent a case from getting well under way before it is recognized.

As an example of this I had a case of a man who was with a party driving an automobile and they tried to cross the railroad track in front of a train. This patient I speak of was one of the survivors. He had a fracture of the femur, fracture of the skull, fracture of three ribs, and otherwise more or less bruised up. Naturally the preliminary work consisted in getting the ribs and legs attended to as well as possible and looking out for cerebral hemorrhage or meningitis.

This patient developed consolidation in both lungs in spite of regular treatment, and it precipitated on him very rapidly, partly masked by the disturbed breathing from other sources of irritation. We put him on hourly treatment, but after a few hours his condition from the injuries and the pneumonia was such that his wife asked us not to treat him any more. She put it this way, that she knew he would die in spite of all that could be done and as long as he was going to die he might as well die easy. Every time he was treated it had the effect of bringing him out of his stupor, and he would complain, and she thought it would be a kind act to let him slide off into the next world uncomplaining.

Pneumonia in a case of this sort cannot be handled with kid gloves if we wish to save the patient. We must give firm, strong treatment. Light treatment in this condition will do no good. Indeed light treatments in any sort of pneumonia are of little avail. Many times I have changed internes in a pneumonic case that was not responding and the results were immediate. That is, the turn for the better was obvious from the beginning of the good strong treatment.

The case above mentioned was treated a good part of each hour for twelve hours. He had no strychnin, no oxygen, nothing but treatments, but he got well and is now living, and aside from a limp has no evidence of either his injury or his illness.

Some cases, in private practice, may get well on a treatment a day, but I would hate to handle the kind of cases we get in that manner. I have had severe cases, especially hemorrhagic cases, where the treatment was almost continuous for hours preceding the crisis. Of course, after the crisis we can ease up. On the other hand, it is not infrequent that a few good strong early treatments, given at the beginning of a case absolutely stop it. I have seen cases where a consolidation area of the apex of the lower right lobe as large as the palm was easily outlined, and this together with the clinical symptoms would be cleared up in two or three days.

There is no possible medical method by which this can be done. Medical authorities agree that under their treatment pneumonia runs an unshortened course; in other words, a course in the individual case that has not been affected by the medication. Medically, even where the crisis occurs early, the consolidation persists for some time, but I have seen it cleared up time and again under osteopathic treatment in the length of time that could have been brought about only by osteopathic treatment.

I have previously called attention to the fact that many of the medical text books on physical diagnosis mention a point that is a very practical and very plain demonstration of the efficiency of osteopathy in pulmonary conditions. These books only mention this fact without pointing any moral or drawing any conclusions. The point is this: that frequently when a professor is having a class or a section of a class examining a case of pneumonia, they will outline the size of the consolidation at the beginning, the instructor marking it off when he makes the first examination; then after the students have examined it, by percussion, palpation, etc., possibly a dozen or twenty of them, the later students will find that the area has shrunk perhaps an inch. This fact has been frequently noted. It is said, indeed, that if careful examination is made it will always be noted.

How Manipulative Treatment Benefits

Doubtless this proved that accidental manipulations of the ribs helps clear up the congestion about the real consolidation and reduces some of the dull area. Very likely this explains some of the cases of

partial or real results from spondylotherapy. Naturally, scientific osteopathic treatment would necessarily magnify such results very much.

It is a great wonder with the obvious failure of medical treatment in pneumonia, that at least some crude form of manipulative treatment has not been devised by those practitioners. We have already mentioned that the treatment of post-operative cases varies mainly in the manner of applying it. In other words, when we raise the ribs we keep the patient on his back, in treating the spinal centers we treat with patient on his back, and the physician who has no grip in his hands will not be able to treat a post-operative pneumonia to any advantage.

In these cases one has to get at the patient's back by reaching under and the weight of the patient helps to give the treatment, but a strong grip is necessary. It is much safer for the wound to handle the patient in this way but not infrequently beginners wear their knuckles pretty nearly off before they get the finer technique; after which it is easy. In raising the ribs there is no more difficulty in treating in this position than there is with a patient who can sit up or turn from side to side and in some cases a patient can, of course, be partially turned.

Theory is all right but in these cases practice has been added to it in something over three hundred cases treated in this manner, and in this manner only. I have had no case die. None of my cases had oxygen and none of them had strychnin or alcohol unless it was a person who had used alcohol constantly or daily and in these cases I consider that the system has become sufficiently used to it that it is practically a food and that sudden withdrawal is apt to bring on delirium. It is not necessary in those cases that indulge deeply now and then, but it is advisable in those that take a small amount regularly, just as they take food. These patients are used to a constant heart stimulant and its withdrawal is also apt to be reflected in the heart action. These are the only cases in which I have ever authorized anything in the way of a chemical stimulant of the heart during pneumonia.

You will undoubtedly recall that in reading the newspaper accounts of men who are big enough and prominent enough to have bulletins in the newspapers when they are dying, that almost universally the next to the last bulletin was that oxygen is being administered. The last bulletin announces the time of death. You will also note that in case the patient lives that oxygen then is not mentioned, and a few days later the patient is all right. My observation is that the use of oxygen may attract the attention of the family, it may attract the attention of the patient, but as for any actual benefit on the patient I do not believe it

is in the least helpful, and that the only treatment for pneumonia is osteopathic. I am so convinced of it that I am using only that method.

As to strychnin, some say strychnin must be given. Some say it must be given at the crisis, and others say it must be given from the inception of the disease. I do not believe the majority of cases will do as well under strychnin. I know they will not do as well under strychnin as under osteopathic treatment. I will not say they will not do as well as if under no treatment. It is possible that there would be an occasion for its use at the crisis, and I have seen such cases, and I have used it while studying medicine. I used it at the crisis, and I used it in cases where I am convinced that it helped them over the crisis, but I am also convinced now that by osteopathic treatment they would have done still better and the crisis would not have been so acute. In other words what strychnin does in favorable cases, osteopathic treatment does better in all cases.

In our post-operative cases study the charts and you will see that they do not have the acutely violent crisis that usually occurs under other treatment. They are under better control and if we can get them near the beginning, as we usually do, we can keep up the resistance so that where they would otherwise have a hard crisis they have an easy one. Instead of having a temperature of 105, pulse 165, respiration 70, or such a condition, they are more apt to run a temperature of 102, pulse 120, respiration 35 or 40 and they go through it without that suddenness and acuteness that is common under other methods of treatment.

In several instances, as an example of showing how this resistance is kept up, I had letters from boys in the camps. One letter told of a wide epidemic of severe tonsillitis. In one group of soldiers there were three osteopaths who treated all the men and this was the only group that was not sent to quarantine. This group developed sore throat and was treated osteopathically and the sore throats checked so that quarantine was unnecessary.

Among the detailed reports in the A. M. A. Journal there will be nothing about this, nor about many other instances where osteopathic treatment, given by men forced to remain in the ranks, has done things that medicine cannot do. These examples are too frequent to be coincidents. If I had had three cases of post-operative pneumonia and they had all got well, it would not be surprising. If I had ten cases and they all got well, there are medical hospitals that have been this lucky. But there are no medical hospitals in the world that can report one hundred cases or two hundred cases or three hundred with developed pneu-

monia and all lived. The percentage of pneumonia cases that die now in medical hospitals, is much less than formerly. But the cause of this is not vaccine, antitoxin or drugs. It is due to the fact that pneumonia cases now, like typhoid, are given very little medicine and are turned over to general nursing treatment; that is, in the best medical hospitals.

The mortality is in inverse ratio to the drugs given. The advance medical teaching is against so much drugs in pneumonia, though of course the hick doctors use it because they are practicing medicine of the by-gone age, before Andrew Taylor Still forced on the world the idea partly started by homeopathy, that the less drugs the better. Homeopathy failed in not quite discarding drugs and in not having a substitute that reprieved drugs.

As a matter of interest I wish to mention that while in medical college I had the advantage of being taught surgery by the greatest surgeon that ever lived, John B. Murphy. I only wish that circumstances could have permitted me to have shown him what osteopathy could do in post-operative conditions, because Murphy was a broad minded man and no man living ever thought less of orthodox medicine and old fashioned drug treatment than Murphy.

He and the Old Doctor would have been great friends had they ever met. Murphy, whom I considered a most wonderful surgeon, and whose skill I never hope to approach, stated to me many times while a student that he lost more cases from post-operative pneumonia than any other condition and that in upper abdominal conditions like gall bladder, stomach, and similar operations, post-operative pneumonia constituted the most of his mortality.

This great man was afraid of post-operative pneumonia, while I, a much less skilled surgeon, am no more afraid of post-operative pneumonia than I am of something occurring in a distant state because with osteopathic treatment, we have eliminated post-operative pneumonia as a fatal condition.



PART SECOND



INFECTIOUS DISEASES

Fever

Fever is due to various causes, so that a definite statement cannot always be given as to the cause of fever in every disease. Each fever case, like all other disorders, is a law unto itself; different causes are found in different cases. Moreover, often only theories, and not absolute facts, can be given.

Fever may be present when a local disease assumes a constitutional character or when the constitutional character is manifested from the beginning of the disease. Fever may be a systemic disorder or a symptom of disease, and is characterized by an increase of body temperature.

- Other symptoms are usually present, as an accelerated pulse, disturbances of distribution of the blood, increased catabolism, and disordered secretions.

Etiology.—In infectious diseases fever is due chiefly to the action of various toxic or harmful agents, produced by the disease, upon the fluids of the body and upon the nervous system. Disturbances of the thermogenic centers and nerves of the brain or cord by harmful agents, or by lesions of the anatomical structures affecting these nerves, are sources of fever. Also disturbances of the vasomotor centers (in the medulla and auxiliary centers along the cord) and nerves are causes of fever in many instances. A disturbed or lessened function of the nerves controlling sweating is an important factor. The multiplication of micro-organisms in the body, acting directly on the tissues or by producing toxic substances which affect the nervous system, is a fruitful source of fever. A few cases may be caused by direct affection of the nervous system, as is shown by appearance of fever in epileptic attacks, or by the passage of a catheter into the bladder. In a large number of all cases a demonstrable cause can be found upon careful examination, whether the fever be due to a necrosed mass of tissue, the introduction into the system of decomposed food, infectious diseases, a lesion of some anatomical structure affecting a thermogenic, vasomotor or sweat center, a lesion to the innervation to the heart (vagi and cervical sympathetic) causing a rapid heart, or a lesion to the lymphatic system.

Treatment.—The treatment of fevers in a general way consists principally of thorough inhibition to the posterior spinal nerves of the upper cervical region in order that the center of the vasomotor system in the medulla may be affected, probably by the way of the superior cer-

vical ganglion of the sympathetic. Thus the entire vascular system is equalized, for there is always a disturbance in the distribution of the blood in fever and if the center controlling the nerves that govern the lumen of the blood-vessels can be brought under control, there will result an equalization of the vascular system; if such occurs, health must ensue. Besides the vasomotor nerves to the blood-vessels being affected by this treatment, the nerves governing the lymphatics and the sweat glands will also be controlled. The sweat glands as a rule are rendered active by affecting directly the innervation of the glands, also the glands are controlled indirectly by the blood supply; this aids materially in lessening the temperature of the body. Treatment for a few minutes to the upper posterior cervical region would also affect the thermogenic centers and nerves of the brain reflexly in the same manner as the vasomotor and sweat centers and nerves are affected, thus tending to equalize the mechanism of the thermogenic system. Besides this action on the vasomotor, sweat, and the thermogenic nerves, there is produced an increased exhalation of moisture from the lungs, on account of an increase of vascular area in the lungs through vasomotor action. Also the large vascular area in the abdomen, under control of the splanchnic nerves, becomes constricted. Thus there is brought about a lessening temperature by evaporation, heat radiation, and perspiration; and an increased action of the general nervous system, a stronger cardiac force, an equalization of the vascular system, and a more perfect elimination of toxic properties by the skin, kidneys and lungs; consequently a reduction of the fever.

The foregoing treatment is successful to a limited extent, only in such cases where causative factors of the fever are involving the predominating centers controlling the heat production or dispersion and the vasomotor system directly; for if the lesion that is causing the disorder should be affecting an auxiliary center along the spinal cord instead of the predominating center, as is oftentimes the case, treatment of the predominating center would be useless as far as any permanent benefit is considered; although a temporary effect will be gained by lessening the fever at that point. Consequently, in many cases, the lesion lies within the jurisdiction of auxiliary centers which are situated at various points along the spinal cord. When such is the case, it will be of little benefit to give the cervical treatment. In such instances the lesion to the auxiliary center would have to be removed in order to cure. One cannot depend upon a set rule to reduce a fever; determine the cause, as in any other disease or symptom, and remove it.

In addition to the treatment to the cervical region and along the spinal column, as are indicated upon an examination, attention should be given to the heart's action. The equilibrium between the accelerator and inhibitory nerves (cervical sympathetic and vagi) should be maintained. The interchange of gases in the lungs should be rendered as nearly normal as possible; this is best accomplished by raising and spreading of the ribs from the second to the seventh dorsals, particularly in the region of the fifth and sixth. Also stimulation of the vagi will aid by increasing the motor power of the lungs. The kidneys and bowels should be kept active so as to favor a rapid elimination of various toxic properties; besides they have control over large vascular areas. Treatment over the ureters will prevent any clogging that might occur in them from a condensation of the urine. Attention, also, should be given the tissues at the fifth lumbar and over the iliac vessels to influence the circulation in the pelvis.

The **food** of the patient should be liquid—milk, soup, broths, etc., and almost any quantity of water allowed if called for, given little at a time and at frequent intervals. The room should be well lighted, ventilated, clean and kept at an even temperature.

Two points should always be remembered relative to fever:

First—That there are many causes of fever; and in order to reduce the fever the cause must be determined and removed, the same as in any disorder. A definite fever treatment cannot be given any more than a definite constipation treatment; the case must be seen in order to determine the cause.

Second—The reduction of fever is not necessary; the fever should be treated only as a symptom of disease when it exists as such. In fact, fever is beneficial, for it is one of nature's methods to relieve an overburdened system from harmful agents, unless the temperature is excessive and continuous and is likely to cause more harm than the primary trouble.

Absolute **rest** in bed always is of decided benefit in lessening the temperature.

Hydrotherapy is of immense value in reducing a fever. It is an agent that has been greatly used, and if applied intelligently cannot but be of aid. There is much ignorance in regard to the principles and practice of hydrotherapy, not only among all classes of people, but among well informed practitioners in medicine. The most important function of the skin is as a heat regulator. Knowing this fact, the osteopath treats the vasomotor nerves that control the cutaneous circulation and

the nerves that control the excretion of the skin; the nerve supply being from the cerebrospinal and sympathetic nerves. In many difficult and obstinate cases hydrotherapeutic measures should be used to aid the skin in regulating the temperature, as well as to enhance system functions for the same reason that osteopathic manipulations are given. Maintaining an equilibrium in heat production and heat dispersion is necessary in order that the standard of the body temperature may be kept; and the amount of the arterial blood circulating within a tissue determines its temperature.

The principal effect of water as a thermic agent when applied externally is due to the influence of the action of the water upon the cutaneous circulation. Lesser effects would be the mere extraction of heat from the body by evaporation and the equalization of temperatures of two bodies coming into contact. As the body is endowed with compensatory powers, this latter means would apply only to a limited extent. The temperature of the water used is important, as the colder the bath the less effective would its power be in reducing internal temperature. When a cold bath is used there is a driving of the blood away from the surface on account of the contraction of the peripheral vessels; consequently increasing the cutaneous circulation and cooling by radiation is prevented and less heat is lost. A collateral hyperemia occurs in the underlying parts which acts as a protection to the deeper tissues. The cold also inhibits the vasomotor nerves controlling the abdominal splanchnics, and thus a larger amount of blood passes to this immense vascular area. On the other hand, when a warmer bath is used the effect is opposite, and a lowering of the temperature is the result. The cutaneous vessels being dilated, the superficial blood is rapidly replaced by blood from the deeper vessels, thus allowing a cooling of the body to a large degree.

In the various fevers where hydrotherapeutic measures are employed, the object to be gained by such methods is not primarily an anti-thermic one but an anti-febrile reaction; consequently the use of cold water is employed. In mere heat reduction the warmer water would be more effective; but by the aid of the colder water the cause of the increased temperature, as in infectious fevers, is lessened; besides a refreshing and stimulating effect upon the entire system is gained. Thus the aim of the cold bath and friction, is not primarily to subdue the temperature by heat radiation or evaporation, but to correct disturbances governing the formation and the dissipation of heat caused by infectious fevers, and, moreover, to stimulate the nervous system, pre-

vent heart failure, increase the eliminating power of the skin, kidneys and lungs, and to influence the corpuscular and chemical constituents of the blood to a more normal condition.

The full cold bath and friction (Brand Method) is commonly employed in infectious fevers. The half bath, wet pack, or sponging may be used. The *modus operandi* of each is given under the hydrotherapeutic treatment of typhoid fever.

Typhoid Fever

(ENTERIC FEVER)

In writing of these acute diseases which are self-limiting, it is understood that osteopathy aborts, overcomes symptoms and otherwise changes conditions frequently. When this occurs the case is not typical and it is a typical case which is here described.

Definition.—An acute, infectious disease caused by the bacillus typhosus. It is characterized anatomically by hyperplasia and definite lesions of Peyer's patches and mesenteric glands, and enlargement of the spleen, and clinically by its slow onset, often diarrhea, abdominal tenderness, tympanites, fever, headache, and rose colored spots on the abdomen.

Osteopathic Etiology and Pathology.—Lesions to the lower dorsal and lumbar regions are always found, which impair the innervation and vascular supply of the intestines and cause defective nutrition. This is the most important predisposing cause, although general lowered vitality from over-work, improper food, unhygienic environment, and insanitary surroundings, are also of great importance. It is possible that one's vitality may be so lowered that the bacillus of Eberth, if of sufficient numbers or virulency, will find a suitable medium wherein to multiply and grow, and thus the spinal lesions found in these cases are the result of reflex irritation. But the most probable underlying cause is the spinal lesion, and given two individuals with equal likelihood to infection, one with the spinal lesions and the other not, the former within all probability will be the more likely to suffer an attack. The severity and extent of the osteopathic lesion undoubtedly bears a direct ratio to the probability of attack from an infectious disease. Typhoid fever usually occurs between the ages of fifteen and thirty years. Some families are more susceptible than others. The autumn months, especially after a dry, hot summer, favor the disease. One may be reasonably certain that whenever there is a case of typhoid the individual has not been careful as to diet, or drinking water, or some rule of health, and

wherever there is an epidemic it can always be traced to insanitary surroundings, the water supply, contaminated garden truck or other food, sewage, etc.; although this does not preclude the probability that the osteopathic lesion or lowered vitality of Peyer's patches and mesenteric glands from other causes are important and many times primal etiological factors. The specific poison may be so virulent that practically no one escapes and again those of lowered vitality only will succumb to an attack.

The **exciting cause** is a special micro-organism, the bacillus of Eberth. The contagion may be carried through the air from one person to another, but this is rarely the case. Though the water is the most common mode of conveyance, the bacillus has been found during epidemics in both water and milk. The water may be contaminated by the intestinal discharges which have not been properly disinfected. Extreme cold does not destroy the typhoid germs. Milk may be infected from the milk-can being washed with the contaminated water or the unclean hands of the milker. In fresh milk the germs multiply rapidly. Salads, celery, ice and fruits may be contaminated. Oysters have become infected while being fattened or freshened. It is thought by some that the poison is not eliminated from the sick in a condition capable of transferring disease to a healthy person, but must undergo changes in the soil before it is able to cause the disease in another. Typhoid fever may be caused, however, by direct contact with the stools. Filth, sewers, or cesspools do not directly cause the disease, but they form a suitable medium for the preservation of the typhoid germs.

Pathologically, the characteristic lesions in typhoid fever consist of changes in the lymphoid elements of the bowels. These changes are most striking in the solitary glands and Peyer's patches. The alterations which occur may be divided into four well defined stages: (1) **Infiltration**—the glands are enlarged from infiltration and there is marked cell proliferation, particularly Peyer's glands in the jejunum and ileum and to a lesser extent those in the large intestine. The glands become pale and prominent. Occasionally the solitary glands, which are usually deeply imbedded in the submucosa, become prominent also.

Microscopically, the capillary blood-vessels are at first considerably dilated, but later become more or less contracted, giving an anemic appearance to the follicles. The adjacent mucosa and muscularis may become infiltrated. The cells have the character of lymph corpuscles, some of which are larger, epithelioid in character, containing several nuclei. From the eighth to the tenth day this medullary infiltration reaches its height and then undergoes either resolution or necrosis.

(1) **Resolution** takes place by a granular or fatty infiltration of the cells. This produces pitting of the swollen follicles, which may cause small hemorrhages.

(2) **Necrosis**.—With all the severe cases of cell infiltration, hyperplasia of lymph follicles reaches a stage where resolution is impossible and necrosis occurs. The necrosis is partly due to the choking of the blood-vessels and partly to the direct action of the bacilli. The necrosis may involve only the superficial layers of the mucosa or it may extend deep into the muscular coat and even perforate the outer or serous coat. Usually, however, this does not extend below the submucosa, mucosa, or muscularis. Not all of the patches necessarily slough, but as a rule it is always more intense toward the ileocecal valve.

(3) **Ulceration**.—The extent and depth of the ulcers depend upon the amount of the necrosis. Large ulcers are sometimes formed, especially in the lower end of the bowel, by the union of several. The edges are swollen and undermined. The base is usually smooth and formed of submucosa. Perforation of the bowel occurs in a small percentage of cases; more commonly the ulcers heal. The perforations may be multiple, but rarely exceed two in number.

(4) **Healing**.—Cicatrization begins about the fourth week. This granulation tissue covers the floor. It is sometimes formed with connective tissue and a new growth of epithelium results. The gland is ultimately replaced by a depressed scar with a smooth, pigmented surface. The majority of deaths occur before this stage is reached. The gland structure is never regenerated.

The **mesenteric glands** show intense hyperemia and later become enlarged and softened, but rarely ruptured. The glands at the lower end of the ileum are markedly involved.

The **spleen** is enlarged, softened, and diffuent. Occasionally rupture occurs. Infarction is not a rare occurrence.

The **liver** shows parenchymatous and granular degeneration, and the cells are found to contain much fat. Infarction abscesses and acute yellow atrophy occur in rare instances. Diphtheritic inflammation of the gall-bladder sometimes occurs and the bile is thinner and paler than normal.

The **kidneys** also show parenchymatous degeneration. They are pale in appearance, with slight cloudy swelling. Microscopically, there are seen granular and fatty infiltration of the cells of the convoluted tubules. Rarely, there is acute nephritis which may be hemorrhagic. There may be miliary abscesses in which typhoid bacilli have been found

by some observers. Diphtheritic, but more frequently catarrhal, inflammation of the pelvis of the kidney may occur. Catarrh of the **bladder** is not infrequent and even sometimes diphtheritic inflammation is present. Rarely orchitis is encountered.

Hypostatic congestion of the **lungs** is not uncommon. Gangrene and hemorrhagic infarction are sometimes present. Lobar pneumonia may be a complication.

In the **larynx** ulceration is sometimes met with; bacilli, however, have not yet been found in these ulcers. Diphtheritis of the pharynx and larynx may occur. Catarrhal or croupous pharyngitis may occur; while swelling of the follicles of the pharynx and base of the tongue is frequently noticed.

Peritonitis is always present in fatal cases in which perforation of the bowel has taken place. The perforation may occur in ulcers from which the sloughs have already separated, or it may be caused by a necrosis of all the coats. Extensive peritonitis may occur without perforation, and is probably due to extension of the inflammation to the peritoneum.

The **heart** may be affected. Endocarditis is rare, while pericarditis is much more frequent. Myocarditis is frequently met with, the cardiac muscles presenting parenchymatous and rarely hyaline degeneration. The **arteries** are frequently found to be involved. These conditions (obliterating arteritis and partial arteritis) may affect the smaller vessels, especially those of the heart, but more commonly affect the arteries of the lower extremities. Thrombosis of the veins, especially of the femoral, and more rarely of the cerebral veins and sinuses, occurs.

Granular and hyaline changes in the voluntary **muscles** may occur. This degeneration does not affect the whole muscle but involves only certain fibres. Regeneration takes place during convalescence.

With the nervous system meningitis is rare. The peripheral **nerves** are frequently the seat of parenchymatous changes. The ganglia of the trunks of the vagi present an inflammatory change.

The **blood** presents little change. During the first two weeks the red corpuscles gradually decrease in number until the first week of convalescence, after which they gradually increase in number. There is often a marked decrease in the number of leucocytes. Leucocytosis is absent. The hemoglobin is always reduced.

Symptoms and Course.—The incubation period varies from a few days to two weeks or longer. During this time the patient may feel in his usual health, but more often there is a feeling of languor and

indisposition to exertion, loss of appetite, slight coating of the tongue, nausea, headache, chilliness, but seldom a decided rigor, pains in the back or legs and nose-bleeding. Any of these symptoms may be present and last usually from a few days to a week or more. These symptoms increase in severity and the patient takes to his bed. The invasion as a rule is gradual.

The **first week** dates from the onset of the fever which generally (but by no means in all cases) rises steadily during the first week a degree or a degree and one-half each day, reaching 103 or 104 degrees F. The pulse is quickened to 90 to 110 per minute and is full, of low tension and sometimes dicrotic. There is great thirst, also a coated tongue. The skin is hot and dry and there is rather intense headache. Unless the fever is high there is no delirium. The sleep is disturbed and there may be mental confusion and wandering. Cough with some thoracic oppression is not uncommon at the onset. The abdomen is slightly distended and tender. There may be either constipation or diarrhea. The spleen is somewhat swollen and a rose colored rash appears on the skin of the abdomen and chest.

During the **second week** the fever remains high and exhibits the continued type, the morning remission being slight. The pulse is accelerated. The headache disappears, but there is marked mental dullness and slowness and there may be a mild delirium at night. The tongue is coated and the lips are dry. The abdomen is tympanitic and tender. Diarrhea replaces constipation. The case may prove fatal during this week from the result of nervous or pulmonary symptoms, hemorrhage, or perforation.

The fever changes in the **third week** from a continuous to a remittent type. The pulse ranges from 110 to 130. The patient is very weak. Complications may arise, as pulmonary symptoms, feebleness of heart, intestinal hemorrhage, perforation, and peritonitis.

In favorable cases during the **fourth week** the fever begins to decline and the general and local symptoms gradually disappear. In protracted cases the **fourth** and **fifth** weeks may present the symptoms of the third week. Frequently the following aggravated symptoms are added: stupor, delirium, increased weakness, rapid, feeble pulse, and distended abdomen. Heart failure and inflammatory complications increase the danger.

During the **fifth** and **sixth weeks** a few cases will show irregular fever. Great care should be taken that complications do not occur.

The **fever** is the most important and characteristic symptom and

from the temperature alone a diagnosis may be made. During these stages of development, which is the first four or five days, the temperature rises steadily; the evening temperature being about a degree or a degree and one-half higher than the morning remissions, reaching 104 or 105 degrees F. at the end of the first week. When the **fastigium** is reached the fever persists with slight morning remissions.. At the end of the second and throughout the third week the temperature becomes more remittent and there may be a difference of three or four degrees between the morning and evening temperature. During the last stage the fever falls by **lysis**, forming a more or less regular step-like line of descent. The stage lasts from one week to ten days.

When the disease sets in with a severe rigor the fever frequently rises at once to 103 or 104 degrees F. In the lightest forms the fastigium may be almost absent; defervescence setting in upon the first day of the fastigium and in many cases defervescence occurs at the end of the second week and the temperature may fall rapidly, becoming normal in ten or twenty hours. This fall in the temperature may take place without any apparent cause or it may follow an intestinal hemorrhage. The temperature often falls many hours before the blood appears in the evacuations. The occurrence of peritonitis is also marked by a sudden fall in the temperature. **Hyperpyrexia** in typhoid fever is not very common except just before death.

After the temperature has been normal for several days there may be a sudden rise of the temperature to 102 or 103 degrees F. This may persist for a couple of days and then return rapidly to the normal. These **recrudescences**, as they are called, are quite common and are caused most frequently by errors in the diet, constipation, excitement or mental emotion. These elevations in the temperature are found most frequently in children and persons of a nervous temperament.

Afebrile Typhoid is of very rare occurrence. The patient has all the characteristic symptoms of typhoid fever with the exception of a fever.

The **rash** is highly characteristic. It appears about the eighth or tenth day, usually upon the skin of the abdomen or chest, rarely found elsewhere on the body. It consists of a variable number of rose colored spots distinctly elevated, and disappear on pressure. These spots last three or four days and appear in successive crops. Vivid red erythematous eruptions upon the chest and abdomen are commonly seen during the first week of typhoid fever. Urticaria is rarely seen.

Sweating characterizes some cases of typhoid fever, but generally the skin is dry. This may occur with or without chilly sensations or actual rigors. In some cases there may be recurring paroxysms of chills, fever, and sweats and they may be mistaken for intermittent fever. Edema of the skin may occur and is usually due to anemia or cachexia and sometimes to nephritis. Local edema may occur as the result of vascular obstruction, particularly thrombosis of the femoral vein. There is a peculiar musty odor exhaled from the skin in typhoid fever, particularly if the skin has been neglected. In all protracted cases **bed-sores** are likely to develop. The **hair** is apt to fall out but is generally renewed. The nails also suffer and ridges can usually be observed upon them.

Intestinal symptoms are very inconstant. Usually there is constipation at the onset and this may persist throughout the disease although a moderate diarrhea may occur throughout the disease. The severity of the diarrhea is due most probably to the degree of the catarrh rather than to the extent of the ulcers. It is probable that the discharges are more frequent when the catarrh involves the large intestine. The number of discharges average, as a rule, from two to four or more daily. The stools are either fluid or of the consistency of jelly, of a grayish-yellow color, alkaline in reaction and are very offensive.

Hemorrhage is a serious symptom, but by no means always fatal. This usually occurs in cases of considerable severity and it generally occurs at the time of the separation of the sloughs during the third week. When it occurs quite early in the disease it is generally the result of hyperemia. It may be so slight as not to be noticed by the eye or it may be from one to three pints. Intestinal hemorrhage, however slight, is always a grave symptom. There may be symptoms of collapse and fall of temperature, or it may occur without any symptoms.

Meteorism is an almost constant symptom, and when excessive adds to the seriousness of the case and corresponds generally with the extent of local lesions. Abdominal tenderness and gurgling upon pressure in the right iliac fossa may be present; pain is generally absent, and when present is usually slight.

Perforation almost invariably causes fatal diffuse peritonitis and is the most serious complication. It may occur at any time but is most common between the second and fourth weeks. It is usually indicated by sudden acute pains in the abdomen and symptoms of collapse. As a rule symptoms of **peritonitis** appear at once; distension of the abdomen, great tenderness, and rigid abdominal walls. Vomiting, pinched fea-

tures, and rapid, small pulse shows general collapse of the circulatory system.

Bronchitis is almost invariably present as an initial symptom. It is indicated by the existence of sibilant rales. The cough is generally slight.

Hypostatic congestion of the **lungs** and edema, due to enfeeblement of the cardio-pulmonary circulation, in the latter part of the disease are not infrequent.

The **pulse** as a rule is not very frequent and is generally not in proportion to the fever until late in the disease; 90 to 120 is the usual range. During the first week it is about 100, full, and frequently dicrotic; later it becomes more rapid, feeble and small. In severe cases during the extreme debility of the third week the pulse may reach 150 or more (the so-called running pulse). During convalescence the pulse occasionally becomes subnormal and bradycardia is met with more frequently than after any other acute fever.

The **blood** presents definite changes, some of which are important. In cases where there is profuse sweating or copious diarrhea, the red corpuscles may be relatively increased; this is due to the loss of water. In most cases there is little change until the end of the second week. During the third week there is generally a decrease in the number of corpuscles and of the hemoglobin, which is always reduced. **Leucocytosis** is always absent. The white corpuscles are slightly diminished especially toward the end of convalescence.

During the first week there is generally persistent headache, sometimes neuralgia. There are a few cases in which the effects of the typhoid bacilli or their poison is manifested in the **nervous system** from the very onset. There are violent headaches, retraction of the head, rigidity, photophobia, twitching of the muscles, rarely convulsions, all indicating meningitis as which it is occasionally diagnosed. It must be remembered however, that all nervous symptoms may occur independently of a lesion of the nervous system.

Delirium may exist from the onset, but it usually is not present until the second or third week and only in the severer cases. As a rule it is most marked at night. It is generally of the low, muttering type, very seldom maniacal. When the patient picks at the bed clothes or grasps at imaginary objects there is indication of danger, as it is a serious symptom. Convulsions are rare.

The **urine** is diminished in quantity, high specific gravity, and of dark hue. Both urea and uric acid are increased and the chlorids are.

diminished during the first stages. About the stage of decline the urine becomes light in color and greater in quantity than normal. The specific gravity is lowered, urea and uric acid are diminished, and the chlorids are increased. Febrile albuminuria is very common but of no special significance. Acute nephritis may develop as a complication. Pyuria is not an uncommon complication and post-typhoid pyelitis may also develop.

Malarial fever may be associated with typhoid, especially in malarial districts. Persons with tuberculosis, epilepsy, chorea, and other forms of chronic nervous diseases are liable to typhoid fever. In epilepsy and chorea the movements and fits usually cease during the attack of typhoid fever.

Varieties of Typhoid are numerous and are named with reference to the degree of severity which varies from extreme mildness to extreme severity.

The **mild** or **abortive** form is of frequent occurrence. The onset is usually sudden. The symptoms are similar to those of a typical case but much milder and appear earlier than in the usual type. This form runs its course in about two weeks. The fever usually reaches 104 degrees F.

In the **severe** or **grave** form there is high fever and the nervous symptoms show a profound intoxication of the system. The grave types are those associated with serious complications or those cases which set in with pneumonia, Bright's disease, or cerebrospinal symptoms.

In the **latent** or **ambulatory** form (walking typhoid) the symptoms are very slight, the patient being hardly sick enough to go to bed. The symptoms may be of this character throughout the attack, and the patient may be able to be up and about. In other cases the first symptoms are very mild, but later they may develop symptoms of the severest type.

The **Afebrile** form is rare. **Hemorrhagic** typhoid is a very fatal but rare form. In this type there are cutaneous and mucous hemorrhages.

Diagnosis.—As a general rule typhoid fever is easily recognized. The Widal test should be made. At times the diagnosis may have to be delayed until the distinctive signs appear, especially in those cases which come on with severe headache, delirium, twitching of the muscles, and retraction of the head. In these cases the diagnosis of cerebrospinal meningitis is invariably made, until the appearance of the colored spots on the abdomen, which must decide the diagnosis; cerebrospinal meningitis being a rare disease and typhoid fever with severe nervous

symptoms quite frequent, it is more probable that it is typhoid. At least one-half of the cases termed brain fever belong to this class of nervous typhoid.

Prognosis.—A positive prognosis can not be made, as even the mildest cases are liable to have severe complications develop at any stage of the disease. Under osteopathic treatment the prognosis is undoubtedly more favorable than with the treatment of the older schools. If the osteopath can see the case early, the first week, there is always a chance to abort the attack. In all cases there is the probability that the attack will be shortened; this is a common experience. Price of Mississippi, has treated many cases, and invariably when the patient is seen early the attack has been shortened to thirteen or fourteen days, whereas under other treatment the disease runs the usual course. Adsit of Kentucky, White of New York, and the staff of the American School of Osteopathy (Kirkville), as well as many others, have had the same experience. And if the attack cannot be aborted or shortened there is the further probability that the severity will be lessened and complications prevented. The prognosis is always more favorable in winter than in summer, and especially favorable in children. More women die than men, and fat persons stand the disease badly.

Treatment.—Typhoid fever is one of the diseases that practitioners of all the schools are agreed that drug therapeutics avail but little in its treatment. The treatment of the older schools consists of prophylaxis, good nursing, attention to hygienic principles, dieting, and hydrotherapy. All of these have their places and are recognized by the osteopathic school. But the above methods are of the defensive only—allowing the disease to run its usual course and reducing the likelihood of complications. On the other hand the above treatment coupled with osteopathy, not only attacks the ravages of the disease defensively, but of more importance, the disorder is attacked offensively. Herein is where attacks are aborted, or shortened, or severity lessened, or complications prevented. The efficacy of osteopathy is due to the ability of the osteopath to treat disease, not only prophylactically and palliatively, but of more consequence, aggressively.

The correction of the spinal lesions in typhoid fever is of first importance. This treatment effects a tendency toward equalized circulation of the intestines. The vasomotor nerves are disturbed by the above lesions which in turn produces stasis in Peyer's patches and the mesenteric glands. Reversely some of the spinal lesions may be due to reflex stimuli, for "Kirk . . . states that muscular contractions produced

by reflex activity are often more sustained than those produced by direct stimulation of the motor nerves themselves."¹

Prophylactic treatment is very essential, for typhoid fever as a rule is a preventable affection. Modern hygienic and sanitary resources enable a community to reduce the number of cases to a minimum. The number of cases in a locality depends almost directly upon the condition of the water supply and drainage. Care should always be taken in regard to the source of drinking water and milk. During an epidemic the water should be boiled for half an hour before being used. The patient should be isolated. In hospitals they should have special wards; in families a special apartment should be given them. Hygienic principles should be followed as in other infectious diseases.

The methods of disinfection must be rigid to prevent the spread of an infection. The excreta (stools, urine, vomitus, and sputum) are to be received into a bed-pan or any appropriate receptacle containing half a pint of carbolic acid (one to twenty). Three or four pints of the carbolic acid (one to twenty) should then be added to the bed-pan and the contents mixed carefully before emptying. All utensils used in handling the excreta are to be carefully disinfected by the same material, and dried. After every stool the nates of the patient should be cleansed by a cloth compress, wet with a solution of carbolic acid (one to forty) and the cloth burned. The sick room should be thoroughly ventilated each day. All utensils used about the patient in feeding should be boiled in water immediately after using. The bed and body linen is to be changed as soon as soiled and these, with all changed bath towels, blankets and rubber sheets, should be received in a sheet rinsed in carbolic acid (one to forty) and placed where they may be soaked in the solution for four or five hours. The clothes are to be boiled for half an hour. The rubber blanket is to be washed in the solution, dried and aired.

The **General Management**, careful nursing and a regulated diet, is of paramount importance in the treatment of typhoid fever. The patient should be placed in bed as soon as the disease is determined and there remain until the end of the attack. The room should be well ventilated and have a sunny exposure if possible. The single woven wire bed with soft hair mattress and two folds of blankets is best. A rubber cloth should be placed smoothly under the sheet. When a good nurse cannot be had, the attending osteopath should write out directions regarding diet, bed linen, and utensils, and the disinfection of the excreta.

1. Hinckle—The Scientific Basis of Osteopathy.

A liquid **diet** should be administered. Milk is most commonly used; care being taken that it is thoroughly digested. If milk is not borne well by the patient, other foods, as whey, sour milk, buttermilk, and broths may be substituted. Give food that is easily digested and which leaves but little residue. When milk is used alone, three pints at least may be given to an adult in the course of twenty-four hours; and it should always be diluted, preferably with plain water. Beef juice, mutton or chicken broth may also be used when milk is not agreeable. Albumin water, prepared by straining the white of eggs through a cloth and adding an equal amount of water, is an excellent food. Well strained, thin barley gruel is considered by many an excellent food for typhoid fever patients. Cases not able to take nourishment into the stomach, on account of vomiting and other causes, should be fed rectally to support life. Do not force feeding to an unwarranted degree.

Recently a number of new diets have received commendation. These include the "high calory" diet, which includes three pints of milk with one of cream, two to eight ounces of milk sugar, eggs, butter; sometimes cereals, toast, potato, and other soft foods are given. A full sugar diet, as of candy alone, is based upon the immediate absorption of sugar, its value as a source of energy, and the fact that a plentiful carbohydrate supply lessens the danger of acidosis.¹

The best drink for fever patients is pure, cold water and they should be encouraged to drink freely of it. Barley water, ice tea, lemonade, or even moderate quantities of coffee or cocoa, may be given.

By **Osteopathic Treatment** many cases of typhoid fever may be aborted, if treated correctly, during the first week. If the stage of necrosis of Peyer's patches has set in, one can either lessen the severity of the attack or, at least, shorten the usual course. During the stage of infiltration, treatment to the intestinal splanchnics (chiefly from the ninth to twelfth dorsal, the innervation to the jejunum and ileum) and careful treatment over the abdomen is indicated. This treatment will tend to lessen the intestinal catarrh and diminish the infiltration and cell proliferation of the lymphoid elements of the intestines, and thus produce unfavorable the conditions for the bacillus of Eberth. In other words, increase the tone and activity of the intestines so that the micro-organisms of typhoid fever will not find the proper tissue-soil in order to grow and multiply.

All cases of typhoid fever present lesions in the dorsal or lumbar spine and this is really the great predisposing cause of typhoid fever.

2. Clinical Osteopathy.

Correcting these lesions is absolutely necessary in order to abort the disease. Some patients may have such a lowered vitality to begin with that the recuperative powers of the body cannot be rendered forceful enough in a short time to combat the effects of the micro-organism. Carefully raising the cecum is very effective (A. T. Still), but this must be done with the greatest of caution and judgment. Dr. Still considers a posterior condition of the third, fourth and fifth lumbar as typical in typhoid and that it inhibits the lymphatics to the intestines.

R. L. Price has had excellent success in shortening the usual typhoid course. His first treatment is to thoroughly empty the bowels by enemata. This is followed by spinal, liver and splenic treatment, and a liquid diet.

E. C. White has also treated a large number of typhoid cases with marked success. He prefers to employ the Brand method (and it must be properly used) from the start. He is, also, a thorough advocate of the spinal treatment. In cases of constipation give a very light treatment over the left iliac fossa. With all patients observe careful dieting. White believes that many lesions of the spine arise from reflex irritations during acute attacks. Careful, frequent attention to the spine is demanded.

Hildreth, relative to abdominal and spinal treatment, writes as follows: "In the abdominal treatment of typhoid fever, too much care cannot be exercised; or in the spinal treatment, too much judgment used in giving just the right kind of manipulation. There can be no question relative to the seat of the disease, and consequently there should be no trouble in knowing where or how to affect the nerves to control the same. That Peyer's patches or the right iliac region is always involved, we all know. The spinal treatment should be applied from the eighth dorsal to the first lumbar inclusive; this affects all the lesser splanchnics and thus controls the circulation of the entire bowel. And this treatment should be given, according to the symptoms indicated, in each and every case. If the patient is constipated, then the treatment should be more of a stimulative character, but if diarrhea is present, as is commonly the case, the treatment should be an inhibitory one. In the above I always finish with a very careful treatment of the floating ribs on the left side; this affects the lesser splanchnic nerves. In all cases I always carefully treat the lower two or three lumbar vertebræ, which directly affects the hypogastric plexus of nerves, and thus controls the circulation to the lower bowel.

"In all cases I always treat the bowels directly, more or less, but

this treatment **must** be given with the very greatest **care** and the best judgment, always governed by the condition of the bowel. By no means manipulate the bowel, but just lay your hands flat on the abdomen, and with the most gentle pressure inhibit the peripheral nerves, thus either quieting an excited peristalsis or equalizing a disturbed circulation. And with this treatment remember that the two specific points in typhoid fever are the lower dorsal and lower lumbar nerves.

"The above treatment is used, of course, in connection with all the other necessary treatments, such as dieting, nursing, sponging, relieving the headaches, etc. I am unalterably opposed to ice-packs for the bowels in typhoid, for the reason it is too much of a shock. Cold cloths are good and much better than ice, and should always be used instead of ice."

After the disease has become thoroughly established always make it a point during each visit to examine the entire length of the spinal column carefully and readjust any tissue, whether it be vertebra, rib, or muscle, that may be found disordered. The bowels are to be watched carefully and if constipated, they should be moved with a light enema. Great care must be taken not to treat the abdomen roughly, if at all, after the first week. The treatment might be very injurious to the structures diseased. A light treatment over the liver and kidneys each time is a wise precaution. The heart's action, should be watched carefully. In addition to the hydrotherapeutic treatment, the general fever treatment should be employed. The patient should usually be seen twice a day.

Abdominal pain is best relieved by light treatment over the abdomen and by thorough treatment of the lower dorsal or lumbar region. Applications of hot water will be helpful.

Meteorism can be relieved by raising the lower ribs and by direct treatment to the abdomen. A change of diet may be beneficial. When gas is in the large bowel an enema may be given to remove it.

Diarrhea and **constipation** are best controlled by the usual treatment given the spine in such cases, and over the abdomen and the liver. Light enemata may be given for constipation. The stools should be examined when diarrhea occurs, as the presence of curds may cause the aggravation.

Hemorrhage from the bowels demands absolute rest. It is probably better to have the patient use the draw sheet for the evacuation. Immediate and thorough treatment must be given to the spinal column in the region of the intestinal nerves to the diseased area, so that existing lesions may be corrected and the vascular area of the mesentery equal-

ized. Ice should be given freely and an ice-pack placed over the abdomen. Food should be restricted for ten or twelve hours. If the peristalsis of the intestines is increased, an effort should be made to control it through the vagi and splanchnic nerves.

In **perforation** hot applications, rest and thorough treatment of the innervation to the peritoneum are of value, but immediate operation is usually advisable.

Insomnia is best relieved by attention to the cervical region. Relaxation of the muscles in this region and a quieting treatment to the posterior occipital nerves, coupled with cold sponge baths, will usually induce sleep.

In **delirium** attention to the circulation of the brain, by careful treatment of the vasomotor system, and the Brand method of baths will relieve this distressing symptom.

During **convalescence** the patient should be restricted from any mental or physical exercise for a week or ten days and then should move about with care. Solid food should not be given for ten days or two weeks. If the temperature has been normal for ten days, it is then safe to allow such food as eggs, milk puddings, and milk toast. If diarrhea should persist, being due to ulceration, the diet should be restricted and the patient confined to the bed. If constipation is troublesome relieve it by enemata.

There are several beneficial effects obtained by **hydrotherapeutic measures** that should receive careful consideration. Probably it is of the least significance to lower the temperature; other beneficial effects being of greater importance. When the baths are systematically carried out, (1) there is obtained a general improvement of the nervous system, the mind is rendered clear, muscular twitchings are lessened, sleep is induced and the heart's action strengthened; (2) the respiration is stimulated, thus diminishing the liability of lung complications; (3) the activity of the renal function is increased, consequently allowing more rapid elimination of toxic matter; (4) reduction of the temperature, and overcoming ill effects of high fever.

A cold water bath, or what is generally termed the Brand method, is commonly employed. The following plan is usually followed. When the temperature is above 102.5 degrees F., rectally, a bath of 70 degrees F. is wheeled to the patient's bedside and he is placed into it for ten or fifteen minutes. The patient should be lowered into the bath by means of a sheet. Enough water is used to cover the body and neck of the patient. The head is sponged and the limbs and trunk are rubbed **thor-**

oughly during the entire procedure. When the patient is taken out he is wrapped in a dry sheet and covered with a blanket. This procedure is gone through with every three hours if the case is severe, otherwise once every seven or eight hours will be sufficient.

The luke-warm bath is occasionally used in private practice when one is unable to use the Brand method. A bath of 90 degrees F. is employed, which is gradually cooled ten or twelve degrees, after the patient has been placed in it, by pouring cold water on the patient. This bath is found very helpful. Also in private practice the cold pack is found satisfactory. The patient is wrapped in a sheet wrung out of water at 65 degrees F. and cold water is sprinkled over him. Whenever there is objection to any of these methods the body may be sponged off with tepid or cold water when the temperature rises above 102.5 degrees F., rectally. One limb should be taken at a time and then the trunk, occupying altogether some twenty or thirty minutes.

The Great War brought the subject of typhoid vaccination before the world with emphasis but its results are not, as yet, in shape so an unbiased opinion can be formed. The army medical department will tell us that it was an unqualified success but we do know that there were serious outbreaks among inoculated troops who were living under most hygienic surroundings in America. There were, also, outbreaks among protected troops in France to the extent that the medical authorities felt called upon to warn all medical officers that vaccination should not be considered as protecting against unsanitary surroundings and that great precaution must be observed, the same as under non-vaccination conditions. This does not imply implicit confidence.

It is, also, a historical fact that the Japanese army, during the Russo-Japanese war had as low a rate of typhoid without vaccination as can, probably, be shown with it in this war. At that time they depended entirely upon pure water and sanitation.

See reports of typhoid fever in A. O. A. Case Reports as follows: C. M. T. Hulett, Series I, p. 7, J. H. Wilson, Series III, p. 3, F. E. and H. P. Moore, and F. A. and E. S. Cave, Series IV, pp. 4 and 5.

In **paratyphoid fever**, an acute infectious disease caused by the paratyphoid bacillus, the treatment is the same as for typhoid fever. It is milder and similar to typhoid fever.

Typhus Fever

Definition.—An acute, infectious disease; characterized by sudden invasion, high fever, marked nervous symptoms, a peculiar macu-

lated and petechial eruption and a termination by crisis about the fourteenth day.

Etiology and Pathology.—Typhus fever is becoming less frequent than formerly and is rarely seen in this country. It was very destructive during the Great War, particularly in the Balkan states. Filth, over-crowding, famine, intemperance and bad food are the predisposing causes. Typhus fever is highly contagious and is transmitted by the *pediculus corporis* (cootie) as was first discovered by the American Red Cross workers in Serbia. Probably infection may come by contact and fomites. The specific organism is the *bacillus typhi exanthematici* (Platz).

Pathologically, there are no constant lesions. There is a general hyperplasia of the lymph follicles, but no ulceration. The blood is dark, thin and lessened in fibrin. Hypostatic congestion of the lungs and bronchial catarrh are frequently met with. The liver, kidneys and spleen are found to be somewhat enlarged and softened. The petechial rash remains after death.

Symptoms.—The **incubation period** is about twelve days. The onset is usually sudden, ushered in by chills. The temperature quickly rises to 104 or 105 degrees F. There is headache, pains in the muscles, especially of the back, and early, profound prostration. The pulse is at first full and strong, 100 to 140, but soon becomes weak and frequent. There may be distressing vomiting. The face is flushed, the eyes injected, the expression stupid, and there is generally low, muttering delirium. The tongue is furred and white, soon becoming dry. The bowels are constipated and the urine is usually scanty and of high specific gravity. There is great thirst. Conjunctiva injected; pupils contracted; early prostration.

The **eruption** appears about the fifth or seventh day. It first makes its appearance upon the abdomen and chest. It rapidly extends all over the body with the exception of the face. The eruption is of two kinds—rose spots, which disappear upon pressure, and those which become hemorrhagic (petechial); pressure has no effect upon them. During the second week the symptoms are increased. The tongue is dry, brown and fissured, and sordes appear on the teeth. Retention of the urine, due to paralysis of the bladder, is common. The breathing becomes more rapid and the heart's action more feeble; the patient may die from exhaustion. This ushers in the typhoid state with low, muttering delirium, ataxic symptoms, subsultus, tremors, and maybe bronchial symptoms. In favorable cases the crisis occurs at the end of the second week. Patient sinks into a sound sleep, the temperature falls rapidly,

there is profuse sweating and a critical diarrhea but the patient now gains rapidly.

Convalescence is usually rapid; relapses rarely occur. The urine is scanty, high colored and frequently albuminous. Bed sores are common. The temperature continues high, reaching 106 degrees F., or more, with slight nocturnal remissions. In fatal cases the fever often rises to 108 or 109 degrees F. just before death.

Diagnosis.—The sudden onset, frequent chills, early profound prostration, character of the rash, history of exposure to the poison and unhygienic surroundings decide the diagnosis. During an epidemic there is usually no doubt, but in sporadic cases the diagnosis is sometimes extremely difficult.

Prognosis.—This is usually grave, but the mortality rate is being greatly reduced in consequence of the better sanitary arrangements.

Treatment.—Typhus fever is highly contagious and great care should be taken in controlling the disease. Isolation, disinfection and extermination is imperative. So far as known none of the osteopaths have had experience in the treating of typhus fever osteopathically, but there is no reason why the disease should not be treated with the same success as is met with by osteopathic treatment in other diseases. It is claimed that the disease should be treated in the open air, in tents, as the recovery of the patient and the safety of the attendants are greatly favored.

For high temperature, besides the treatment given to remove any disorder that may be found, the general fever treatment is indicated, and hydrotherapy would also be of aid—sponging the surface of the body, or the use of the bath. Asthenia is wherein the greatest danger lies, and a stimulating treatment along the spine and to the heart should be given; although correction of the primary trouble may be sufficient. Hydrotherapeutic measures, the systematic use of the cold bath, would be of service the same as in typhoid fever.

Headache and delirium which are apt to arise, caused by too much blood in the head, may be relieved by treatment of the cervical spine. Also cold applied to the head will aid. The bowels should be watched carefully; treat the splanchnics thoroughly and the intestines and liver directly. Nourish the patient as in typhoid fever by nutritious liquids—milk, broths, etc.

Although typhus is now a comparatively rare disease, an outline has been given to emphasize what correction of unhygienic conditions and insanitary surroundings will accomplish. It is particularly a disease of filth.

Malarial Fever

(AGUE)

Definition.—An infectious disease caused by the hemocytzoon of Laveran. "It is characterized by paroxysms of intermittent fever of the quotidian, tertian or quartan type, a continued fever with marked remissions, a pernicious or rapidly fatal form, and a chronic cachexia with anemia and enlarged spleen." (Halbert). The varieties of malarial fever are: intermittent fever; pernicious intermittent; remittent fever; malarial cachexia; masked intermittent; malarial hematuria.

Osteopathic Etiology and Pathology.—Malarial fevers are caused by a parasite known as the hematozoon of Laveran. Three varieties of the parasite have been separated, corresponding with the three leading forms of the affection. The parasite of tertian fever is about as large as a normal red blood corpuscle, beginning as a small hyaline ameba in the red blood corpuscles. The parasite of quartan fever is very similar in its appearance to the tertian parasite but smaller; its ameboid movements are slower and the red blood-corpuscle embracing it shrinks about the parasite, assuming a deeper greenish color. The parasite of the estivo-autumnal fevers is still smaller. "If only one group of parasites exists the paroxysms—quartan intermittent—will occur every fourth day. Double quartan infection will result in paroxysms on two successive days with an intermission of one day. Infection by three groups of parasites will create daily paroxysms—the quotidian intermittent. Infection by more than three groups is rare." (Anders). Only in the earlier stages of development, small hyaline bodies are to be found in the peripheral circulation; being, in the later stages, in the blood of certain internal viscera, spleen, and bone marrow, particularly.

It is an accepted fact among medical observers that to the mosquito, *anopheles*, is due the spread of malaria and it has been the subject of much investigation in all parts of the world. The mosquito becomes infected from biting an individual whose blood contains the malarial parasite, this is then developed in the mosquito to maturity and later is transmitted to the next subject bitten. This explanation would show why certain localities favorable for the breeding of mosquitoes are particularly given to malarial outbreaks. Low, marshy grounds, banks of rivers, small ponds, etc., as well as warm weather, are needed to produce the conditions for the development of the *anopheles*. As the country has developed the intensity and extent of malaria has diminished until it is now confined largely to the southern states. It is practically un-

known in the northwest and in the St. Lawrence basin. Regions which have never had cases, however, have developed them when the *anopheles* has appeared. Whiting notes cases in Southern California, the result of the insect being brought in by ships from Mexican or Central American ports. In certain regions the *anopheles* is present but has not apparently come in contact with a malarial victim, so is incapable of spreading the disease. Also in colder climates this species is harmless.

By draining the lands and preventing the breeding places, the number of the pests is reduced, while the screening of houses and care against exposure to the bites make it possible to live in malarial sections and not become infected. Naturally the resisting power of a patient is called into account when bitten by the mosquito. Where it is epidemic the inhabitants will be found, generally, poorly nourished or debilitated from climatic or other conditions. This renders infection easy, for immunity must come from the ability of the blood to combat the invading parasite.

The **osteopathic predisposing causes** for malaria are usually interference with the vasomotor nerves to the spleen and liver, as these two organs are so concerned in maintaining the stability of the blood tissue. Ligon, of Alabama, notes that most cases have lesions between the ninth and twelfth dorsal on the right side.

The chief **morbid changes** are due to the direct effect of the malarial parasite upon the blood. There are also changes in the liver, kidneys, and spleen, which changes usually vary with the duration and intensity of the disease. The disintegration of the red blood-corpuscles, accumulation of the pigment thus formed, and the toxin engendered by the malarial parasite are responsible for the morbid lesions of the disease.

In **pernicious malaria** the blood is more or less hydremic, and the discs are seen in all stages of destruction. The spleen is enlarged and soft and the pulp dark from the accumulation of the pigment, and spontaneous rupture has occurred in a number of cases. The liver is swollen and turbid; pigmentation occurs, but is generally only visible by means of the microscope. By the aid of the microscope all the tissues of the body, even the brain, may be found to be pigmented.

The **spleen** in **chronic malaria** is greatly enlarged, firm, pigmented and the capsule thickened. The **liver** is enlarged, the color varying from a slight gray to a deep slate gray, according to the amount of pigment. The **kidneys** may be enlarged and deeply pigmented, as is also the mucous membrane of the **stomach** and **intestines**.

R. W. Connor observes that the kidneys and liver are most noticeably involved, vasomotor obstructions the rule, the spleen in the majority of cases shows engorgement and that special attention to these centers will give the best results. He invariably finds spinal lesions from the seventh dorsal to the first and second lumbar, most frequently the eighth, ninth and tenth dorsals. A lowered vitality predisposes to infection from the bite of the mosquito.

Symptoms.—Intermittent Fever.—This form is what is known as fever and ague, in which chills, fever and sweat follow each other. The period of incubation varies from six to fifteen days, but it may be months after exposure before the first paroxysms set in. The paroxysm is usually preceded by a feeling of uneasiness and discomfort, sometimes by nausea or headache. The paroxysm consists of three stages, cold, heat and sweating.

In the **cold stage** the chill usually begins gradually; it is generally intense, the teeth chatter and the body shakes violently. The skin is cool and pale, the lips are blue, the face is pinched and the patient looks very cold. During the chill the temperature rises rapidly. Nausea, vomiting and headache are common. The pulse is frequent, small and hard. The urine is increased in quantity and of low specific gravity. The chill lasts from a few minutes to a couple of hours.

The **hot stage** succeeds the chill. The skin gradually loses its coldness and becomes hot. The face is flushed, there is great thirst, the mouth is dry, and the tongue is coated. Usually at the termination of the chill the temperature has reached its maximum level, from 104 to 106 degrees F. The pulse is full, and there may be a throbbing headache. The duration of this stage is from half an hour to three or four hours. During the **sweating stage** drops of perspiration appear upon the face; the perspiration soon becomes profuse, extending all over the body. The temperature soon falls, the headache disappears and in a couple of hours the paroxysm is over.

The entire duration of the paroxysm is from eight to twelve hours; the patient usually feeling perfectly well between the paroxysms. The spleen is enlarged. If the paroxysms of fever occur daily at the same hour they are called **quotidian** intermittent fever; if every other day they are known as **tertian** intermittent; and if every third day they are called **quartan** intermittent. If there are two paroxysms in the same day the term **double quotidian** is used; if the paroxysms occur a couple of hours later each successive day they are called "**retarding**;" if a couple of hours earlier they are named "**anticipating**."

Remittent Fever.—(Estivo-Autumnal Fever).—This is characterized by a continued fever with paroxysmal exacerbations and remissions. It occurs especially in warm and tropical climates. In temperate climates it usually occurs in the late summer and fall. It is also termed bilious remittent fever on account of the intensity of the gastro-intestinal manifestation. The estivo-autumnal parasite is the exciting cause.

It is very often preceded by malaise, headache, nausea and vomiting. The onset is usually gradual and the chill may be wholly absent. As a rule, however, a chill generally occurs at the onset, but it is less severe than that of intermittent fever. After the chill the temperature rises rapidly to 102 or 104 degrees F. or even higher. The pulse is full, rising to 100 or 120. There is violent headache, flushed face, pains in the limbs and loins, nausea and vomiting, and delirium when the temperature is very high. The urine is scanty or even suppressed, slightly albuminous, sometimes bloody, high colored, and deposits a sediment of urates. Jaundice is not infrequent; the spleen is enlarged and herpes labialis is quite common. After six to twenty-four hours the symptoms abate and slight sweating occurs. The temperature usually drops to 100 degrees F., the headache disappears and vomiting ceases; this is followed by a new exacerbation of fever at the end of about twelve hours, generally without the chill; and this hot stage is in turn again followed by the remission. These attacks may last three or four weeks.

Pernicious Malarial Fever.—This is rare in temperate climates and is always associated with the estivo-autumnal parasite. The principal types are the cerebral and algid.

The **cerebral type** usually begins with a severe chill; sometimes, however, the chill is absent. The patient is violently seized with grave cerebral symptoms, as acute delirium or sudden coma. The comatose condition lasts from twelve to twenty-four hours when consciousness usually returns, the primary paroxysm rarely proving fatal; it is, however, often followed in a short time by fatal relapse.

The **Algid** variety is characterized by intense prostration and extreme coolness of the surface with the internal temperature high. The gastric symptoms are extreme nausea and vomiting. The pulse is feeble; the breathing frequent and shallow. There is intense thirst. The voice is feeble and indistinct. The mind is clear. The urine is suppressed. In this type the parasites gain entrance to the gastro-intestinal mucosa, sometimes forming distinct thromboses of the smaller vessels. This form may be confused with yellow fever.

Malarial Cachexia.—This is a chronic condition which often occurs in cases that have not been properly treated or in persons that live in malarial districts and are constantly exposed to the infection. The two most striking symptoms of this condition are anemia and an enlarged spleen or "ague cake." There is fever at intervals, but chills rarely occur. The skin is of a dirty yellow color. The spleen is greatly enlarged and the blood is profoundly anemic. There is debility, and frequent sweating, and the hands and feet are cold. The digestion may be deranged and there may be slight jaundice. Sometimes there is edema of the feet and even dropsy occurs. Hemorrhages of the various mucous surfaces are common. Paraplegia and orchitis are rare symptoms. These cases usually do well under proper treatment, and if the patient can be moved from the malarial district.

Masked Intermittent.—Malarial neuralgia most frequently involves the supraorbital branch of the trigeminus; also the occipital, the intercostals, sciatic and brachial nerves may be affected. Such forms of malaria are called "masked malaria." In this form there is no fever and as a rule it is very hard to diagnose. A blood analysis should be made to confirm the diagnosis. In some cases one or more stages in the paroxysm of intermittent fever is omitted; this is especially true with the chill, in which case it is termed "dumb ague." Malarial cachexia is also sometimes called "dumb ague" and both are found among the older inhabitants of malarial districts. Persons living in malarial districts are sometimes affected with constipation, headache, loss of appetite, nausea, vomiting and a languid feeling; this is called "latent intermittent fever." Frequently "bilious attacks" are of a malarial origin.

Malarial Hematuria.—Hemorrhages may occur from the mucous membrane in all severe and persistent types of malarial infection. It is a frequent symptom of the pernicious variety. The parasites destroy the red blood corpuscles; this is the cause of the hemoglobinuria. Prostration and anemia are marked. In **blackwater fever**, a tropical disorder, acute hemolysis, is the cause of the hemoglobinuria.

Diagnosis.—This is usually easy. The characteristic stages of the paroxysms, the periodicity, residence in malarial districts and the alterations in the blood will usually remove every doubt as to the diagnosis.

Typhoid Fever may simulate malarial fever, but a careful analysis of symptoms and blood examination will differentiate.

Prognosis.—This is almost always favorable under early and persistent treatment. The unfavorable symptoms are uremia, hemorrhage and marked jaundice.

Treatment.—Attention should first be given to **prophylactic measures**. Environment, isolation of the patient, and destruction of the mosquito are important considerations. Cases of malarial fever present distinct lesions in the vertebræ and ribs corresponding to the vasomotor nerve supply of the spleen and liver. The most common lesion found is a marked lateral deviation between the ninth and tenth dorsal vertebræ and a consequent downward displacement of the tenth ribs. A disturbance will always be found in the region of the eighth to the eleventh dorsal vertebra, inclusive, or in the corresponding ribs on either side. These lesions undoubtedly derange the vasomotor nerves to the spleen and liver; thus permitting a weakness or lowered resistance of the system, especially of the blood. The blood resisting powers are lessened, probably on account of the spleen being affected, as it is an elaborating gland of the blood; and the liver's action is somewhat dependent upon the action of the spleen; besides, the liver is a secretory and excretory organ.

The principal **osteopathic treatment** given in cases of malarial fever is correction of these subdislocations, and thorough treatment to the liver and spleen directly. Ligon observes that when the case does not respond quickly to treatment it is very liable to be of considerable duration, although in the majority of cases the disease is controlled from the third to seventh day; the most constant lesions found are from the eighth to tenth dorsal and also the fourth lumbar.

During the **chilly stage** thorough treatment of the vasomotor nerves in the upper cervical, the upper dorsal, the lower dorsal and the lumbar regions is indicated; this treatment is given to equalize the vascular system.

During the **hot stage** the same treatment as in the chilly stage should be given to control the vascular system; besides a thorough treatment of the spleen and liver is necessary. Sponging the body with water will be of some aid in reducing the temperature.

During the **sweat stage** thorough inhibition at the superior cervical ganglion to control the sweat center of the medulla, and treatment at the upper dorsal and first lumbar to control auxiliary sweat centers are indicated.

The bowels should be kept active. When in a comatose form and when internal temperature is high, place the patient in a bath. In chronic cases, change of climate with thorough systematic treatment will usually result in recovery.

Tete¹, of Louisiana, makes the following interesting statement: "A specific osteopathic treatment given within an hour before the expected chill is a specific cure for malaria." He follows this up by treating on the third, fifth, seventh, fourteenth, and twenty-first days, on account of the tendency of the return of an attack on those days. His observation of the value of treatment just before the attack is borne out by a report by Teall² where the case was cured in one treatment, but the lesion was as high as the fourth dorsal. N. Chapman confirms this as being her experience in many cases. The spleen has been observed by Bandel to become engorged and upon emptying there would follow a rise of temperature of one fourth to half a degree. This has also been spoken of by Tucker as the "splenic wave." Ligon makes the statement that where the osteopathic lesion (the predisposing cause) has been of long standing prior to the attack, and as a consequence hard to correct, it is difficult to shorten the malarial attack.

This would emphasize the point that the essential treatment must be a thoroughly readjustive one, and that stimulatory and inhibitory work can only palliate. This is borne out by several practitioners who have had considerable experience. Very satisfactory results follow adjustment of the seventh to tenth dorsals.

Quinine has been accepted by medical authorities as a specific for malaria. It is supposed to act directly upon the intracorpuscular hematozoa. That it is not infallible is shown by the numerous cases which come to the osteopath, suffering from both the disease and the quinine. And even drug authorities state that other treatment is also required. It has remained for Dr. Still to demonstrate that excellent results follow osteopathic treatment in malaria. Frequently a single treatment has been sufficient to free and regulate the body fluids and forces so that the parasite was rendered inert, and this treatment was directed chiefly to the fourth and twelfth dorsals. Whereas the osteopath recognizes and appreciates the importance of micro-organisms as exciting and determining factors in many diseases, still he values them as secondary factors only and relies primarily upon removing the predisposing and true etiologic factors, so that nature's forces may not be obstructed and thus predominate. Osteopathic etiology and pathology has shown so conclusively, in a large number of cases, that the existence of micro-organisms is dependent upon devitalized tissue, whether the tissue is a local one or a circulating one, as the blood; and just so soon as the ana-

1. Journal of Osteopathy—Prize Article July, 1906.

2. A. O. A. Case Reports—Series I.

tomical is adjusted the physiological will function and antitoxic and antimicrobial substances are secreted.

"When the patient has the quartan parasite, as soon as the temperature begins to fall I give him from two to six ounces of red meat juice, extracted from rare beefsteak, sometimes as much as five pounds in the first twenty-four hours following the chill. In almost all cases of quartan malaria the blood is built up sufficiently by the time they reach the second cycle to pass without the paroxysm, or chill. By the time for the third cycle, which is the seventh day, I always have built up the patient's resistance so as to enable him to pass by this cycle without any symptoms of malaria whatever. In cases of double or triple I find the same treatment causes about the same results. I do not give any other diet, except dry toast if they eat the beef instead of taking the juice. If they can take the steak I prefer their taking it, but almost all cases prefer the juice. * * * The treatment for the tertian type of malaria is practically the same as the treatment for the quartan.

"The estivo-autumnal type of malaria differs from the quartan and tertian types; first, in that the paroxysms are, as a rule, much more irregular; second, they are much longer in duration; third, the chills are more frequently absent; fourth, the fever is often irregular, intermittent, remittent, or continuous in character. This type very often takes the form of blackwater or hemoglobinuric type with hemorrhagic symptoms, with hemorrhage from nose, gums, and bowels. The first thing to do in a case of hemorrhagic malaria is to put an ice bag on the abdomen, which will tend to control the hemorrhage from the kidneys. Give the patient all the red beef juice you can get him to take, provided he has not developed a very sick stomach; if so, give him high saline enemas and in one-half hour give him four ounces red beef juice per rectum. Repeat the feeding per rectum in four hours. As soon as he can retain anything on stomach give him all the juice he can take comfortably. Treat the liver thoroughly—at least three times in the first twenty-four hours. At the end of thirty-six hours the yellow cast will be very much lighter, which is a sure sign that the patient is getting better. Watch the urine closely. The third day there may occur a suppression. If so, give strong stimulation to the renal plexus through the abdomen, and be sure there is a thorough relaxation of the dorsal and lumbar muscles.

"It is an established fact that people in the malarial districts eat very little beef. I find that ninety-nine per cent of the cases of malaria never eat it, or when they on rare occasion do, it has been so overcooked that all the blood-building substances have been destroyed. The beef

raw would be better in my opinion; although, the possible chance of getting a tapeworm or animal parasite is so considerable that I would advise that the beef should be heated to 250 degrees."—E. C. ARMSTRONG, *Clinical Osteopathy*.

Septicemia

This term is applied to any toxic condition caused by the invasion of the blood by pathogenic micro-organisms, with or without any visible site of infection.

Etiologically, the micrococci, streptococci, pneumococci, or staphylococci, as to frequency, in order named, are the cause. The infection is usually introduced by a wound, of any degree of severity. The uterus is a frequent seat following miscarriage, parturition or operation. The virus may be absorbed by the mucous membrane. It may also arise from infection of the deeper tissues. **Pathologically**, the changes are not marked, but consist in brownish color of the muscles, ecchymotic spots in the pia mater and dark appearance of the blood, which is also less coagulable. Spleen, liver and lymphatics are enlarged with some changes in the other organs.

Symptoms.—The incubation period is from four to six days and the onset is gradual, though often announced by a distinctive chill, followed by a profuse sweat. The most common type is the continuous form of fever, which may, in morning remissions, become subnormal. Pulse is rapid at the beginning, but as cardiac failure comes on, it becomes weaker. In the earlier stages there may be vomiting with diarrhea later. There are punctiform hemorrhages of the skin and possibly other eruptions. Blood examination will settle any doubt as to diagnosis.

Prognosis is good in large percent of cases and depends upon the general health of the patient.

Treatment.—"Incise and drain the infected part; if possible, apply hot boracic acid compresses or keep part suspended in hot boracic acid solution. Osteopathic treatment will aid materially in stimulating and strengthening the patient. Bowels, kidneys and skin must be kept active. Normal salt solution, hypodermically or per rectum is of value. Diet should be liquid, fruit juices, broths, soups until temperature has remained normal twenty-four hours then milk, eggs etc., in gradually increasing amounts until general diet is restored. Amputation of the part may be necessary."—L. E. BROWNE.

Pyemia

A febrile disease arising from an invasion of the blood by pathogenic bacteria, wherein sepsis and multiple abscesses occur from absorption and metastasis.

Etiologically, the cause may be traced to various specific organisms which enter the blood stream and produce thrombophlebitis. From these points and from other bacteria, new foci are established. Occasionally the lymphatics carry the germs. The disease may also start from ulcerative endocarditis or when the appendix is infected.

Pathologically, thrombosis of the vein may take place in any region. Abscesses may form in the lungs, liver, spleen or other internal organs. The small abscesses may unite and form a large one. The skin presents eruptions and hemorrhagic extravasations, while there may be ulcers of the mucous membrane, also the serous surfaces may be purulently inflamed. The muscles, subcutaneous and osseous tissue occasionally have abscesses. Ulcerative and suppurative heart lesions occur.

Symptoms.—The incubation period is short. There may be slight fever, but commonly a chill is the first symptom, which may re-occur for some time. The fever is either remittent or intermittent and when the temperature is low, sweating is a feature. The pulse becomes rapid and weak, when the disease is severe; breathing becomes difficult. Skin symptoms, such as eruptions and pustules, generally occur. In a word, there is a general intoxication. There is a lessened number of red blood corpuscles and leucocytosis is a characteristic. In grave cases, delirium and coma are present.

Diagnosis.—The history of the case and symptoms will usually render diagnosis easy, although care is necessary to determine from septicemia. Malaria, typhoid and acute tuberculosis must be excluded.

Prognosis.—Much depends on asepsis and surgery but on the whole it is unfavorable.

Treatment.—Surgical interference and treatment as outlined under septicemia is the only hope.

Dengue

(BREAKBONE FEVER)

Definition.—An acute infectious disease; characterized by a double febrile paroxysm, severe pains in the muscles and joints and sometimes a skin eruption.

Etiology.—It is a disease of tropical and subtropical regions. Unhygienic conditions predispose to an attack. During an epidemic a single attack is the rule. The disease spreads from place to place along the lines of travel, attacking both sexes, and all ages. It occurs in epidemics, practically affecting every one. The specific germ has never been isolated as it is probably ultra-microscopic but there is no doubt but that it is carried by the mosquito *Culex fatigans*.

Symptoms.—The incubation period lasts about four days. The onset is abrupt with a slight chill, headache, and extreme pain in the joints and muscles, of a boring or breaking character. The joints become red, swollen and painful. The fever rises gradually to 103 or 106 degrees F., or over. The pulse is rapid and full and the respirations are much quickened. The face is flushed, the tongue coated, the appetite is lost, and slight nausea occurs. "Black vomit," similar to that of yellow fever, has been observed in this disease. Hemorrhages from various organs may occur and the lymphatic glands are swollen. The urine is scanty and the bowels constipated. Febrile albuminuria and delirium are rare.

At the end of three or four days the temperature falls and there is a period of remission; the patient is free from pain, but profoundly prostrated. During this time the eruption generally appears, but is never constant in character. After a remission of two or three days, the symptoms reappear and a second febrile paroxysm sets in. This is usually milder and shorter than the first, lasting two or three days, when convalescence begins. The duration is, according to medical writers, from seven to ten days, and convalescence slow. Death seldom occurs, so practically no pathological changes have been recorded. By osteopathic treatment, E. B. Ligon has been able to confine the attack to four or five days duration; this is confirmed by the experience of N. Chapman.

Diagnosis.—During an epidemic the disease attacks all classes alike, and the distinct remission renders the diagnosis comparatively easy. An occasional case might be mistaken for acute rheumatism, but the absence of any glandular swelling or eruption, while the pain is more closely limited to the joints, will aid in the diagnosis. Care has to be taken that yellow fever is not mistaken for dengue.

Treatment.—The indications of the treatment are to maintain the patient's strength and to treat the leading symptoms as they arise. The severity of an attack can probably be lessened at the start by strong and thorough treatment of the sub-occipital, upper dorsal, lower dorsal

and lower lumbar regions, respectively, so as to control the large vascular areas by means of the vasomotor nerves of the cranial region, of the lungs, of the splanchnic region, and of the lower limbs, thus equalizing the entire vascular system. Elimination should be pushed and the excretory organs stimulated. Ligon has observed that the cervical and lumbar regions are especially tender on the second day and the lower dorsal region on the third day. The most severe symptoms disappeared within a few hours after treatment and the attack was markedly shortened.

The high fever may be treated by the usual methods and by the external application of cold water. The pain is to be controlled, according to the region affected, by a correction of parts impinging upon the nerve tissues and by strong inhibition. The entire spinal region should be kept constantly in a relaxed condition, as far as muscular contractions are concerned. Particularly should the treatment be extensive along the spine during prostration. N. Chapman, in addition to the osteopathic treatment, has the patient drink considerable hot water; also employs the hot bath. The treatment frequently shortened the attack. During the entire attack of the disease, the patient should be kept in bed and a carefully regulated diet administered. Relapses are not infrequent. A suitable change of air may hasten convalescence.

Cerebrospinal Meningitis

Definition.—A specific, infectious disease caused by the diplococcus intracellularis meningitidis, occurring sporadically and in epidemics. It is characterized by inflammation of the membranes of the brain and spinal cord and an irregular course.

Osteopathic Etiology and Pathology.—The specific exciting cause of the cerebrospinal meningitis is due to the diplococcus intracellularis meningitidis of Weichselbaum.[†] Lesions are found in the vertebrae corresponding to the cervical and dorsal enlargement of the cord, as well as in corresponding deep muscles; also, as is well known, the muscles of the entire back are severely contracted, especially of the cervical, upper and lower dorsal regions. More commonly it attacks the young, although it may occur at any age. Overexertion, exposure, overcrowded and illy-ventilated buildings, barracks and tenements, and depressing mental influences are predisposing causes. Many times the disease occurs among the poorer classes. Sometimes the disease prevails in the country rather than in the city.

In cases that prove speedily fatal there may be no characteristic changes; simply marked congestion. Other cases in which death occurs

after the disease has been fully developed, there is found every degree of inflammation from slight hyperemia to suppurative changes. There can be no doubt that the osteopathic lesion, as vertebral and rib lesions and deep muscular contractions, affects the circulation of the meninges of the brain and cord and thus favors the invasion of the specific micro-organism. The arteries, veins and sinuses are greatly engorged. The walls of the ventricles soften and the ventricles contain serous exudate. The brain matter may be congested and softened in spots. In the spinal membranes similar changes take place and at times there is extravasation of blood. The changes are more marked on the posterior than the anterior surface of the cord. Abscesses sometimes form. The exudate may follow the lymph sheaths of the cranial nerves, especially the auditory and optic. In long standing cases the membranes become thick and adherent and areas of softening or atrophy of the cortex develop. The thickening and adhesions of the membranes may cause various symptoms for months or even years after recovery from the acute disorder.

The spleen may be normal in size, but when the fever has been intense, it is apt to be slightly enlarged. Bronchitis, pneumonia, endocarditis and pleurisy may occur. The liver may become hyperemic and the kidneys congested.

Symptoms.—The prodromes vary, although the onset is apt to be sudden with a decided chill; headache; vomiting, and pain in the neck and back, which is usually severe, but may be so slight as not to be noticed by the patient. The temperature rises to 101 to 102 degrees F., in most cases. However, it may rise to 105 degrees or 106 degrees and even to 108 degrees in fatal cases, and the pulse is full. Hyperesthesia, photophobia, and dread of noise are apt to be prominent symptoms. The muscles of the neck and back become rigid, and there are pains in the limbs. Orthotonos occurs more frequently than opisthotonos. Convulsions are common in children. There may be paralysis, especially of the muscles of the face and eyes. Delirium usually appears early; it may be mild, but it is often maniacal. The bowels are usually confined, though there may be diarrhea. There is moderate and constant leucocytosis and jaundice has been met with.

The urine is sometimes albuminous, and sugar has been noted in rare cases. The urine may be increased, but more often it is lessened as in other infectious diseases.

Herpes facialis occurs shortly after the onset in more than half the cases. The contents of the vesicles may be purulent and one or two may

coalesce. The petechial eruptions are occasionally numerous and cover the entire skin; they do not disappear upon pressure and the number of spots varies greatly. Other eruptions as sudamina, ecthyma, pemphigus, urticaria, erysipelas, rose colored spots, and gangrene of the skin (rarely) have been met with.

In cases that are **rapidly fatal**, the onset is sudden, usually with violent chills, headache, depression, and in a few hours coma and collapse, which are soon followed by a fatal termination. The temperature may rise slightly, but it is often subnormal. The pulse is feeble; breathing is labored. These cases occur more frequently at the beginning of an epidemic. They occasionally occur sporadically.

The **abortive** form terminates abruptly after the development of one or more pronounced, characteristic symptoms.

The **mild** form can only be recognized during the prevalence of an epidemic. The symptoms are very mild; slight vomiting, little or no fever, headache and slight pain in the back and limbs.

The **intermittent** form is characterized by increase in the fever every day or second day. The strict periodicity seen in malaria is not observed; the fever resembles that of pyemia.

In the **chronic** form the condition may persist for weeks or months.

Complications.—Pneumonia (lobar and lobular) is a frequent complication. Pleurisy, pericarditis, parotitis, arthritis, enteritis, optic neuritis and otitis media may be other complications.

Sequelae.—Blindness, deafness, keratitis (rarely), persistent headache, chronic hydrocephalus, abscess of the brain, mental feebleness, defective articulation, aphasia, and paralysis of certain cranial nerves or of the lower extremities have occurred.

Diagnosis.—**Typhoid fever** begins slowly and is unaccompanied by vomiting, muscular spasms or rigidity, or hyperesthesia. In typhoid the fever is higher and there is a characteristic temperature curve. Widal's test will confirm.

Tubercular meningitis is not epidemic and has no characteristic eruption. It is usually less sudden in its development and is invariably fatal. Retraction of the neck, muscular spasms of the legs and arms are not so marked as in spinal meningitis.

Pneumonia may be complicated with meningitis, especially when the meningitis is confined to the cerebrum. If the case is not seen early, it is almost impossible to say which is the primary affection, as pneumonia may have meningeal complications or cerebrospinal meningitis may be associated with pneumonia. There will be motor spasms and tremors,

but the head is rarely retracted, and there is less myalgic pain than in cerebrospinal meningitis.

Prognosis.—This varies according to the severity of the type. It is a grave disease. Cases have been treated successfully by several osteopaths. The duration is very variable—from two or three days to weeks or even months, but probably in all cases this time can be materially shortened by judicious osteopathic treatment. Convalescence is very slow and relapses are prone to occur.

Treatment.—The osteopathic treatment of cerebrospinal meningitis requires most thorough, but very careful, work along the spinal column, especially the cervical region and the region of the dorsal enlargement of the spinal cord, in relaxing and keeping relaxed the deep muscles on either side of the spine and correcting the derangements of the vertebræ, particularly in the upper cervical spine. Such treatment has a marked effect on the circulation of the spinal cord and brain. Probably, a large amount of the work along the spine, in all cases where muscles are relaxed, has a direct effect upon the circulation of the spinal cord. This treatment constitutes the primary osteopathic work in cerebrospinal fever and should be frequently applied until a cure is obtained. Even in chronic cases where limbs have been greatly affected by pressure upon the nerve centers, due to a thickened membrane, continued osteopathic treatment along the spine has had a marked effect in absorbing the pathological condition and restoring strength.

The preceding spinal treatment is also a very great safeguard in keeping the various viscera healthy and thus preventing complications. In all constitutional diseases of an acute nature, it is a wise precaution to thoroughly examine the entire length of the spinal column at each visit; and if such precaution is taken many serious complications will never occur that might otherwise have taken place.

The patient should be isolated in a somewhat darkened room, and care taken that the disease is not allowed to spread. Keep the patient upon his sides as much as possible. The diet should be a nutritious one of milk and broths. They should drink freely of water. Cold to the head and spine will be of service in controlling the inflammation; it should be applied with an ice-cap and a spinal ice-bag. Sponging the body should be employed if the temperature is above 102° F. The general bath, as in typhoid fever, may be employed if practicable. Direct treatment to the bowels, kidneys, liver and spleen should be given at each treatment.

Lumbar puncture and the Flexner-Jobling serum are considered of value by those who have had an extensive experience.

Diphtheria

Definition.—An acute, infectious disease, caused by the Klebs-Loeffler bacillus, and characterized by a membranous exudation on the mucous membrane of the fauces, larynx or nose, and by constitutional symptoms. The presence of the Klebs-Loeffler bacillus distinguishes true diphtheria from any other form of membranous inflammation. The term diphtheroid is applied to all such forms as are not due to the Klebs-Loeffler bacillus.

Osteopathic Etiology and Pathology.—The exciting cause is the Klebs-Loeffler bacillus. The predisposing cause is obstruction to the circulation of the pharynx and tonsils by sub-dislocations of upper cervical vertebræ, and even the lower cervical and upper dorsal, and severely contracted deep muscles of the neck. The stasis of blood favors the growth of the bacillus.

Link¹ says: "The cause of nasal, pharyngeal or laryngeal diphtheria is obstruction of the blood and lymph through the neck and the obstruction occurs as a result of lesions in the cervical region, affecting the cervical sympathetics, or lesions in the upper thoracic region whence the vasomotor fibers arise. A derangement of the vertebral articulation of the first rib is usually found. (This affects the stellate ganglion and fibers of the sympathetic chain). These lesions cause a condition of lowered vitality of the mucosa of the nose and throat; the abnormal secretion favoring the rapid multiplication of the Klebs-Loeffler bacillus—the exciting cause of the disease."

Dr. Still believed that, among other lesions, contracting of tissues involving the scaleni and disturbing the relations of the first rib with the clavicle and vertebra are causative factors. The constitutional symptoms are produced by the toxins generated by the bacillus and absorbed from the diseased spots by the lymphatics and blood-vessels. The bacillus is non-motile and does not usually penetrate the mucosa, but remains very near the site of the local changes although there are instances where it may enter the blood and other tissues. The bacillus is very resistant and can maintain an existence for months outside of the body. There is great variation in the virulence of the Klebs-Loeffler bacillus; it has been found in healthy throats, and sometimes the bacillus may exist in the throat after an attack of diphtheria for months after all the membrane has disappeared. It has also been found in cases of simple catarrhal angina without membrane, and in simple tonsillitis

1. E. Link, Diphtheria—The Bulletin, 1905.

Of the bacteria associated with the bacillus of diphtheria, the streptococcus pyogenes is the most common and probably the most active. The staphylococcus, micrococcus lanceolatus and bacillus coli communis are also found.

The contagion is communicated, as a rule, through the air, by means of fomites from the membranous exudate or discharges from the diphtheritic patients, or during convalescence, from secretions of the nose and throat. Infected milk may cause the disease. Most cases occur in childhood, between the second and seventh year. The disease is most prevalent in the cold autumn and spring months. It is most frequently met with in temperate and cold climates. Defective drainage, catarrhal conditions of the throat, enlarged tonsils, general weakness, and feeble resisting power are predisposing factors. One attack does not confer immunity from another, but rather predisposes to a second.

The **false membrane** is usually found on the tonsils, the pillars of the fauces and the pharynx, and in fatal cases it may be extensive and involve the uvula, the soft palate and the posterior nares, and even the trachea and bronchi. At first this membrane is yellowish white, but later may become gray; it is more or less adherent and when torn off leaves a raw surface. The diphtheritic poison coming in contact with the throat leads to, first, a necrosis or death of the epithelial cells, especially the more superficial, and the leucocytes. The second change is the hyaline transformation, and simultaneously coagulation; hence the term coagulation-necrosis. The irritation produced by the bacilli causes a migration of leucocytes and these are destroyed and undergo hyaline transformation. This process proceeds from without inward and is usually superficial, and the necrosis may be extensive, involving the deeper tissues, causing ulceration and a gangrenous condition of the parts. The erosion of the tonsils may be so severe as to attack the carotid artery. The lymphatic glands are considerably swollen. The spleen is commonly enlarged. The kidneys show parenchymatous changes. The blood is dark and fluid. Fatty degeneration of the heart is not infrequent. Sometimes fibrinous coagula are found in the heart. Capillary bronchitis, catarrhal pneumonia and areas of collapse are almost constantly found on examination of the lungs in fatal cases. The **urine** is typically febrile with early albumin and often tube casts and renal epithelium. The **blood** shows an excess of red blood cells which may reach 7,500,000. Hemoglobin is slightly reduced. There is considerable anemia during convalescence depending upon severity of toxemia.

Symptoms.—The incubation period varies from one to ten days, usually two or three days. According to the location, diphtheria may be divided into pharyngeal, laryngeal and nasal forms.

In **Pharyngeal Diphtheria**, which is most common, there is first a slight chill or chilliness, followed by fever and sore throat, both of which increase rapidly. The throat is swollen and red and the patient complains of difficult swallowing. The membrane begins on the tonsils in the form of grayish-white patches; it then spreads from the tonsils to the soft palate, sometimes covering the uvula. The cervical glands are swollen and tender. The neck muscles are contracted and somewhat difficult to relax. The temperature rises to 102 or 104 degrees F. The pulse is rapid and feeble, ranging from 120 to 140. There is loss of appetite. There is more or less prostration depending upon the gravity of the constitutional symptoms. The average duration is from one to two weeks.

Laryngeal Diphtheria (Membranous Croup) may be secondary to extension from the fauces or it may be primary. At first there is slight hoarseness and a harsh, metallic, ringing cough. These symptoms may persist for a day or two, when the child suddenly becomes worse; there is marked dyspnea and the lips and finger tips become livid. The child soon becomes very restless. The temperature may be slightly above normal and the pulse increased in frequency. In favorable cases the dyspnea is not very marked and the child probably will have only one or two paroxysms, when it will fall asleep and wake in the morning feeling very comfortable. The next night, however, the attack may be more pronounced. In extreme cases death may result from suffocation. In some cases the suffocation is slower and results from extension of the membrane downward into the bronchi. Dr. Still found same conditions as in diphtheria, but also the hyoid is involved with the superior laryngeal nerve. The sacral and lumbar nerves are also involved. He always emphasized chilling of gluteal region as a cause for croup and that heat should be applied at the inception of the disease.

Nasal Diphtheria is generally secondary, but it may be a primary affection. In many cases no membrane is found; in others there may be a pseudo-membrane formed in the nose, but there is absence of any systemic disturbance. The Klebs-Loeffler bacillus is sometimes present in these membranes. Nasal diphtheria may be a very grave disease—the constitutional symptoms being great prostration, high fever, marked glandular swelling, irritating and offensive discharges from the nose, and epistaxis. Inflammation occasionally extends through the tear duct to the conjunctiva.

A diphtheritic membrane may grow where the skin has been cut or bruised, but the bacillus cannot live on normal skin. It flourishes on a raw, moist surface and membranes have grown on the lips, tongue, vulva, glans penis, and on ulcerative surfaces and wounds. Diphtheria occurs occasionally in the conjunctiva and the external auditory meatus.

It should be remembered that there are many atypical forms of diphtheria. Bacteriological examination should always be made in suspicious and puzzling cases.

The complications of diphtheria are nephritis, hemorrhages, rashes, capillary bronchitis, pulmonary collapse, catarrhal pneumonia, myocarditis, arthritis, otitis media, and paralysis.

Diagnosis.—The presence of the Klebs-Loeffler bacillus will at once decide the diagnosis of diphtheria.

Prognosis.—The prognosis should always be guarded. The nasal and laryngeal forms are always grave. The causes of death are involvement of the larynx, septic infection, heart failure, bronchopneumonia during convalescence, and rarely, uremia.

Treatment.—Hygienic and prophylactic measures are important. A room should be selected that is ventilated and exposed to the sunlight. All unnecessary articles of furniture should be removed. Great care must be taken against the spread of the disease. Always isolate the patient and disinfect everything that has come in contact with him. The greatest danger lies in the spread of the disease during convalescence and in the ambulatory form, when patients are about and coming in contact with individuals, especially children with catarrhal conditions of the nose and throat. The physician should be careful about disinfecting himself.

In view of the fact that many osteopaths have treated successfully numerous cases of diphtheria and that the osteopathic treatment is peculiarly indicated and effective, the probable requirement of antitoxin (the use of which we do not feel called upon to discuss) would be lessened. Relative to the antitoxin Osler says: "The principle of action depends on the circumstance that the blood-serum of an animal rendered immune, when introduced into another animal, protects it from infection with the diphtheria bacilli, and has also an important curative influence upon diphtheria, whether artificially given to animals, or spontaneously acquired by man."

"The treatment of diphtheria by osteopathic methods is often a pleasure rather than a trial because of the success which rewards us for our efforts. There has been considerable discussion by the members of

our profession regarding the methods to be employed in successfully overcoming this disease, and many have expressed the view that since antitoxic serum is a physiological remedy, which naturally belongs to all schools of healing, it should be employed by the osteopathic physician in cases of diphtheria. I have no objections to the use of the serum therapy by members of the profession who conscientiously feel that they need it in their practice to secure the highest success. However, I feel, on the other hand, that if they were well acquainted with the technique of the methods * * * they would not feel it to their advantage, from the standpoint of success, to use injections in a single case."—R. D. EMERY, Clinical Osteopathy.

The local treatment should be carefully, but vigorously, given. By proper treatment of the throat the extension of the disease may be prevented. The muscles about the throat, especially the deep ones, should be thoroughly relaxed and the cervical vertebræ corrected if displaced. The vasomotor nerves to the blood vessels of the affected region require careful treatment at the superior cervical ganglion, and the cervical lymphatics from the atlas to the first rib should be closely watched. The nerves to control are the vagi, glosso-pharyngeal, spinal accessory, and sympathetic nerves to the pharyngeal plexus, and in cases of nasal diphtheria the fifth nerve has to be carefully treated. An external treatment to the pharynx will have the greatest effect on these nerves. An internal treatment to the nerves of the soft palate will be of considerable service. The parts diseased should be disinfected and kept as clean as possible. Bichloride of mercury (1:4000) used as a spray will be found satisfactory, although there are several other disinfectants and germicides that may be used. Pellets of ice in the mouth will be a comfort to the patient. Cold applied externally will be found best for the adult; heat externally is better for the child.

Every possible means should be used to prevent the disease from spreading. One of the chief dangers of diphtheria is the spread of the disease to the larynx, trachea and bronchi. When the disease has extended to these parts it presents all the symptoms of **true croup**. The deep cervical muscles should be thoroughly relaxed to aid in relieving the passive hyperemia and with a view of disorganizing the exudate. Attention should be given to the upper ribs, as interferences with the vasomotor nerves of the mucous membrane of the trachea and bronchial tubes usually occur. Direct treatment over the larynx and local treatment through the mouth upon the soft palate will be of aid. A thorough relaxation of all the dorsal muscles, even as low as the tenth dor-

sal, should be given. Inhalations of slaked, freshly burnt lime may be useful in loosening the exudation. In desperate cases tracheotomy or intubation of the larynx should be performed. Willard¹ says, relative to membranous croup: "It matters not whether or not the laryngeal inflammation was immediately caused by a germ; it would not, nor could not, have been produced by such had there not been an unnatural condition of the circulation of and about the larynx."

A constitutional treatment should always be given with a view of preventing the spread of the disease from one organ to another and to prevent complications. The heart's action should be carefully watched throughout the entire course of the disease. Treatment of the spinal cord will guard against paralysis that sometimes follows the venous hyperemia of the vascular linings and substance of the brain and spinal cord. Pay particular attention to the upper dorsal region to prevent possible heart involvement. Post-diphtheritic paralysis seldom if ever occurs in cases that are treated osteopathically. This is a common sequela and is present in from 10 percent to 30 per cent of cases, appearing within three weeks of apparent recovery. Sometimes it is the only result to show diphtheria was present. It seems to follow use of anti-toxin rather frequently. Attention to the splanchnics and to the abdomen directly will tend to keep the stomach, liver, kidneys, and intestines in a healthy state. The diet of the patient should consist of liquid food—milk, broths, meat juice, raw eggs and barley water. Let the patient drink freely of water. Treatment of the rectum may be employed with benefit when the pharynx is greatly disturbed.

Various **sequelae** and **complications** are best relieved or prevented, according to Link, as follows: "First, limiting the production of toxins by a most thorough relaxation of the muscles of the neck, thereby favoring the unobstructed circulation of the blood and lymph; second, by the correction of lesions which affect the vasomotor of the head and neck; third, by spinal treatment affecting the vasomotor to the areas involved; fourth, by increasing the activity of the excretory organs, by treatment in the splanchnic and lumbar areas, that the toxins may be more rapidly eliminated. In cases where laryngeal stenosis is marked and suffocation is imminent, intubation should not be delayed." Post-diphtheritic paralysis usually yields to osteopathic treatment. Apply treatment according to location.

1. A. M. Willard, Membranous Croup—Journal of Osteopathy, March, 1904.

Dysentery

(BLOODY FLUX).

Dysentery is an infectious disease wherein the large intestine is inflamed, with ulceration of the mucous membrane; is characterized, clinically, by frequent stools containing blood and mucus; fever and exhaustion. **Osteopathic lesions** of an osseous character and deep muscular contractions of the lumbar region are always present. These involve the vasomotor nerves to bloodvessels and lymph channels. Catarrh of the intestinal tract is an important predisposing cause. The disease usually occurs in the summer and autumn, and is more common in hot, malarial regions, although it is found in various climates. Unhygienic conditions are also important predisposing factors. In no disease more than dysentery does specific correction of the osseous lesion effect quick and satisfactory results.

Acute Ileocolitis

(BACILLARY DYSENTERY)

This is the variety most frequently found in temperate climates. It occurs either sporadically or endemically. The Flexner bacillus is frequently found, as well as pus microorganisms. There are various strains of the bacillus. There is a catarrhal inflammation of part or the whole of the large bowel. Other forms may occur, as ulcerative and membranous.

Osteopathic Etiology and Pathology.—Sudden atmospheric changes and simple irritants, such as unripe and indigestible food, are usually the immediate causes. The predisposing cause of acute catarrhal dysentery is always found by the osteopath to be due to spinal derangements in the lumbar region. The lesion is generally a slight lateral deviation of a vertebra. It is generally found at the second or third lumbar; still, the trouble may be found at any point in the lumbar section. The lesion involves vasomotor nerves to the intestinal mucous membrane, thus causing the inflammation. The drinking of impure water in itself may not be the cause of the disease, but is a favorable medium for the development of the organisms which may excite it. Dyspeptic conditions and constipation seem to predispose to the disease.

The mucous membrane is injected and swollen and often covered with bloody mucus. The follicles of Lieberkuhn are enlarged from retention of their contents, the result of the swelling; the follicles are often ruptured and the mucous membrane sloughs off in patches, forming ul-

cers. These may extend along the whole colon and frequently into the ileum.

Symptoms.—Diarrhea is the most common initial symptom; the stools being copious and painless. The stools soon become small and frequent, covered with mucus and streaked with blood. These are passed with straining and tenesmus, accompanied by colicky abdominal pains of a griping character. Chills are rare. The tongue is furred and moist; later it becomes dry. Nausea and vomiting may be present, but not as a rule. There is fever and often excessive thirst. Later the stools become green in color, due to the bile which causes a burning sensation in the rectum.

On examination there are found red blood-corpuscles and leucocytes, and large, round and oval epithelioid cells containing fat drops and vacuoles. In mild cases, the course is about eight days; severe cases subside within four weeks, but if the **osteopathic treatment** is careful and specific, the usual duration can generally be reduced one-half.

Prognosis.—The prognosis is generally favorable in the catarrhal form when the disease is treated properly. The previous general health, hygienic conditions, and sanitary surroundings are of great importance. When there is ulceration or membranes the prognosis should be guarded. The condition may become **chronic**.

Treatment.—The bowel should be thoroughly washed out by warm water enema, several times, if necessary, to remove irritating material. Invariably a lesion of the spinal column is found at the third and fourth lumbar or near by. It is generally a subluxation, of a lateral nature, between these vertebrae: rarely is the lesion above or below this point. The treatment should be applied immediately and directly to this region. Time is valuable in these cases and one should go to work at once to correct the irritation. An attempt should be made at each treatment to correct the disorder. This should not be delayed by wasting time in relaxing muscles and inhibiting, for unusually this gives only temporary relief. When a slight movement has been accomplished between disordered vertebrae, treatment should be stopped and results watched, because the adjustment may have released all obstructions or irritations causing the disease. In many cases, to get an anatomically correct spine is an impossibility, from the fact that the displacements may be of long standing and naturally the subluxated vertebrae have conformed themselves to some extent to their unnatural position. In other words, what has been lost in the position and relation of a vertebra may have been compensated by reducing the effect of the lesion to a

minimum. A lesion of this nature at the third lumbar impairs the innervation to the colon and consequently produces a stasis of blood in the mesenteric circulation, followed by inflammation, bloody discharges, cramps, etc. A single treatment is usually quite sufficient in milder cases. Other cases require treatment every few hours or thereabouts, until recovery.

Treatment directly over the abdomen through the mesenteric circulation and glands is an effective treatment in most cases and especially when the attack is severe. It relaxes the tissues about the mesentery, thereby relieving the stasis and freeing the circulation. The greatest care, however should be exercised in giving this treatment.

The constant desire to defecate, that is common to many cases, is a very annoying symptom. Strong, thorough treatment over the sacral region, by inhibition over the sacral foraminae and by relaxing the tense muscles of the sacrum, will relieve this condition. In relaxing these muscles, place the whole hand against the muscles and push upward toward the occiput. This treatment inhibits the nerves to the rectum and lessens the **tenesmus**.

Attention should be paid to the liver to keep it active. Washing out the large bowel with tepid water produces a soothing effect, besides having a tendency to allay inflammation. The blandest of liquid foods, as peptonized or boiled milk, broths, beef juice, barley and rice, should be given. The patient should remain in bed until completely cured.

Amebic or Tropical Dysentery

This form prevails in the tropical and subtropical countries for the most part, and is caused by an animal parasite, the *ameba dysenteriae*. This is constantly found in the stools, the tissue of the intestine and also in the pus of the liver abscesses, which are secondary to dysentery. Amebae are sometimes found in the stools of healthy men, having probably entered the system through the drinking water or uncooked food.

Pathologically, the mucous membrane of part or whole of the large intestine is swollen. Round or irregular ulcers which undermine the mucous membrane, especially of cecum, ascending and pelvic colon, are found. In later stages there is infiltration of the connective tissue followed by necrosis. In some cases false membranes and sloughs are formed.

Symptoms.—The onset may be either sudden or gradual, with a very irregular diarrhea, moderate fever, and copious, liquid stools, abounding with the amebae coli. The straining may be less severe and

persistent than in catarrhal dysentery and may be absent. Sometimes there is nausea and vomiting.

Abscess of the liver is the most common complication, which may be single or multiple. When single it usually involves the right lobe. Multiple abscesses are small. The more recent abscess walls are necrotic; the older have whitish, smooth, fibrous walls. These abscesses do not contain pure pus, but a fatty and granular debris containing the amebae and a few cellular elements. Sometimes they extend into the lung.

Diagnosis.—This depends upon severity of attack and general condition of the patient. Relapses often occur and the case may become chronic. Cases have been treated osteopathically with success.

Treatment.—In this form of dysentery the treatment is largely the same as in acute ileocolitis. The spinal lesions affect the innervation to the intestine, thus producing a stasis in the circulation; this condition favoring, and in fact, inviting the retention of the ameba coli in the system at this point.

The diet is the same as in other forms of dysentery. Rectal injections and hot applications to the abdomen are useful. In all cases where strong treatment has been given to the spinal column, a quieting treatment to the nervous system and an inhibitory treatment to the heart will be gratefully received by the sufferer. Both of these effects can be accomplished at the same time by simple inhibition to the occipital nerves. The stools should be taken care of immediately and disinfected. Ice water enemas given frequently are reported as giving good results. For the tenesmus, inhibit strongly at 3d, and 4th, sacrals.

Chronic Dysentery

This is generally resultant from an acute attack, though the amebic form may be sub-acute from the onset.

Pathologically, the coats are generally thickened, especially the submucosa and the muscular coats being hypertrophied. Ulcers are usually present, although there are cases in which there are no ulcers. Cicatricial contractions sometimes follow and the calibre of the bowels is reduced, strictures being rare.

Symptoms.—There is a progressive loss of flesh and strength, little or no tenesmus, slight, colicky pain and extreme anemia. The stools contain mucus, at times blood, and the bowels move from two to twelve times a day.

Diagnosis.—The history of the initial symptoms will establish the diagnosis. It is not always possible to distinguish between chronic dys-

enterly and chronic diarrhea. The duration is from a few months to several years, although osteopathic treatment has proven very efficient in many instances.

Treatment.—Rest and a liquid diet are most essential. Foods that are easily assimilable and nourishing, with a minimum amount of residue, are required. Beef juice, beef peptonoids and peptonized milk are the types of food. Change of air, hygienic measures and environment are important.

In cases that become chronic, the spinal column oftentimes exhibits lesions above and below the lumbar region. Undoubtedly they are lesions of secondary importance in comparison to the lumbar lesions, but it is important that they be corrected. The treatment requires thorough, careful work of the disordered spinal column and lower ribs. Occasionally a slight kyphosis is present in the dorso-lumbar region that demands persistent work in order to correct it. An occasional rectal injection is beneficial, especially in cases that have slight ulceration of the sigmoid flexure or rectum causing colicky pains and a few loose stools in the morning, the patient being fairly comfortable during the rest of the day.

Erysipelas.

Definition.—An acute, infectious, specific disease, characterized by a peculiar inflammation of the skin, due to the streptococcus erysip-elatis, with a tendency to spread.

Osteopathic Etiology and Pathology.—Osteopathically, lesions are found to the vasomotor nerves and lymphatics of the affected area. Dr. Still gives lesions of the "inferior maxilla, the cervical vertebrae, the clavicles or the upper ribs" as specially important factors. These lead to congestion and predispose to infection. It occurs in epidemic form, especially in the late winter and spring. One attack predisposes to a second. Family predisposition exercises a slight influence. Abrasions, lacerated wounds, especially of the scalp, may be the starting point of an attack. Persons having skin diseases and wounds, and women who have been recently delivered are liable to be affected. Chronic Bright's disease, chronic alcoholism, syphilis, debility, phthisis, organic heart disease and unhygienic surroundings are predisposing causes.

The specific virus is the streptococcus erysip-elatis, which acts as a local irritant producing the dermatitis. These are found in the lymph vessels and cutaneous connective tissue. The fever and constitutional symptoms are due to toxic agents.

It is an inflammation of the skin, and if uncomplicated, no other structures are involved. Subcutaneous and mucous tissues may be involved, but rarely; if so, there is apt to be suppuration. Visceral complications are of a septic character. Endocarditis, pericarditis, pleuritis-pneumonia, and nephritis are possible complications.

Symptoms.—The incubation period varies from two to seven days. The onset is generally sudden with chill, followed by fever, 104 or 105 degrees F. There may be nausea, headache, and pain in the back and limbs. The local inflammation of the skin follows, usually on cheeks and bridge of nose, or at site of an abraded surface. The area is red, smooth, and edematous. It spreads rapidly, the patch being elevated above the surrounding tissue and tense. The swelling may be so great as to close the eyes and distort the features. The cervical glands are swollen. The temperature continues high for four or five days and falls by crisis. The eruption begins to subside and a moderate desquamation occurs. If the disease takes a fresh start the fever again rises and continues as long as the disease spreads. There is usually headache and sometimes delirium. The tongue is furred, and bowels constipated and the urine scanty. As a result of intense infiltration the part may become gangrenous. Suppuration frequently occurs in facial erysipelas. The inflammation may extend to the mucous membrane of the throat and mouth.

Diagnosis.—This is not difficult. The fever, the acuteness of the disease, the rapidly spreading eruption, and the constitutional disturbances will serve to distinguish it from all others.

Prognosis.—This is usually favorable; healthy persons rarely die. Convalescence may be slow.

Treatment.—Isolate the patient for the disease is contagious, and a third person may convey the virus. The poison may cling to clothing, furniture, etc. The physician should not take care of confinement cases.

A number of cases of erysipelas have been cured by correcting disorders in the region of the second, third, fourth and fifth dorsals. The lesions are principally subluxations of the ribs and severely contracted muscles. The disorder at the points named interferes with the vasomotor nerves to the face, thus predisposing to an attack of erysipelas by allowing the micro-organism congenial tissue for its devastations. In many other cases derangements have been found higher than the upper dorsal, principally through the middle and upper cervical vertebrae. Lesions in these regions would also interfere with vasomotor fibres, especially through the fifth nerve directly.

The treatments on the whole are to examine for lesions to the innervation of the affected region and remove them, besides giving special attention to the bowels, a nutritious diet, and absolute rest. In cases where there is much restlessness and insomnia, treat the upper cervical region, especially the deep posterior muscles¹. Locally, use cold water applications; adhesive strips applied near the inflamed area or tincture of iodine, may prevent the disease spreading.

Yellow Fever

Definition.—An acute, infectious disease, characterized by a febrile paroxysm followed by short remission and then relapse, jaundice, toxemia, suppression of the urine, and gastric hemorrhage.

Osteopathic Etiology and Pathology.—While a specific germ is the cause of yellow fever, it has not as yet been isolated. Extended tests by United States Army surgeons in Cuba show conclusively that the infection is alone carried by the *stegomyia fasciata*, but "It remains somewhat uncertain whether the mosquito is the sole means of transmission." (Anders). Season is the chief predisposing cause as the outbreak is usually in summer and a frost ends its spread. Immunity is generally conferred by one attack. Tucker² noted that all cases examined had liver lesions and that most of the patients were of the malarial or bilious type. Spinal lesions were not marked in some cases, but when present were in the liver and renal areas. Tete³ believes it to be a virus secreted in the human organism under certain atmospheric and other conditions in certain types, i. e. people subject to hepatic and renal disturbances. He also says the vagus is an important factor.

Pathologically, there is more or less jaundice and hemorrhagic extravasations under the skin. The blood serum is red-tinted, owing to the destruction of the red cells. The liver is pale and presents extensive fatty degeneration, with necrotic masses in and between the cells. The gastro-intestinal mucous membrane is swollen, congested and presents numerous minute hemorrhages. The kidneys show parenchymatous inflammation. The spleen is not enlarged. The heart sometimes shows fatty degeneration. The stomach contains more or less of the "black vomit," which is a mixture of transuded serum and transformed blood pigment.

1. See Dr. Still—Philosophy and Méchanical Principles of Osteopathy.
2. Journal of Osteopathy, October 1905.
3. Journal of Osteopathy, October 1905.

Symptoms.—The incubation period varies from one to five days. The attack generally begins with a chill, fever, 102 to 105 degrees, headache and pains in the loins and legs. The pulse is accelerated, the face is flushed, the tongue is coated, the throat sore, the bowels constipated and the urine scanty and albuminous. Recent observers state that bile is present in most cases before the albumin is noted. Nausea and vomiting may be present at the onset, but become more severe about the second or third day when the black vomit appears. The **febrile stage** or stage of invasion, lasts from a few hours to several days and is followed by a decline in the fever when the severity of the other symptoms abates. This is called the **stage of remission** and in favorable cases convalescence sets in or the patient may pass into the second febrile paroxysm. The temperature rises again, jaundice appears rapidly, nausea and vomiting return. The tongue becomes dry and coated. The stools are black and offensive, the urine is albuminous, scanty and may be suppressed; there may also be hematuria. Death may occur from exhaustion or from uremia. Recovery may follow the gravest symptoms, even when there has been black vomit. The duration of the entire attack covers about one week. Relapses sometimes occur.

Price says there is a point in differential diagnosis in yellow fever and it is a symptom not met with in any other febrile affection. It is the progressive fall of the pulse rate during the congestive stage of the first sixty or seventy hours, i. e., a variation of from five to ten beats less each morning and evening. He adds, "As long as the kidneys are active there is but little to fear."

Diagnosis.—**Remittent fever** has not the deep jaundice, the clear mind, the black vomit, or the albuminuria of yellow fever. The enlarged spleen and the presence of the organism of Laveran in the blood in remittent fever will decide the diagnosis. **Dengue** is sometimes confused with yellow fever.

Prognosis.—This is always a grave disease, and in its severe forms very fatal. Recovery, however, may occur after the severest symptoms have been manifested. Black vomit is not always a fatal sign. Enough cases have been treated osteopathically to state that osteopathy is particularly effective. Improved sanitation is doing much to reduce mortality.

Treatment.—Prophylactic treatment should be carefully carried out. All patients should be quarantined and carefully screened so they cannot be bitten by the mosquito and the disease spread further. People that are not acclimated should keep away from infected districts.

All pools, cisterns and other places which can breed mosquitoes should be drained or screened. A systematic warfare should be waged against them. The patient must be put to bed at once and plentifully supplied with fresh air. Everything must be scrupulously clean—body and bed linen. Use a tube for nourishment and a bed-pan for excretions as the patient must not make the slightest exertion.

Spinal lesions may or may not be found. They have been observed in the cervical, eighth dorsal and second lumbar.

The treatment on the whole is symptomatic. The chills and fever of the first stage should be controlled by thorough work at the upper cervical, upper dorsal, lower dorsal and lower lumbar regions. Treatment at these points controls the superficial and deep vascular areas of the body through the vasomotor nerves. The irritable stomach, delirium and severe neuralgic pains of the head, back, epigastrium and limbs are to be treated according to the conditions and severity of the symptoms. The kidneys and bowels should be watched carefully, and at the onset should be freely opened and control of the kidneys never lost. Let the patient drink freely of tater, which will aid. Hydrotherapeutic measures, as a cold bath or sponging, may be employed to aid in controlling the fever, the nervous symptoms, and the eliminative power of the excretory organs. Discontinue the use of hydrotherapy when a spontaneous fall of temperature occurs.

At the beginning of the first stage and during the stage of remission are the periods that the osteopath should do very effectual work by paying particular attention to the four large vascular areas of the body, viz.: head, lungs, abdomen and legs. Treat the vasomotor nerves to these regions, thoroughly, as given in the treatment of the first stage. During the third stage everything should be done that is possible to support the system. Ice slowly dissolved in the mouth will be of aid to an irritable stomach. Hemorrhages and the various symptoms are to be treated as they arise.

Good nursing, dieting, ventilation and keeping the skin, kidneys and bowels active are the primary points to consider. During the period of depression, the heart must be closely watched. The diet should be a light, liquid one, of the nature of peptonized milk or light broths. No food is recommended by some at the onset nor until the crisis is passed. Others feed during the stage of remission and give stimulants. During the last stage rectal feeding is suggested if gastric irritability is pronounced.

Tetanus

(LOCKJAW)

Definition.—An infectious disease, caused by Nicolaier's tetanus bacillus, characterized by persistent, tonic spasms of the muscles with violent exacerbations.

Etiology and Pathology.—The exciting cause of tetanus is a specific bacillus which usually gains access to the system through some wound. The site of infection is the only place the germs are found.

The disease is much more prevalent in some localities than in others. It is found in hot countries, as in India and the West Indies, far more commonly than in temperate regions. Exposure to damp cold is one of the recognized causes, also those localities where there are rapid changes from cold. Such regions seem to produce conditions favorable to the existence and growth of the bacilli.

Earth mould, particularly where putrefaction is taking place, as in soil that has been manured, is especially favorable to the existence of the bacillus. It is frequently found in the intestinal tract of the horse, so that the soil about stables is apt to contain the germs. The highly fertilized soil of France and Belgium rendered it a special menace to the wounded of the Great War. Antitetanic serum, according to all reports, was particularly efficacious.

Wounds and abrasions of various kinds, particularly contused and punctured wounds of the hands and feet, favor the excitation of tetanus. When an open wound is present, the term **traumatic tetanus** is given to the disease; **idiopathic tetanus** when no wound is discoverable; **tetanus neonatorum** when it attacks infants—this form is usually due to insanitary conditions, especially the improper care of the umbilical cord; **lock-jaw** or trismus when the jaw alone is affected; **cephalic tetanus** when the throat and face is involved.

Characteristic lesions have not been found in the cord or the brain. The bacilli develop at the site of the wound where the toxin is manufactured. The bacilli do not invade the blood and organs. The toxalbumin is one of the most virulent poisons known.

Congestion occurs in various organs, due to obstruction of the movement of the blood during a spasm. The brain, cord, lungs and muscles are congested. The nerves are often found swollen.

Symptoms.—The period of incubation is from one to twenty days. This is time required for the poison "to be absorbed by the end plates in the muscles and to pass up the motor nerves to the spinal cord." In

most cases the incubation is from five to ten days. A chill precedes other symptoms in a few cases. The onset is quite sudden, with stiffness in the neck, jaw and tongue. There are headache, stomach disturbance and languor. Opening the mouth is difficult, but is not painful. Deglutition is difficult. The stiffness increases and extends to the spinal muscles, abdomen and legs which are held in a firm spasm. Thus, the trunk and legs are inflexible.

These symptoms vary in degree of severity, dependent upon the extent of involvement. The jaws may be firmly locked or they may yield to forced extension—"lock-jaw." The muscles of the face may be involved, the angle of the mouth drawn out, and the eye-brows raised—"risus sardonius." The neck and trunk muscles affected produce opisthotonos. Spasms of the pharynx and esophagus may occur, especially when there are injuries to the fifth nerve.

Associated with these tonic convulsions is intense pain. The distress of the patient is extreme when the chest muscles are affected. All symptoms are increased during the paroxysm. A foot fall, the slamming of a door, a draught of air or any slight sensory impression may excite a paroxysm. The paroxysm may relax and during the interval the patient may walk about. The spasms vary in frequency from a few minutes to one in several hours. During spontaneous or induced sleep the spasm usually ceases. The febrile reaction is generally slight and apparently of nervous origin; in many cases 102 degrees F. In severe cases the temperature may be considerably higher. Perspiration is excessive. The urine is scanty and high colored. The bowels are usually constipated. The mind remains clear throughout. Death is generally caused by exhaustion. **Chronic tetanus** presents similar symptoms, but less marked, and it develops slowly.

Diagnosis.—The history of a wound followed by the characteristic symptoms would rarely occasion an error. **Strychnine poisoning** differs from tetanus in the history, in the more rapid development of the symptoms, no trismus at the beginning, marked involvement of the extremities, and absence of rigidity between the paroxysms. In **tetany** the extremities are chiefly affected by the spasms, the muscles are relaxed during intervals, and trismus is a late or very rare condition. In **hydrophobia** trismus does not occur and the respiratory spasm is caused by attempts at swallowing. The mental symptoms increase.

Prognosis.—The prognosis is unfavorable. Eighty per cent of traumatic and fifty per cent of the idiopathic cases prove fatal. Cases that are fatal usually die within six days. Cases where there is slight

elevation of temperature, and where the spasm is localized to the muscles of the face, neck and jaw, or where muscle stiffness is late in appearing, are more likely to recover.

Treatment.—Free incision and thorough disinfection with hydrogen peroxide and cauterization with pure carbolic acid, of the wound are necessary. The patient should be put in a dark room and there remain as quietly as possible. Avoid all sources of peripheral irritation. Liquid food is to be given, and if the jaws are firmly set, rectal feeding may be employed or food may be passed through the nose with a catheter.

For the spasms, strong inhibition of the nerve centers controlling the affected muscles may be of use. Probably the most effectual treatment for the paroxysms would be strong, thorough treatment of the upper cervical region. Hot baths give relief to the spasms. All the excretory organs should be greatly stimulated, particularly the kidneys, lungs and bowels. Other symptoms are to be treated as they arise. Tetanus antitoxin is highly commended by surgeons who used it during the Great War. As death is at a two to one ratio any method of treatment is justified. A few cases have been treated osteopathically with fair success, following antiseptic measures.

Simple Continued Fever

Definition.—An acute, febrile disease, mild in character, of short duration, not excited by any special organism and depending on a variety of irritating causes.

Osteopathic Etiology.—The most frequent cause of this form of fever is probably gastro-intestinal disturbance. In children it may be due to gastro-intestinal derangement, or to the eating of decomposing food or to exposure to wet and cold. It may be caused by exposure to the sun or great heat, or mental or physical fatigue. It may be the result of exposure to cold sufficient to produce a slight bronchitis, tonsillitis or other affection producing an unnoticed localized inflammation. It may follow a prolonged exposure to noxious odors or gas. Lesions, osseous or muscular, are always present, corresponding to the tissues and organs disturbed. Muscular lesions, especially, are prominent.

Symptoms.—The onset is usually sudden with a feeling of lassitude, weariness, chilliness, and headache. The temperature rises quickly to 102 or 103 degrees F. or over, and is usually apt to terminate suddenly by crisis on the third or fourth day. The pulse is frequent and the face is flushed. The child is often irritable. Mild delirium may occur. Anorexia is present, and the bowels are constipated. Convalescence is rapid.

Diagnosis.—This depends upon excluding other probable diseases. If the fever cannot be attributed to some of the causes already referred to, there may be a doubt as to its character for the first twenty-four hours, but, if after a careful examination, one finds no other cause and no symptoms develop of any of the recognized diseases, acute continued fever can hardly be mistaken for any other disease.

Prognosis.—Always favorable, recovery without sequelae being the rule.

Treatment.—It is necessary to find out the irritative cause in order for one to be able to treat intelligently. Rest in bed with treatment of the disturbing factor of the disease, whatever that may be, is the principal treatment to be given. Careful examination of all the organs, with due consideration of the symptoms, will generally leave no doubt as to the cause, and treatment applied accordingly will be sufficient. If there is any gastro-intestinal disorder, thorough treatment of the splanchnics, anterior treatment to the abdomen and thorough evacuation of the bowels are indicated. Use an enema if necessary. Besides the usual fever treatment, sponging the body with tepid water at the time of day when the fever is highest will aid in lessening the temperature and render the patient more comfortable. In cases where nervous symptoms are prominent, care should be taken against any excitement and, if insomnia results, a quieting treatment in the cervical region is usually sufficient. Use plenty of water internally, which is not only necessary for the tissues on account of the fever, but is of great aid in keeping the skin and kidneys active, and thus a great help in the elimination of waste material. A liquid, nutritious diet is best. Milk, broths and soups will be enough. The demands on the digestive tract are not great when a light diet is administered, besides not exciting the nervous and vascular systems unduly.

Tuberculosis

Definition.—A general or local infectious disease caused by the bacillus tuberculosis of Koch. The bacillus produces specific lesions of the form of nodular bodies called tubercles that undergo caseous necrosis with a tendency to involve neighboring tissue. There may be a diffusion of the infection by way of the lymph and blood vessels to various tissues and organs.

Osteopathic Etiology and Pathology.—Tuberculosis exists in all countries. It generally prevails more extensively in warm than in cold climates, and is of more frequent occurrence in the city than in the coun-

try. Altitude, however, exerts more influence than latitude. The disease rarely occurs in mountainous countries, owing to the purity of the atmosphere. The disease is very prevalent in the West Indies and the South Sea Islands. Tuberculosis is frequently met with in Canada among the French Canadians and the English. All races are subject to tuberculosis, but the Indians of this continent, the South Sea Islanders and the colored race are very susceptible to the disease. It is estimated that from seven to ten percent of the present death rate in the United States is due to tuberculosis.

The tubercle bacillus was discovered by Koch in 1881. It is a short, straight or slightly bent, rod. This bacillus has an exceedingly tenacious hold on life and is found in greater or less numbers in all tuberculous lesions.

It can live almost indefinitely outside the body. The bacilli are found in great numbers in the sputum, which dries and flies in the atmosphere in the form of dust. The organism is thus widely spread in regions frequented by phthysical patients. The bacillus gains entrance into the body by way of the respiratory tract in the vast majority of cases. Milk from tuberculous cows will produce the disease, especially in children, causing intestinal and mesenteric tuberculosis. The meat of tuberculous animals is not necessarily infectious, although there is a possibility of infection by this means. Tuberculosis may be transmitted by direct inoculation; this does not often occur in man, but when it does, the disease usually remains local, although general infection may occur. Persons who follow certain occupations, as butchers, dissectors of dead bodies, and handlers of hides, are more or less subject to local tubercles of the skin. The virus may enter the body through any fissure or excoriation on the skin; thus by washing the clothes or bed linen of phthysical patients, by the bite of a consumptive, or by a cut from a broken sputum glass of a consumptive, one may become infected. It is stated that there may be hereditary transmission. In some cases the virus may be transmitted and the disease may not appear for many years.

Predisposing Causes.—Hereditary predisposition, which renders the person more liable to accidental infection; delicate constitution; scrofulous tendency; previous infectious diseases, as influenza, whooping cough, measles, typhoid fever; diabetes mellitus, etc. In young children meningeal, mesenteric and lymphatic forms of tuberculosis are the most frequent. Pulmonary tuberculosis is usually met with in adults, especially between twenty and thirty years of age. The development of tuberculosis is favored by damp localities; by improper and insufficient

food; constant inhalation of impure air; injuries to the chest, with or without laceration of the lungs, and various osteopathic lesions that weaken the tissue through faulty nutrition. Corresponding to the innervation of the organ or tissue diseased will always be found anatomical derangements. "Every case has a defective spine and thorax." (Hayden¹).

Bronchial catarrh, tonsillitis, diseases of the stomach and intestines, especially enterocolitis, tubercular pneumonia, pleurisy (rarely), intra-thoracic tumors and congenital or acquired contraction of the orifice of the pulmonary artery increase the susceptibility to infection. Lessened vitality of the tissues, whether inherited or acquired, is necessary before the germ can become implanted and proliferate, producing tuberculosis of the tissues and organs. In nearly every instance, when the lungs are involved, lesions are found at the second, third, or fourth ribs. These lesions undoubtedly predispose to the tubercular infection, by lessening the vitality of the lung tissues through interference with the innervation or vascular supply. Possibly a lesion at the second rib or second dorsal vertebra would interfere directly with the vasomotor nerves of the upper thoracic ganglia. The condition of the middle and lower cervical vertebrae should be carefully examined, for lesions at that point would involve the lymphatics of the lungs. The lowered vitality caused by the lesion is the predisposing cause and the tubercular bacillus is the **exciting cause** which determine the character of the affection.

C. A. Whiting in Clinical Osteopathy says:

"The spinal outline characteristic of tuberculosis and of the pre-tubercular stages presents the following peculiarities: The cervical spine presents various abnormalities, usually lesions involving single vertebrae and associated with irregular muscular tensions. The upper thoracic spine is anterior, the ribs drooping and rather more freely movable than normal; the vertebral articulations are less movable than normal; the tissues in the neighborhood of the upper two or three dorsal spines are abnormally sensitive and the muscles innervated from these segments are contracted irregularly when the disease involves the apices. The lower interscapular region is found sensitive and these muscles are contracted when the lower lobes of the lung are involved, and the location of these sensitive areas may be employed in the localization of the lung area infected.

"In every case recorded in this clinic, lesions involving the area of the origin of the upper and middle splanchnic nerves have been

1. Journal of the American Osteopathic Association, March 1906.

found. The typical tuberculosis spine must include lesions of the lower dorsal area. Probably these lesions are predisposing factors in tuberculosis, partly because of the effects produced upon nutrition thereby, but doubtless the lack of the normal mobility of this part of the spine prevents the normal stimulation of the liver, the spleen, perhaps the pancreas, thus the normal opsonic index is lost, and immunity broken. The treatment of tubercular cases should include careful attention to the splanchnic area, the maintenance of the normal mobility and structural relationship of the entire spinal column, and such stimulating movements to the ninth and tenth thoracic neighborhood as is indicated in each individual case."

Pathology.—In adults the most common site of tubercles is the lungs; in children it is the lymphatic glands, joints and bones. No organ is exempt; the salivary glands and pancreas are the least frequently involved. The military tubercle is the beginning of tubercular deposits. This may develop in any tissue where the tubercle bacillus is found and it is only distinguished by the presence of a tubercle bacillus, as similar conditions are produced by the *aspergillus glaucus* and *actinomyces*.

In the development of a tubercle there is proliferation of the fixed tissue cells, particularly those of the connective tissue and the endothelium of the capillaries, due to the irritation of the bacillus, producing the epithelioid cells and in some instances the giant cells, in both of which bacilli may be found. The epithelioid cells vary in shape. The giant cells are formed by enlargements of the epithelioid cells and a repeated division of their nuclei or possibly by fusion of several cells. On account of the inflammation produced by the bacillus, there is migration of leucocytes from the adjacent vessels and lymphoid cells. The leucocytes are largely polynuclear and are rapidly destroyed, but later mononuclear leucocytes appear, which are able to resist the action of the bacilli so that they are not so readily destroyed. A reticulum of connective tissue is formed around the various cells. The tubercles are non-vascular and when once formed undergo caseation and sclerosis.

Caseation is a process of coagulation necrosis or destructive change, beginning at the central part of the growth, due to the action of the bacilli. The primarily transparent tubercular tissue may become a gray gelatinous body containing bacilli. Frequently the caseation is followed by softening; less frequently, calcification, or it may be surrounded by fibrous tissue.

During the time the cell destruction is going on at the center of the tubercle, hyaline and fibrous changes may render the tissues **sclerotic**.

These changes, **caseation**, the destruction of forces, which are dangerous to the patient, or **sclerosis**, which is a healing process, depend upon the power of the body to produce an antitoxin to overcome the effects of the special toxin produced by the bacilli.

There may be a widespread **tuberculous involvement**. This is the result of fusion of the new foci of infection or of miliary tubercles. The lungs are the usual site of infection, varying from a small area, to a lobe or a still greater area.

The irritation of the bacilli is capable of producing **associated inflammatory processes** in its own neighborhood. There may be an overgrowth of interstitial tissue. In other instances, changes to catarrhal or croupous pneumonia may occur. Suppuration is associated with tuberculosis, especially of the lungs, and is due to a mixed infection or the presence of pus organisms. Some authorities claim that the tubercle bacilli alone are able to produce suppuration; it is, however, more probable that suppuration is due to a mixed infection. The constitutional features in tuberculosis are more dependent upon this secondary infection, especially by the streptococci, than upon the primary infection.

Tuberculosis of the Lymph Glands

(SCROFULA)

Scrofula is a true tuberculosis of the lymphatic glands. The virus is less virulent than that from other sources, which accounts for the slow development and milder course of tuberculosis of the glandular system.

Tuberculous Adenitis may occur at all ages, but is most common in children and young adults. It is rarely congenital. Catarrhal inflammation of the mucous tissues weakens the resisting power of the lymph tissue, thus allowing the bacilli to develop, and is an important predisposing cause. The glands most frequently affected are those of the neck; more rarely there is involvement of all the lymphatic glands of the body. Invariably lesions of the upper and middle cervical vertebrae and upper dorsals and corresponding ribs are found, as well as lesions to the lymphatics at various points along the spinal column and ribs. These lesions affect the innervation to the lymph glands, as well as mucous membranes, and thus predispose to the disease. In all cases anatomical derangements are found in the region of the innervation to the involved gland.

In **general tuberculous adenitis** all the lymph glands of the body are more or less involved, while the other organs and tissues are

rarely affected. All the visible glands are found to be swollen, tender and painful. There is more or less protracted fever, with wasting and debility. This is a rare affection.

In **local adenitis** the glands of the neck are most frequently affected and this is especially the case with children. Negroes are more frequently affected than whites. It is seen especially among those living in an unsanitary environment. Measles, whooping cough and an hereditary tendency are predisposing factors. The submaxillary glands are usually the first affected. At first they are swollen to various degrees and are tender; later they suppurate and rupture if one is not able to cure them. There may be fever. The skin over the glands is usually freely movable; it may, however, be adherent.

The glands above the clavicle, those in the posterior cervical triangle, and the axillary glands may all be affected. In such cases it is likely that the bronchial glands are also involved and may infect the living tissue.

Lesions of the upper and middle cervicals and deep muscles are always found and undoubtedly are the underlying causes. Lesions of the lower cervical, upper dorsal, ribs and clavicle, are of frequent occurrence. Infection may gain entrance by way of the pharynx and tonsils.

The affection often runs a slow course.

The **bronchial** glands may be affected primarily, but usually secondarily to infection of the lungs. The primary form is seen most commonly in children and is apt to be associated with suppuration. Lesions of the upper and middle dorsals and of the cervicals will be found. Catarrh of the bronchial tubes is a predisposing cause. The X-ray is of great value in the diagnosis.

The most noticeable symptoms are those due to pressure or irritation.

Systemic infection may follow rupture into a vessel. Local infection of the lung may occur and the pericardium become infected.

Mesenteric cases occur among children and may be primary or secondary. The primary form is rare. Swallowed sputum is a frequent cause. The trunk and limbs are puny. The child is anemic, and often the abdomen is tympanitic. Diarrhea is marked and there is pain and indigestion. Fever is almost constantly present and of an intermittent type. The disease is most frequently met with among poor children in unhygienic, poorly ventilated houses. There may be an associated tuberculosis of the peritoneum.

Acute Tuberculosis

This shows best the truly infectious nature of tuberculosis. In it miliary tubercles develop in many and various parts of the body. In some cases these growths seem to be uniformly distributed throughout all the viscera. In other instances they are localized in the lungs or in the meninges of the brain. In nearly every instance it is an auto-infection, arising from an old tuberculous focus, which may be latent and quite unsuspected. General infection, in most instances, arises from the rupture of a nodule into a vein, from tuberculous lymph glands, tuberculosis of the bones, joints, or even the skin.

General Miliary Tuberculosis or Typhoid Form.—This is similar to a general infection of the body and resembles, to a marked degree, the symptoms of typhoid fever. The onset is rarely rapid.

In most cases there is a period of incubation, during which the health fails, the appetite is lost, headache occurs, and the patient soon becomes feverish, with increased debility. The temperature rises and the pulse is rapid and feeble. The tongue is dry. The respirations are increased. Delirium may be present. In rare cases, there may be little or no fever. The temperature ranges from 101 to 103 or even 105 degrees F. It is irregular and marked by evening exacerbations and morning remissions. Occasionally there is an inverse type of temperature in which it rises in the morning and falls in the evening. In some cases the pulmonary symptoms are marked, while in others the meningeal symptoms are more prominent. Tubercle bacilli are rarely found in the sputum.

The spleen is usually enlarged. Constipation is present, as a rule, but there may be diarrhea, and hemorrhage from the bowels may occur. The urine may contain traces of albumin. There may be excessive sweating, and herpes is often present. Choroid tuberculosis is frequently met with. In doubtful cases the blood should be examined for tubercle bacilli, although they are not always present. The duration is from two to four weeks, the disease usually terminating unfavorably.

Diagnosis.—It is often very hard to differentiate between this form of tuberculosis and typhoid fever. In **typhoid fever** epistaxis is a common, early symptom. The temperature curve of the continued type is quite diagnostic. The Widal test should be made. The respirations are moderately hurried and the pulse is often dicrotic. Diarrhea is frequent. Typhoid rash is diagnostic. No tubercles are found on the choroid. No tubercle bacilli are found in the blood. Hemorrhages from the bowels are common.

Pulmonary Form.—When the lungs are chiefly affected the pulmonary symptoms are marked from the onset. It may develop suddenly or there may be a long period during which the general health fails markedly. In children the disease may follow measles or whooping cough. There is dyspnea, cough and the expectoration is mucopurulent. There is broncho-vesicular breathing with sibilant and subcrepitant rales. The temperature is high, ranging from 103 to 105 degrees F., or higher. Respiration and pulse are rapid.

The disease may last from several weeks to months, or, on the other hand, it may prove fatal within a few days. As the end draws near the signs of suffocation become intensified.

Diagnosis.—The history and general symptoms, together with the dyspnea and cyanosis, will generally decide the diagnosis. The blood should be examined for malarial parasites. The Widal test will differentiate typhoid.

Cerebral or Meningeal (Tuberculous Meningitis).—This form which is sometimes called acute hydrocephalus, occurs quite frequently and is an infection of the pia mater of the brain or cord.

It occurs most frequently in the first two years of life, although it may occur later. It is usually tuberculous in some other region, especially in the bronchial glands. Rarely does the disease involve the meninges primarily.

The meninges at the base of the cerebrum is the principal involvement. There is more or less inflammation, with fibrous purulent exudation. There are tubercles along the blood vessels. The ventricles may be distended.

Symptoms.—The onset is slow, lasting one or more weeks. Headache, constipation, vomiting and chills, followed by a fever, are the initial symptoms. When the onset is sudden, the disease is generally ushered in with a convulsion. The fever rarely rises above 102 or 103 degrees F. The pain is often severe, causing the child to give a sudden cry—the hydrocephalic cry. During sleep the child is restless and there are slight muscular twitchings.

The **irritative symptoms** now abate. The child becomes quiet and is dull and apathetic. Constipation still persists. The abdomen is boat-shaped, and the neck may be retracted. The pupils are dilated. Convulsions and other cerebral symptoms may occur. The temperature ranges from 100 to 103 degrees F. The respiration is irregular and sighing.

Following this, the mental faculties are lost and coma occurs. Con-

vulsions or spasmodic contractions of the muscles of the neck, back and limbs may occur. The pupils are dilated and do not respond to light. The pulse is frequent, irregular and small. The temperature rises to 103 to 105 degrees F., or it may be subnormal. The duration is from two to five weeks; chronic cases may last for a number of months.

Prognosis.—Generally very unfavorable.

Acute Pneumonic Phthisis

The infection of the lungs is rapid and may be primary or secondary. This form is met with most frequently in children and young adults, but may occur at any age.

The **Pneumonic form** is more rare than the bronchopneumonic form and may be very rapid in its course. The attack sets in abruptly with a chill and the temperature rises rapidly. There is pain in the side; cough; dyspnea and mucous and rusty sputum, which may contain tubercle bacilli. There is impairment of resonance, increased fremitus, and bronchial breathing. The whole or part of the lung may show signs of consolidation and dullness, all the symptoms of pneumonia being present. The patient rapidly loses flesh. This attack may come on a person in good health after exposure to cold; but there may have been a debilitated condition, or a predisposition to phthisis. Death may occur in the second or third week or the case may continue from three to four months.

One or both lungs may be involved. The lung is heavy and airless, sinking quickly in water. There is destruction of lung tissue and upon section, cavities are found. The cavities are generally small and are surrounded by tubercles. Older caseous areas of a yellowish white color may be visible. Miliary tubercles are found upon careful examination.

The **bronchopneumonic form** is the most common and occurs most frequently in children. It often follows the infectious diseases, especially measles and whooping cough. The child may be taken ill suddenly with what seems to be an ordinary bronchitis, the temperature rises, the cough is severe, and there may be consolidation with submucous and subcrepitant rales. Rapid respiration and sweating are often marked. The course of the disease varies. There is rapid loss of flesh, and in many cases the disease develops into chronic phthisis. In other instances death occurs in from three to eight weeks.

The disease may attack the adult whose resistance is impaired. Chills, fever, pain in the chest, hemorrhages, wasting are most noticeable signs; these are the various signs of bronchopneumonia. Tubercle

bacilli are often found in the sputum. The course is usually from three to eight weeks, while a number pass into a chronic stage.

Areas of caseous tubercles are found, which later suppurate, break down and form cavities. The bronchial lymph nodes are found enlarged, and usually there is acute tuberculous pleurisy.

Diagnosis.—In the **pneumonic form** it may be impossible to make a diagnosis early in the disease. Tuberculosis may be suspected if the patient has been in bad health, has a predisposition to phthisis, or has had any pulmonary disorder. Pneumonia will present the typical symptoms, but if fever continues, tuberculosis will be suspected. Examination of the sputum will probably decide.

In the **bronchopneumonic** form it is very difficult, in the early stages, to distinguish it from simple bronchitis and bronchopneumonia. The irregular fever and rapid loss of flesh are important signs. The sputum will show elastic tissue and tubercle bacilli early in the disease and should be carefully examined.

Chronic Pulmonary Tuberculosis

The chronic form of the disease is more common than the acute. It seems probable that many cases of pulmonary tuberculosis are due to inhalation of the tubercle bacillus, though no doubt, particularly in children the bacillus frequently gains entrance to the system through the intestinal tract from infected milk and food. **Deformities** of the chest, especially where there is constriction and rigidity of the upper part, with more or less immobility of the first, second and third ribs and the junction of the manubrium and gladiolus, associated with weak muscles and a stooped posture are definite predisposing factors. This condition may be congenital or acquired. The local innervation, blood supply and lymphatic drainage is involved, so that the individual is less resistant and consequently susceptible to infection. The bronchi are thus weakened, favoring the infectious process so that the disease may advance and involve the neighboring tissues, or if infection has gained entrance to the lymph or blood stream elsewhere, the susceptible pulmonary organs may become diseased.

Owing to the above predisposing factors the **primary lesion** of the lungs is often in the bronchus a little below the apex near to the posterior and external borders. A lower lobe may be involved, or several lesions may occur at the same time, involving one or both lungs. Frequently the other lung is infected from the lesion or lesions of the first.

In the acute cases the exudative process involves the lung tissue,

becomes caseous and softened, and later necrotic with cavity formation. In the **chronic type** the exudative process is slower, with thickening of the walls of the air vesicles and increase of fibrous tissue. **Cavities**, the result of caseation, are of various size, ragged, often coalesce and open into the bronchus. Fibrous tissue forms about them and frequently arrest the process. In the necrotic involvement blood vessels are often injured causing hemorrhages. Pleurisy, empyema, catarrhal bronchitis, and bronchiectasis are often associated involvements.

In addition to the tubercle bacillus, other microorganisms, streptococcus and staphylococcus pyogenes, influenza bacillus, and diplococcus pneumoniae, are often found, and no doubt are important exciting factors.

The **bronchial glands** are swollen, and contain tubercles. They may undergo purulent disintegration. Tuberculosis of the **larynx** is common. In severe cases there may be amyloid changes of **liver, kidneys, spleen**, and mucous membrane of the intestines. Tuberculous lesions are found in the intestines, spleen, kidneys, and brain in nearly equal proportions; then come the liver and pericardium.

Symptoms.—The onset of the disease is either abrupt or gradual. Frequently it succeeds influenza, measles, or bronchitis. There is a cough, expectoration, loss of weight, afternoon temperature and probably night sweats. The disease is likely to develop slowly. In other cases gastro-intestinal disorders are the first symptoms, especially with weakness and debility. Again, the disease may follow pleurisy. When the attack is abrupt, pneumonia is simulated. However, the apex of the lung, instead of the middle or lower lobe, is involved; expectoration is considerable and the fever is not so high and pronounced. Hemoptysis frequently occurs.

The **local symptoms** are important. **Pain** is an early either moderate or severe, symptom, although there are cases where it is absent. When associated with pleurisy, it is severe. The pain is usually situated at the base, anteriorly or laterally, of the scapulae, but may be between them. **Cough** is present, in the majority of cases, throughout the entire course. It usually grows worse, and is dry and hacking at the beginning but looser and paroxysmal and accompanied by a mucopurulent expectoration later on. The **expectoration**, at first, is slight and there may be more or less blood mixed with it, or even hemorrhage may occur. With the formation of cavities, the expectoration increases and is of a greenish-gray or greenish-yellow color. In some instance the sputum is more or less fetid. The expectoration is composed of pus cells, blood, elastic tissue, fat globules and tubercle bacilli. **Hemoptysis** is present in a

majority of cases. Early hemorrhages are usually slight, due to rupture of weakened vessels. When there is softening or cavity formation, erosion of vessels may be pronounced and hemorrhage considerable. Dyspnea is a variable symptom, but is characteristic of lung changes.

Fever is a characteristic symptom. It is probably always present at the beginning and the afternoon increase of temperature is common. Where there is softening and formation of cavities, a remittent or intermittent type is present. The pulse is frequent, regular and compressible. **Sweats** may occur at any time, but especially during sleep. They indicate fever activity, and are increased during cavity formation. **Emaciation** is a prominent symptom. This is due to gastro-intestinal disorders and prolonged fever. Loss of weight is gradual, especially if the disease is advancing. Where the lung is considerably diseased, heart disturbances are common.

Other disorders, as of the gastro-intestinal tract, genito-urinary, cutaneous, and nervous systems, are frequent, especially in long standing cases. The **gastro-intestinal disturbances** are gastric catarrh, vomiting, loss of appetite, coated tongue, constipation, and later on, diarrhea. Among **genito-urinary symptoms**, albuminuria is frequent. The kidney involvement may be either of an acute or chronic character. Pyelitis and cystitis are present in some cases, and amyloid degenerations are not uncommon. With the **cutaneous symptoms**, the skin is frequently dry and scaly, and the hair of the head dry. The hectic flush is common. Upon the chest and back there may be pigmentary stains. The **nervous symptoms** vary according to the involvement. Tuberculous meningitis is rare. The mind usually is clear and even in advanced stages the patient is always hopeful.

Physical Signs.—**Inspection** reveals that the shape of the chest is often characteristic. A phthisical thorax is flat, especially the thoracic opening with wide intercostal spaces, prominent costal cartilages, and depressed sternum. Sometimes the lower sternum forms a deep concavity (funnel breast). Another type of thorax is long and narrow, with very oblique ribs, and little expansion. In other instances the chest is of apparently normal build. Defective expansion is observed early, especially at the apex of the affected side. The clavicle of the affected side often stands out more prominently.

Palpation shows there is decreased expansion and increased fremitus. Normally, the fremitus is stronger at the right than at the left apex. If the pleura is thickened, the fremitus is decreased, but increased in lung involvement.

On **percussion**, if the diseased areas are minute, the percussion note may not be changed. Always compare the two sides of the chest. Dullness is first noted, as a rule, above, on or below the clavicle. As the disease progresses, the dull sound increases. The size of the cavity, its walls and the amount of secretion modify the note. Large, thin-walled cavities elicit the "cracked-pot" sound. Consolidation, thickened pleura, large amount of material in a cavity and a connecting bronchus impair resonance.

On **auscultation** the breathing is harsh and the expiration is prolonged and high-pitched (bronchial). Early in the disease crackling rales may be heard. After consolidation takes place there is bronchial breathing and crepitant rales. When softening occurs they become moist, louder and sometimes bubbling. These may be heard upon inspiration and expiration. Pleuritic friction sounds, as in case of pleurisy, may be heard at any stage. Vocal resonance is increased.

The **signs of cavity** are: **Percussion**.—There is more or less defective resonance or tympany. Over large cavities a "cracked-pot" resonance is obtained. This is best obtained when the patient has his mouth open. There may be normal resonance if the cavities are covered with a considerable thickness of unaffected air cells.

Auscultation may detect cavernous or amphoric breathing, pectoriloquy and coarse, bubbling rales. Metallic tinkling may be heard over large cavities. Vocal resonance is increased.

Complications.—The larynx and trachea frequently undergo tubercular inflammation, due to invasion from the lung tissue. Pneumonia is of common occurrence. Gangrene, pleurisy and endocarditis are other complications.

Diagnosis.—Bacilli may be found in the sputum before the physical signs are well developed. It may be necessary to examine the sputum several times before the tubercle bacilli are detected. The presence of bacilli will set the diagnosis at rest, provided clinical symptoms are present. Fever, hemoptysis, cough, emaciation and a continuous, local induration are diagnostic. The X-ray should be employed as an aid in diagnosis.

Prognosis.—The prognosis of pulmonary tuberculosis varies greatly in different cases. Undoubtedly a number of cases have been cured; many arrested; even spontaneous cures have occurred. A great deal can be done to prolong life and to make the patient comfortable. The average duration is about three years, although by careful treatment this time is probably being increased.

Fibroid Phthisis

This term is applied to a form in which there is induration, followed by contraction of the affected lung tissue, due to an overgrowth of fibroid tissue. The greater number of cases are primarily tubercular, but have run a fibroid course. Other cases are primarily fibroid, followed by tuberculous infections. It may begin as an ordinary ulcerative phthisis, or it may begin as an inhalation bronchitis. In other instances it may follow a chronic tuberculous bronchial pneumonia or pleurisy.

The **onset** is extremely insidious. There is persistent cough, often paroxysmal in character. Dyspnea is marked, especially on exertion, but little or no fever is present. The expectoration is profuse and mucopurulent. There is slight loss of weight. In the later stages edema is marked. It is a disease of long duration, lasting from ten to twenty years. The patient is often able to pursue some occupation and may have fair health.

There is marked dullness over the affected side, which is commonly much depressed. There is distinct bronchial breathing at the base, while at the apex there may be cavernous sounds. The heart is frequently displaced and the right ventricle hypertrophied. The bronchi are dilated. The clinical history is identical with that of simple cirrhosis of the lung from which it is often separated with difficulty. Both lungs may become the seat of tuberculous disease. Prolonged suppuration results in amyloid changes in the liver, spleen, kidneys and intestines. X-ray plates are of value in diagnosis.

Tuberculosis of Other Tissues

The **alimentary tract** is frequently the seat of tubercular inflammation. The intestines may be involved primarily or else secondarily from the lungs or peritoneum. The **primary form** is most common in children. There is slight fever, pains of a colicky nature, irregular and persistent diarrhea. The disorder is commonly unrecognized, being mistaken for appendicitis or other intestinal disorders, until emaciation, sweats, the continued fever or lung involvement are manifested.

The stomach, esophagus, pharynx, tonsils, palate, tongue and lips may be the seat of a tubercular lesion.

The **serous membranes** are usually secondarily involved. The peritoneum is generally invaded from contiguous organs, especially the intestines, although the pleurae may be the starting point (and in the female the generative tract is a source). The disease may be either acute or chronic. In the former it starts abruptly with vomiting, pain in the

abdomen, fever, and possibly diarrhea. In the chronic form there are fever, pains, emaciation, weakness and the abdomen is distended. The enlarged glands may be felt through the walls. There may be ascites, or the walls of the peritoneum are adherent, or the tubercles may ulcerate.

The endocardium is occasionally the seat of acute or chronic tuberculosis. It is usually secondary. Likewise the pleurae are sometimes involved. The chronic form is more common.

The **genito-urinary system** is subject to tuberculosis. The bladder, ureters and pelvis of the kidney are attacked, and from these the kidney; or possibly the kidney involvement is part of a general tuberculosis. (See pyelitis). The ovaries, Fallopian tubes and uterus are also subject to tubercular invasion. The **diagnosis** depends upon finding the bacilli, the symptoms indicating, oftentimes, an inflammation only. Also the prostate, testicles and seminal vesicles are attacked.

Tuberculosis of the mammary glands is rare. In miliary tuberculosis the liver is commonly affected, often secondary to other tissues, especially the peritoneum, lymphatics and lungs.

The blood-vessels and heart are sometimes involved from nearby organs or from miliary tuberculosis. The brain and cord are also at times invaded. This has been described under meningeal tuberculosis.

Diagnosis and Prognosis of Tuberculosis.—The osteopath should be familiar with the various forms of the disease. An understanding of the pathology and clinical symptoms is essential. The finding of the bacillus, provided there are symptoms of inflammation, is diagnostic. Much depends upon the patient's constitution, hygiene, sanitation, food, fresh air and general management. The osteopathic lesion is decidedly an important factor, but the treatment must be balanced from both the distinctive osteopathic view and that of general management. Then the patient's part is as necessary as the osteopath's. Under proper care and treatment, unless the disease has progressed to a marked degree, there is always a tendency toward recovery, but, to emphasize again, the osteopathic treatment, the environment and general hygiene should be thoroughly understood and appreciated, for at best, the disease is treacherous. Even after an apparent recovery is made, the patient should be under observation; there is always danger of recurrence. Tuberculosis can often be treated successfully, or arrested, provided the disease has not progressed to a late stage; although many times, in the later stages, life can be considerably prolonged by careful treatment.

Treatment of Tuberculosis.—The **prophylactic treatment** of tuberculosis should receive first consideration. The sputum should

be thoroughly disinfected and care taken that the patient does not spit about carelessly. A spit-cup should be provided and the sputum collected and destroyed by burning and the cup sterilized. The patient should be well taken care of and given a separate apartment, so that the danger of conveying the disease to others is reduced to a minimum. He should occupy a single bed. All unnecessary furnishings of the room should be removed and the objects that remain in the room should be frequently aired and disinfected. The general and sanitary environment of the patient should be as favorable as possible to hygienic living. Many times a change of residence is of great benefit. When possible the patient should be out of doors and light exercise taken. The body should be well protected by flannels, the year around.

Keene¹ would carry prophylaxis to careful examination of the pregnant woman to avert a sudden development of tuberculosis after parturition; also of the child, after birth, to remove any predisposing lesions. The mother with a tubercular tendency should, under no circumstance, nurse the child and should be instructed to observe any disposition on the part of the child to acquire malpositions in sitting, standing or walking.

Another important consideration in the prophylactic treatment is the inspection of dairies and slaughter houses. The disease may be transmitted by infected milk. There is less danger of infection through meat; although all animals that present distinct lesions should be confiscated. Sanatoria and other special arrangements for the care of patients should be encouraged.

The **Treatment of the disease** consists primarily in locating the cause of the devitalized condition of the cellular tissue. This is the vital point to be considered and requires a thorough examination of anatomical structures in the region involved. There is a reason why the tissues are in a depraved state and it is our work to examine thoroughly the structures that might become deranged anatomically and cause an obstructed innervation or vascular supply. The disease is not primarily due to the bacilli; the bacilli would not have infected the system had it been in a healthy state. Hence, the object of the treatment in tuberculosis is to favor a building up of normal, well-nourished tissues so that it is impossible for the bacilli to infect the region. Of course, destruction of the bacilli is important, but we cannot expect to do much by the use of a parasiticide, for we are not then influencing or affecting the real cause of the disease. If we can improve the arterial circulation to the diseased tissues, we will be striking at the root of the disease and the healthy blood

1. Journal American Osteopathic Association, December 1904.

will be the only parasiticide necessary. This is where the osteopathic theory of the cause of disease differs from that of other schools of medicine. At the local points of infection there is a decided malnutrition of the tissues, due to a lack of proper blood to the parts, thus favoring the lodging of micro-organisms; by re-establishing normal nutrition nature will repair the tissues if the condition is curable. Hence, it can be seen at once that if the case is curable osteopathic treatment will meet the demands scientifically.

The preceding is the key-note of osteopathic therapeutics; not only in the treatment of tuberculosis, but in all diseases where micro-organisms play an important part. In **tuberculosis of any part of the body**, it is the duty of the osteopath to carefully examine the structures that may become anatomically deranged, from any cause, affecting the nerve, blood and lymphatic supply to the tissues or organs diseased. Correction of anatomically deranged tissues and attention to the hygiene, diet and general health of the patient constitute the treatment.

On the subject of Pulmonary Tuberculosis, W. Banks Meacham says:

"In cases of **pulmonary tuberculosis** it should be remembered that the pathological lesion in the lung is a result of a general systemic interference—an interference so great that the body as a whole loses its stored-up heat in excessive temperature, loses its reserve nutrition, as manifested by early and continuous loss of weight.

"Therefore the causative osteopathic lesion should not be sought alone over the site of the pathological lung lesion but rather in that area where general nutrition is osteopathically affected.

"A few general considerations of **osteopathic mechanics** involved in nutrition should be ever present with the searcher for the cause of pulmonary tuberculosis. For instance we know that ingested fat is acted upon by the pancreatic enzymes; that the invertin of the intestine is an endocrine secretion. In diet we seek to administer an excess of fats to take the place of fat-loss in this disease, often losing sight of the fact that some mechanical maladjustment prevents fat-splitting into a form suitable for tissue assimilation.

"It is common osteopathic knowledge that lesions of the upper dorsal area have a profound influence on general nutrition. Consequently it is to this area that we must look for the causative osteopathic lesion in this disease. The influence of this area is due to the fact that the nervous mechanism of the secretory glands gets its most direct disturbance in this area where the nerves leave the spinal cord to become distinct innervation to these organs.

"Apart from the nutritive and general circulatory influence of upper dorsal lesions we must consider the germicidal action of the endocrinous secretions in devitalizing the specific bacterial agent in tuberculosis. Undoubtedly these internal secretions have marked effect in agglutinating the bacilli, thus enabling the phagocytes to perform a larger duty.

"The correction of upper dorsal lesions, with due regard for the pathological condition within the thoracic cavity gives a scientific physiological and bacteriological therapeutic action in tuberculosis.

"**Other lesions** may and do demand attention and correction when possible. But we must not lose sight of the fact that our specific action comes from a corrected relation of the upper dorsals. In the cloud of unproved theories and guesses in the literature of pulmonary tuberculosis nothing seems nearer an established truth than that it is a disease contracted in infancy, that it develops, later, in those persons who retain the infantile type of chest—thorax of large antero-posterior diameter in contrast with the lateral diameter.

"In the progress of the disease we do get a costal malformation giving the 'horse-collar' thorax, with an apparent lesion of the osseous walls of the thoracic cavity. But these lesions are the result of nutritive changes brought on by the active infection already present; and are not in any true sense, causative factors in the establishment of pathological areas within the lung.

"The **osteopathic treatment**, then, of this disease is, manifestly, a correction of a plastic posterior upper dorsal lesion. And where the pathological lesion of the lung contraindicates forceful correction, mobility of the area should be sought.

"The **general care** of the case should look to the normal functioning of all organs, with emphasis on ease to the patient. The **diet** should be what the patient can assimilate properly even though it be much less than the amount a normally active person should ingest. **Altitude** has a favorable effect in selected cases only. It is remarkable that many cases recover in the extremes of the Rockies and the coasts of California and Florida.

"No violent **exercise** should be undertaken on account of the possible embarrassment of an already overworked heart and in consideration of the possibly engorged pulmonary vessels. For these reasons, too, rest in bed is advisable with temperature above 99° F. and pulse above 85."

In **scrofula**, lesions will be found to the lymphatic glands, impairing their innervation and function. The treatment is not to be applied

over the glands directly. First, it is necessary to locate the lesions of the bones, ligaments and muscles or such tissues that would cause disturbances to the glands, then readjust the parts. The object of the treatment is to modify the soil conditions on which the bacilli multiply, by correcting the local derangement of the tissues. The entire body is not in such a depraved state that the bacilli will grow and multiply wherever they happen to come in contact with the body; tissues of any organ favor a receptivity for the bacillus only when these local tissues are in a morbid condition. It is then our work to aid nature in relieving obstructed forces that are causing such an effect.

There are **general measures** which influence the tubercular process. The diet of the patient should be nutritious. A diet of milk, buttermilk, egg albumen and meat juice will probably be found best, although many will be able to take ordinary food. The patient should be out of doors as much as possible. Meacham¹ says "Fresh, pure air, wherever found, is essential; elevation is an individual requirement, an even temperature is not necessary and sunshine is important only as it allows the patient to be out of doors. Exercise should not be taken when the patient has a temperature above 99 degrees." The dry, even climate of the Southwest certainly tempts the patient to be out of doors more than one with opposite conditions. Even when the patient is greatly debilitated and weakened, insist upon his taking outdoor exercises or rides. Gymnastic and methodical breathing exercises are essential in widening and strengthening the chest. Bolles² believes that the appetite should control the diet and forced feeding be not insisted upon. Fasting, to test the sense of food desires, has points well worth looking into, as gastric disturbances with a loss of strength follow over-feeding. He also recommends deep breathing and physical culture to elevate the ribs and increase thoracic expansion. Outdoor sanatoria are being established over the country, in many cases by state appropriation as, "the treatment of tuberculosis itself has not been a satisfactory procedure except by climatic changes or the outdoor treatment persistently applied." (Halbert). The fresh air treatment may be taken at home by sleeping in the open air or by appliances fitted to the window of the room so only the head is exposed to the air. The only factor is to get the air. The skin, as well as the excretory organs, should be kept active. Always make it as comfortable for the patient as possible.

The **fever** is indicative of the activity of the disease, so that treat-

1. Journal American Osteopathic Association, May, 1905.
2. Journal American Osteopathic Association, May, 1905.

ment to influence the process and to promote elimination is best. Sponging with either cold or tepid water will be helpful. The **cough** is a troublesome symptom. Attention to the underlying irritation is demanded, although one cannot hope to influence, to any great extent, the cough dependent on cavity formation. Catarrhal processes in the respiratory tract can be lessened. Lesions that are acting as a cause of irritation, will frequently be found in subluxated ribs or vertebræ. The seventh and eighth dorsals are frequent sources of cough. The tissues about the pharynx and larynx, and the hyoid bone, disturbing the vagus and other nerves, should be carefully watched, also possible reflex irritation from the abdomen and pelvis. **Night sweats** are due to tubercular processes weakening the system and particularly lessening nervous control. These will subside as the body is strengthened. Sponging will be of service. Disorders of the **stomach** and **intestines**, such as nausea, vomiting and diarrhea, require treatment of the splanchnic area and regulation of diet. Considerable can be done to relieve **tubercular laryngitis** by careful treatment of the larynx and contiguous tissues. **Hemorrhage** is likely to be self-limiting. Attention to the upper dorsal vertebræ and ribs and muscles will tend to equalize the circulation. Rest and use of ice upon the chest, as well as internally, will be beneficial.

McIntyre, in an article on "Fat Food in Consumption," sums up the treatment for tuberculosis in the following words: "The treatment, then, for consumption should include rich, stimulating diet, proportioned to the digestive power of the patient, containing an excess of fats in most digestible form, of which sweet cream, fresh butter and well-cured bacon are the best examples, and the free use of pure drinking water, coupled with the promotion of blood flow, respiration and elimination of waste by osteopathic means."

Surgical measures may be necessary where glandular or other tissue has broken down and is a menace to recovery.

Spanish or Epidemic Influenza*

BY GEORGE M. MCCOLE

The epidemic of influenza which swept over the world and reached the United States in August 1918, starting in at the Atlantic sea-board cities, developed rapidly there and passed westward over the country. It reappeared the following winter.

*Rewritten from article in Osteopathic Physician, June 1919.

Epidemiology.—In the United States it was called Spanish influenza, as it was at its worst in Spain at the time it broke out here and was thought to have been brought from that country.

In Europe it was called the Ukrainian influenza and in southern Russia it was said to have emanated from the Orient. No country in the world was exempt. It was at one time thought to be a type of the pneumonic plague and while plague is the severest toxemia known many cases of Spanish influenza were equally as prostrating and fatal as the ordinary type of pneumonic plague. The bacillus pestis was never proved to be the cause of this pandemic of influenza but the clinical analogy was very evident.

A study of European conditions of health and hygiene shows how reasonable it is to believe that some disease would develop and sweep a world lowered in vitality and immunity by the abnormal conditions of war. Every known communicable disease was raging in Europe and Asia where millions of people existed under exceedingly poor hygienic conditions.

The period of incubation of influenza was extremely short, averaging about two days. All ages were attacked, although persons over 60 rarely. Those between 25 and 35 seemed to be the most susceptible but it was, perhaps, because they were in active life and more exposed. There is considerable evidence that the disease was not air-borne but conveyed by contact with active cases. The secretions of the mouth, nose and eyes were considered the active carriers. Masks, made of several layers of gauze fastened over the face, have been worn by many people but experience taught that their use did not avail against infection.

Mortality.—The mortality under drug medication as shown in a statement by Henry S. Bunting was as follows: "New York City 9.8%; Chicago 14.5%; Boston 27%. Osteopathy's influenza salvage represents the difference between these figures and the low score of one fourth of 1%." He gives the following statistics on pneumonia following influenza under drug medication. "Reports from 148 health commissioners show an estimate (called conservative) of 33% of fatalities in epidemic pneumonia under medical care. In some large centers it ran as high as 68% to 73%. As officially compiled to date, the fatalities in epidemic **pneumonia** in our army and navy cantonment hospitals amounted to 34½%. Osteopathy's fatalities were only 10% which included all those eleventh-hour appeals to Osteopathy.

"The Chicago and New York departments of health figures, each show total death losses of 18% in all of their epidemic cases. Osteopa-

thy's remarkable salvage of life is best measured from this point of comparison. Its total death rate from both influenza and pneumonia has been actually less than one percent." And this is based on 110,000 cases reported to the American Osteopathic Association.

Pathology.—The pathology of Spanish influenza is practically a study of lung involvement. There we find an exudative pneumonia of a rapidly confluent type, a transudate of blood serum and red cells appearing in the lower lobes of both lungs and rapidly flooding the entire space. Air bubbles were scattered through the serum soaked lungs, giving a frothy appearance to some parts. At times some parts of the lungs showed drops of liquid pus.

Where pneumonia did not develop there was no typical pathology. The toxins left an irritated bronchial tube, intestine or kidney just as in any other severe toxemia.

Bronchial and the old type of lobar pneumonia also appeared as a complication of Spanish influenza, making three types of pneumonia which were to be guarded against.

Symptoms.—The attack is usually ushered in by a chill or prolonged chilly sensations, sometimes lasting for two or three hours; fever 103° to 105° F.; if it does not fall in three days or if it comes up after once falling, pneumonia is to be suspected; pulse, full and bounding with a varying rate; headache usually general in type and in severity from slight discomfort to a most violent type; intense pain in the back and legs; tenderness the whole length of the spine but especially distressing in the upper dorsal, lower lumbar and sometimes the upper cervical; a dyspnea which is best described as being a constricted feeling of the chest with airhunger; often the bronchial tubes are raw and dry, the patient feeling as if the breathed-in air were hot to the bronchial tubes, an active exudative bronchitis developing; sometimes there is an active bronchitis with distressing cough; nose bleed is a frequent symptom (and is often a sign of threatening pneumonia); most cases sweat more or less, some have drenching sweats; sleeplessness; albuminuria frequent.

When the temperature breaks it practically always falls below normal during the course of that day. A typical case of severe character often presents all of the above symptoms; the lighter cases perhaps only two or three of them, of which the chilly sensations, fever and bounding pulse are the most common encountered.

A severe case is impossible to differentiate from the first symptoms of smallpox. Where a case of this type is encountered, it is always advisable to get history of vaccination or smallpox.

Examination.—The successful treatment of disease calls for attention to little things. Some little thing properly cared for very often gives us our margin over adverse conditions and spells success in the care of our patient.

During the epidemic I found a few cases which ran a temperature much below normal, sometimes as much as three or four degrees, and still with enough symptoms to be easily diagnosed as influenza.

Pulse was taken at the time the thermometer was in the mouth. Pulse was practically always bounding and hard. Its rate varied widely, being influenced by many other conditions. I often, early in the attack and where other symptoms were indefinite, made a diagnosis principally from the pulse.

Respiration was taken while holding the watch and with the finger on the pulse so that patient would not know that breathing was being watched.

Many patients complained of a sensation of weight on the chest and difficult breathing—hardly what one would term true **dyspnea** yet a real air hunger and sensation of constriction in the chest. The breath was often tainted with the odor of acetone, indicating a high degree of acidosis and giving an important diagnostic point.

The **heart** was then examined, both by auscultation and percussion.

The examination was then extended over the lungs and pleural rub listened for.

Patient was questioned as to having had a chill, general health, occupation, undue exposure, fatigue, what physic if any, had been taken or other drugs used, bowel movements and bloody stools, food taken, sleep the night before, and dreams, headache and backache.

The full examination could not be given at each call and not all of it to each patient, as time would not permit during the height of the epidemic.

Throat was always examined. This is an important point.

The urine was examined in a great many cases and often albumin and sometimes casts were found.

Treatment.—I consider it advisable to give a strong deep treatment if the patient is seen before the attack has gained full headway; after that I give short light treatments.

If the disease has not developed much at the time of the first visit vigorous treatment with adjustment of the deep-lying and tightened-up ligaments over the spinal cord is indicated. Subsequent treatments are given to overcome the invariable and recurring contractions along the

spinal cord. The spine is gently sprung and the muscles pulled away from the intervertebral foramina so that arteries, veins and nerves of the spinal cord are free to function.

I might note here that I consider Spanish Influenza does its damage through the attack of its peculiar and virulent toxin and the accompanying acidosis, on the body's reservoir of energy—the spinal cord and related structures, the vegetative glands and nerves.

If the patient is in a serious condition he is often treated in the position in which found, so as not to disturb him. Care is particularly taken to keep a patient who is moist with sweat from taking cold or being exposed. An extra covering is thrown across the neck and shoulders, and pulled down as the bed covers are moved to get to the area to be treated.

The musculature of the upper dorsal and cervical region is given special attention, the region of the first and second cervical and the first to sixth dorsal being special seats of trouble. The region between the spine and scapula on the left side, first to sixth ribs left, and the region of the suprascapular notch on the left side are given specific treatment to free them of contractions. The tissues of the suprascapular notch are in direct connection with the nerve supply of the heart muscle and treatment here is astonishingly effective.

This treatment for the heart is best given with the patient lying on the right side, leaning a little forward, with his left forearm against the chest, hand at neck or chin. Stand then at the patient's head and with the thumbs give all the region on the left side at the base of the neck and around the suprascapular notch thorough muscular adjustment for circulation and removal of contractions which disturb the heart's vitality. Treat first to sixth dorsal region.

I consider this treatment specific for the heart debility of influenza and many other heart conditions, as well. I have found it especially effective in the weakened and nervous states following influenza and in so-called "run down conditions" generally.

Vibration with the tips of the fingers on the anterior chest wall is often used. Tender and contracted tissues are often found along the anterior ends of the ribs which are involved at their spinal ends. These are gently treated. Children are often given vibration, holding their chests with my hands under their arms.

If the patient is stout and not easy to treat I have him sit up in bed and give the upper dorsal thorough percussion with the side of the hand¹.

1. This treatment was described by Henry M. Stovel, in *The Osteopathic Physician* of January 1917.

About 100 strokes at each treatment are usually given. I remember one very fat patient in the eighth month of pregnancy to whom I could give hardly any other treatment. It was especially valuable here and we saved the mother after a hard fight, though the child was still-born.

When nature is meeting the emergency and holding her own in the battle against infection we have a moderate fever—a benign fever. When the body is overworked with other duties and irritations the fever may rise dangerously high. Here it is that the physician must give further aid. Here it is that osteopathic treatment further aids by giving rest to the patient, easing pain and promoting general circulation (this in itself often quickly reduces fever). Here it is that the attention we give to clothing, diet, ventilation, quietness, good nursing, etc., comes in. The body is relieved of all duties but the one. Its functions are all turned to one end—the destruction of the invading infection. The osteopathic physician adjusts. Nature cures. It is all a matter of adjustment.

For labored breathing, an effective treatment is to have the patient with hands clasped and arms raised above the head, patient being in bed, face up. Stand directly at head of patient. Reach over patient's arms and under the upper dorsal and lift up against the heads of the ribs with your fingers, thus raising the chest, beginning as far down the spine as you can and working up as you treat. Relax the muscles at the same time.

Frequency and Amount of Treatment.—Frequency and extent of treatment depend upon the condition of the patient. In influenza the patient is approached with the idea of a daily visit. If then there is any doubt about his being entirely safe for 24 hours he is seen in 12 hours or as often as the condition indicates. Patients are usually seen more than once a day.

The average time which the patients are confined to the bed is about five days. Some are free from fever in three days; some not for six or seven days. According to conditions they are then kept in bed from one to three days longer.

As to the amount and length of treatment, I agree with James M. Fraser, who says adjustment of the soft tissues should be made and made with as little disturbance to the patient as possible. He says¹: "The ill effects of too long-drawn-out general treatments, or in short, over-treatment, I consider one of the most important questions for osteopaths because I incline to the belief that in many acute infections more harm may be done by such fatiguing over-treating than if the patient

1. O. P. June 1919.

were really not treated at all. A "flu" or pneumonia patient should never be treated over fifteen minutes at the longest in one treatment. It is much better to treat often and not treat so long, as over-treatment may result from a desire to be thorough. If we always would stop and think what we are doing and just what we are trying to prevent we would be more careful when we treat these infectious cases. A patient's resistance may really be lowered, his bowels inhibited, his heart overstimulated, his muscles fatigued and his nerve force depleted by treating over-time. When the reaction begins, stop."

Congestions and contractions should be removed wherever they are found, be it in the region of the throat, spine, ribs, liver or spleen. I order a daily enema and give positive instructions—after having had one or two almost fatal cases from this cause—to use no physics. Purg-ing killed more people here than any one other thing. If a heavy physic be given two or three times and the patient comes to a crisis, so much vitality has been taken out of the blood that he does not have enough strength to carry him over and he dies.

If the patient comes to pneumonia I find it good and effective to use the "constipation treatment." It is best to let the bowel take care of itself. Nature can do many things, and caring for the bowel in a crisis is one of them, providing the correct diet has been given the patient. If the patient is getting nothing but fruit juices there may be a natural bowel movement and even if he has been getting other food it is better to leave the bowel alone until after the crisis and then give the enema.

A patient with a frank pneumonia following influenza has but little chance of living if his strength is being drained from the blood stream through the bowel every few hours.

I see to it that no draft blows on the patient's bed. In a windy location a cold draft can appear suddenly and do great damage in a short time. The patient should not breathe cold air. Fresh air is all right but it must not be cold air. I order extra covering for the neck, arms, shoulders, back and chest. I like a wool workshirt best but use pneumonia jackets, extra undershirts, sweaters, etc., when the wool shirt is not to be had. In fact continued warmth seems to be an almost necessary condition to the proper handling of influenza. It is because heat, even the heat of the fever itself seems to aid the nervous system in building up antitoxins.

The patient is instructed that if a sweat comes on, either from a hot bath, hot drink or as a result of the disease, to lie and take it, for throwing off the covers is a sure way of taking cold and inviting pneumonia.

If the house is cold or the patient weak or very sick the urinal and bed pan are used. In fact I prefer their use even when those conditions are not present, as the less the exposure the less chance of pneumonia and the quicker recovery. **Rest** lying in bed is absolutely necessary to a satisfactory course and quick recovery.

For lung congestions and bronchial irritation, in addition to osteopathic treatment along the spinal cord, raising the ribs and chest, and vibration of the chest wall, I sometimes use the old fashioned mustard plaster (made with one teaspoon each of flour and mustard, mixed with olive oil or with water and white of egg), keeping it on about ten to thirty minutes or until a good, red reaction is brought about. The feet must be kept warm with hot water jugs. A hot mustard foot bath is excellent when the feet persist in staying cold.

At first I did not use the hot tub-bath. I am now ordering it if I see the patient early in the attack and where there is no contra-indication, such as a dangerous heart condition. I do not use it unless it can be given properly and without undue exposure to the patient. I never give it late in the disease.

A good method is to get the patient into the tub, lay two canes or sticks across the tub, and cover all with a blanket or rug. Place a bath towel for the head to rest on and pull the blanket around the neck. The patient can then take a good hot sweat in comfort. His arms and shoulders, his knees and legs will not be exposed to chill. When he gets up the blanket can be drawn about him if desired. He then goes back to bed for a good rest and sweat. A cold towel is placed on the head and water given to drink.

Every patient should have a good sweat early in the attack. Another good method is to cover with a blanket and place outside fruit jars or jugs filled with hot water, cold towel to the head and several glasses of water or lemonade to drink.

The use of cold compresses on the chest I do not favor. They are used by some osteopathic physicians, but I believe the result is better with other methods. Applied in a hospital where the technique is well in hand they might be successful, but personally I fear them. I am even careful about putting an ice bag on the heart. Cold packs are sometimes used in my practice but only on the head for pain or delirium. Chill must be avoided. Warmth must be conserved, even the fever is benign.

Neither do I favor "rub-on" of camphor, turpentine or onions when they irritate the patient. If the patient has been used to them or

has faith in them and wants them I order them. I also order something of the kind where "something must be done". When a family calls a doctor they "want something done," and it is best to do something; ever keeping in mind, however, that our patient's strength must be conserved.

I do favor "rub-ons" in that I think it is well to keep the skin soft with some oil. It helps to keep an even temperature and the skin active. The skin should be wiped dry often; however, to remove the skin secretions which if left on become stale.

I remember being called to see one little girl who could not get her breath, and found she was holding her nose with the bed clothes. She told me that the smell and stickiness of the lard and turpentine and the onions made her so sick and uncomfortable that she felt she could stand it no longer. When she was cleaned up, and clothed in nice clean white cotton she showed a wonderful improvement, and it was real as well as apparent.

As to **baths** in influenza, I instruct the nurse to bathe the patient only as necessary for cleanliness and his comfort. Dabbling around in water is not a safe procedure in a disease where pneumonia is so easily contracted.

I do not use alcohol rubs where the patient is in anything like a serious condition, as alcohol closes the pores and dries out the skin. A rubbing or massage by the nurse is good for a restless, nervous patient, but it had better be done with olive oil or some other good oil. In influenza we do not want the pores closed. We need elimination, and all we can get. A small saving of vitality or a little elimination of toxins may be the margin that saves a patient for us. I do not favor the use of turpentine, for if it is absorbed it irritates an already sick kidney; if it is not absorbed it is useless. Why disturb the patient?

For the bronchial irritation, in addition to osteopathic treatment, and the accessory mustard plasters, inhalation of steam is often used. A pan of boiling water is set by the bed and the patient leans over the edge of the bed with a bed-sheet or paper over the head and steam vessel, breathing the steam as long as it lasts.

For the **throat** most any cleansing gargle can be used but I prefer the use of the common baking soda gargle. I have about one-half teaspoonful of soda placed in a glass and boiling hot water poured over it. As soon as this is cool enough to use I have the patient gargle thoroughly. The idea is to get the mouth, pharynx and tonsillar area clean and free from accumulations. Lemon-water gargle is often gratefully accepted.

If a very sick patient breathes through a dirty and dried-out mouth, all the stage is set for him to draw into the devitalized lung large quantities of infectious material. For this reason if not for the comfort of the patient it is necessary that the mouth be kept clean and also moist.

It is not possible to kill this germ life with any antiseptic. The field must be made and kept clean.

The **nasal passage** also should be looked after, to keep it clean as possible and also to allow the patient to breathe through the nose.

For the nasal passage any good non-irritating oil is effective but I like best 2½% iodine in oil. It is a good lubricant and as far as possible we do get the germicidal action of the iodine.

Patients asking me what to do to avoid influenza are advised to keep the mouth clean and closed and to use the oily solution of iodine in the nasal passages.

And when treating the respiratory tract we must keep in mind the fact that all healing comes from the blood side of a membrane. No healing ever comes to a membrane from its exposed surface. Local treatment to a membrane must be a treatment which removes irritation, not one which adds more. Healing must come from within. "The rule of the artery is supreme."

Diet.—The diet used is liquid, so that the digestive functions will be taxed as little as possible, for they are weak at this time. Fruit and vegetable juices only are used.

The influenza germ propagates largely in the intestine and if the intestine has in it the products of a full diet the bacterial growth soon overpowers the patient. Germ life cannot develop on fruit and vegetable juices.

Another reason for using the liquid and fruit diet is that influenza is a disease running a short course and feeding is not necessary. If it were a disease such as typhoid, running a fever for several weeks, we would then give a more liberal diet, but the patient's strength will not be lost on a liquid and fruit-juice diet in three or even eight days.

The frequency with which the urine contains albumin in this disease shows us what a heavy load the kidneys are carrying. This makes a salt-free diet advisable and again brings fruit juice to our favorable attention.

To activate the kidneys and thus relieve the headache we give always plenty of water and often hot lemonade. Orange juice and lemonade are used frequently as are blackberry, raspberry, pineapple, loganberry and grape juices. When the acid juices are not well borne we use non-

acid juices, such as pear and raspberry juice. A ripe, cooked pear mashed with a fork and mixed with one or two different fruit juices makes a satisfying dish.

Bottled sweet cider is also a most valuable food and a good beverage. We use it in almost every case and find it the most acceptable to the patient of any food offered. I am of the opinion that apple cider has been neglected as an article of diet, both in disease and health, but especially in fevers. It contains considerable iron for the blood, as well as having considerable food value. It has the added virtue of being pleasing to the patient.

In addition to these juices we often use spinach juice. I have the nurse get a can of the best grade spinach and serve the juice hot, as a broth, with a little salt and pepper and perhaps celery salt and a piece of bacon in it to flavor it and to appeal to the patient. Spinach juice contains much iron and iodine in a form readily absorbable by the blood. It also is useful in maintaining the alkalinity of the blood and body fluids, thus counteracting the acidosis of the disease. It renders the urine alkaline and thus relieves the kidneys of the irritation of acidosis and of an acid urine. Where the kidneys are or are likely to be involved the spinach juice must be served without salt.

All the mentioned fruit juices tend to counteract acidosis and produce alkalinity, but are not so effective as the spinach juice. They have the advantage, however, of being used in larger quantities. The spinach juice has considerable food value and has the added value of appealing to the patient's reason, when the iron and iodine content is explained to him. It is especially useful when treating those patients who are wondering if they should not be getting some sort of "tonic."

The juice taken from ground fresh lettuce is also valuable. It contains more iron, iodine and phosphates than the spinach but it is not so easy to prepare. I have used it in the cases of several anemic and quite sick babies and consider it well worth all the expense and effort it took to secure it.

The breaking down of the alkaline reserve of the body and the consequent acidosis, comes early in the disease and is disastrous, and all the attention given to the diet is amply repaid in results. Careful attention to the diet is the only way the acidosis can be overcome.

Raw fruit and vegetable juices also supply that most valuable element, vitamins. For this one thing alone is the raw fruit juice most valuable. I do not believe too much attention can be given to securing

a liberal supply of vitamins for the body, especially during an attack of fever.

Some especially interesting points are brought out by contributors to the Journal of the American Osteopathic Association in the March, 1919 number. I wish here to add a discussion of these points. The contributors are physicians and good representatives of our profession and they report uniform and excellent success in handling the recent epidemic.

It seems to be the consensus of opinion that the treatment should be specific and light to avoid fatigue, with the possible exception of the first treatment, which often should be general and vigorous.

All are agreed that the patient should be kept in bed, not even leaving it to go to the bath room. The patient must be protected in every way from fatigue and exposure. The enema was used by all. A number of writers state plainly their opposition to the use of physics and laxatives. A hot tub-bath is recommended by several, but there is opposition to much bathing.

Practically all the writers used the fruit-juice diet. However, a few gave a heavier diet and were successful with their patients, which is one more proof that the osteopathic treatment is the deciding factor in bringing about a cure.

J. R. Thornton wrote after having had about 100 cases. He speaks especially of his cases of pneumonia. They resolved by crisis. There were no deaths. He says: "All cases were, preceding the first treatment, given a generous plain water enema. Orders were left for two enemas per day until told to discontinue, and in most cases the patient got the enema. A few cases, with the highest fever, the stationary fever, were given tap-water enemas, one each hour until the temperature dropped two or three degrees.

"Sponge baths were given to reduce fever in every case. Diet was liquid until the temperature was normal.

"The osteopathic treatment of the usual spinal work, paying special attention to cervical and dorsal areas, and strong inhibition.

"Pneumonia cases were treated three to five times a day and had as much time as they required at each visit. They required action. Heating compresses were used on each case, except the ice bag to the heart when rapid. One case of delirium was treated with ice caps to the head and neck. Normal salt solution per rectum. Murphy drip was given in each case. Diet, liquid consisting of egg-nog, milk, strained soup and broth."

Mary Alexander Patton: "Treatment should be quick, every motion significant so as not to tire the patient, for exhaustion is always present. Each patient was treated two or three times a day until temperature became normal. The nasal douche was given twice a day followed by K-Y jelly. Hot soap bath followed by soap enema and enteroclysis when fever persisted."

W. Curtis Brigham ordered "Hot packs the full length of the spine twenty to thirty minutes, three times a day. This will produce profuse sweating and often put the patient to sleep."

I have used this same treatment, especially in nervous cases, and hold it in high esteem. I have the patient put a bath robe on backwards so that the arms and legs are well protected but the spine easily accessible. The hot packs can then be used and covered over and the patient not exposed.

R. H. Nuckles maintains that lung and ear trouble will not follow influenza where osteopathic treatment has been given to adjust the cervical and upper dorsal circulation.

H. A. Price: "We have kept particularly in mind, first, the nerve, blood and lymphatic supply to the lungs; second, the circulation to the spine (meaning spinal cord); third, the internal secretory functions and to the general excretion."

Ralph M. Crane says: "A great deal of my work is among the Italians. It was necessary to give quick specific treatment that I might do as much good as possible to the greatest number. I did not treat them as often as I would like to, and because of this fact I learned that osteopathy got control of the 'flu' immediately, the first treatment sufficing to start them on the road to recovery; in fact, many of them got no more than one treatment."

ACUTE ERUPTIVE FEVERS, MUMPS AND WHOOPIING COUGH

By EDGAR S. COMSTOCK

GENERAL CONSIDERATION

In the consideration of these diseases, it is well to bear in mind that lowered resistance is the primary condition that has made the infections possible, and that lowered resistance implies an imbalance of or obstruction to the vital fluids and forces of the body, thereby interfering with the functional activity of the body's normal protective mechanism.

The imbalance of or the obstruction to these vital fluids and forces, which is structural in nature, is produced by many conditions, as fatigue, exposure, sudden changes of heat and cold, emotions, dietetic errors, physical force or violence, etc. These conditions, because of the response of the tissues of the body to environmental changes, produce contractures of the elastic tissues, such as muscle, fascia, etc., which disturbs the structural integrity of the body and thus produces obstructions, irritations or interference with the media of exchange of these vital fluids (blood and lymph) and forces (nervous energy) of the body.

It is evident, then, that the most potent curative factor in the treatment of these diseases, as in all others, is the removal, whenever possible, of the obstructions and interferences that pervert the activity of these protective forces. It is necessary, therefore, to remove the exciting causes (fatigue, dietetic error, etc.) and by such physiological means as may seem necessary to readjust the structures of the body so as to remove the above mentioned obstructions and interferences.

The structural lesions most frequently found in the infectious diseases are of the muscular and fascial type and are very evident to the careful observer. The interosseous lesions are probably often the predisposing factors to the susceptibility of the softer tissues to reaction to environmental changes, but it has been the experience of the writer that the adjustment of the softer tissues was of greater primary importance in the acute stages of these diseases. The interosseous lesions may be easily adjusted in the very early stages of these diseases, that is before the severe symptoms have appeared, but after the more severe conditions have appeared it has been our experience that the soft tissue work was sufficient unless the interosseous lesions were very easily adjusted.

It is the writer's desire to impress upon the reader the necessity of

careful attention to the structural lesions that are always constant in these diseases, using whatever physiological means seem necessary to adjust these lesions and keep them adjusted, and to insist upon carefully restricted diet; continuous, thorough elimination of the waste products of the body; hygienic surroundings and well regulated environments both mental and physical. Then Nature, which has given the body its own protective mechanism, may have full control of the situation and all of the normal protective chemicals and forces in the body organism are utilized in the battle with the invading infective forces: the glands secrete the chemicals of protection; the antibodies are rapidly developed and thrown into the battle area; metabolism begins to return to normal; elimination becomes increased because of the stimulating action of foreign substances in the body structures; and the work of repair and recuperation begins.

If reliance is placed upon the inherent protective forces of the body, the knowledge of the special type or character of the invading organism is of little importance from the standpoint of the treatment of the disease after it has become established. The value of the knowledge of the specific organisms is in preventive medicine, in seeking out the habitat and breeding ground of the organism and its mode of transmigration. Knowing these, effective measures may be adopted to prevent their propagation and spread. Examples of this are Yellow Fever and Malaria.

Variola

(SMALLPOX)

Definition.—**Variola** is an acute, specific, highly infectious and contagious, epidemic disease. Its beginning is sudden with a chill, vomiting, severe headache and lumbo-sacral pains. It has a typical fever curve and a typical eruption on the skin and mucosæ of macules, papules, pustules and crusts successively.

History.—Prevailed in China and India at least 1000 years before the Christian era. Epidemics occurred in the sixth century and during the crusades. Its first clinical description was given in Arabia during the ninth century. It was brought into Mexico about 1520 by the Spaniards and between three and four million people contracted the disease. In 1718 preventive inoculation was introduced into England and in 1796 Jenner discovered vaccination.

Etiology.—The specific agent which is the cause of this disease is unknown, but the virulence of the agents is retained for a long period

and is the most virulent found in all diseases. There is no period from the initial fever to the final desquamation that the disease is not contagious, although the stage of suppuration is the most violent. Although the disease is so highly contagious and the entrance of this particular poison into the system produces this disease, still no one has yet been able to discover a germ nor what the nature of the infective agent is. To contract the disease it is not necessary to touch an individual already afflicted, not to even approach the sick room. It may be only necessary to touch a garment that has once been in contact with a smallpox patient, or which has simply hung in his vicinity.

The blood is infectious at a very early stage. As smallpox is contagious without eruption it seems that the secretions and excretions convey the virus. The dried pustules seem to have the greatest infectiousness. Cadavers of smallpox (*Variola*) victims are very dangerous and relatives of them should be carefully warned. The disease often persists in infected communities for years. The disease is evidently spread by fomites, contact with the pustular contents, and crusts or scales of the desquamating skin. It attacks all classes, ages and conditions of people, which is unlike other erythematous diseases.

A previous attack usually confers immunity. Vaccination is claimed to confer immunity but apparently in not all instances, for there are records of "successfully vaccinated" individuals having severe attacks of the disease.

The susceptibility to smallpox, as to all other infectious diseases, varies in different individuals, in different races, and under the influence of conditions as yet unknown. Some persons are not susceptible to the disease, nor are they to vaccination, and yet others have been known to have had the disease as much as three times. The Negro and Indian races seem to be more susceptible than the Caucasian. Then again at intervals of a few years, the general susceptibility of the people seems to be increased so that cases of smallpox become far more numerous than usual.

A point of considerable interest is the fact that the child, while in the mother's womb, may experience the disease along with the mother and thereby acquire, before birth, the usual immunity conferred by one attack of the disease. In most cases of smallpox in pregnant women, abortion or miscarriage occurs, yet a sufficient number of instances are on record in which healthy children have been born, exhibiting the characteristic pitting of smallpox, and possessing no susceptibility to vaccination. Again there are other cases in which pregnant women have small-

pox and the babes in the wombs have escaped entirely; while the most singular fact is that while the fetus may experience the disease, the mother through whom the exposure was effected, escapes, either because of a previous attack or possibly because of vaccination.

While there seems to be no reason for believing that an attack of smallpox can be, or ever has been, aborted by artificial means, yet there is a prevalent belief that this process occurred during certain epidemics of smallpox, cases having been known in which individuals presented all the symptoms indicating the invasion of smallpox, and yet no eruption occurred, and yet such individuals were thereafter insusceptible to smallpox or vaccination.

The mortality of smallpox varies like the susceptibility of it—with the age of the patient and with some unknown conditions of the atmosphere or soil which favor the occurrence of the epidemics. The average in scattered cases—sporadic—is probably not greater than one in nine or ten. A fatal result occurs more frequently in the second week of the disease than at any other time.

Pathology.—Granular and fatty degeneration occurs in the liver, spleen, kidneys and heart. Infiltration is found in the adrenal glands and testicles. During the papular stage, there is local hyperemia of the papillæ, with interstitial exudation and colliquative necrosis of rete cells, so that a vesicle is formed, peculiar in that it is traversed by delicate bands of epithelial cells. This, with the fact that coagulation-necrosis occurs mainly in the center, gives it the umbilicated, or depressed appearance. The contents of the vesicle are plasma, fibrin and cell detritus. Leucocytic invasion converts vesicles into pustules. This has a more globular, elevated appearance than the umbilicated vesicle. Pyogenic organisms are found in the pus. When the inflammation injures the corium, scars are apt to result; this occurs when the skin is scratched. The actinic light rays increase the danger.

Diagnosis.—Mistakes in the diagnosis of the first cases of smallpox in an epidemic are almost inevitable. Hemorrhagic scarlatina or measles sometimes cause confusion; in the hemorrhagic scarlatina the mucous membrane hemorrhages are less frequent than in smallpox. The prodromal eruptions plus purpura are very suggestive. The invasion stage lasts about three days.

Smallpox is characterized by sudden onset with violent chill and shivering; agonizing pain in the back and legs; intense headache, mostly frontal; temperature rapidly reaching 102 to 104 degrees F.; full, strong, rapid pulse, going to 100 to 140; uncontrollable vomiting; pharyngitis;

red face, bright eyes, coated tongue; anorexia; constipation; sleeplessness; delirium; often copious perspiration and extreme prostration.

An "initial exanthem," clearing within 24 to 48 hours, appears. It is either hemorrhagic or erythematous. About the third day the true eruption appears, first upon the forehead and in the scalp, then the rest of the face, the backs of the wrists, trunk, arms, and lastly the legs, most abundant upon the parts exposed to the atmosphere. With the appearance of the eruption, all symptoms abate, the temperature falls, and the patient may feel quite comfortable. The eruption consists of coarse, red spots upon the body, like flea-bites, rapidly becoming, within 24 hours, slightly raised red papules, feeling hard and shotty to the touch, and each surrounded by a broad red inflammatory band, the areola. Usually by the sixth day the papules become converted into umbilicated vesicles, at first clear, then turbid. They are hard and indurated to the touch, and on the eighth or ninth day they become pustular. The areola becomes much darker, the temperature rises to 103 to 105 degrees F., and the pulse to 110 to 120. The other symptoms all reappear, with salivation and delirium. Marked edema of the skin renders the skin unrecognizable. The pustules are painful, especially in places where the skin is thickened. The maturation lasts about three days, when the fever falls by lysis. If fatal, death usually takes place about the tenth day, preceded by feeble and more rapid pulse, marked delirium, subsultus and sometimes diarrhea. About the eleventh day, desiccation begins, the pustules begin to dry, forming tight scabs which are closely adherent. The fever and other symptoms subside but itching becomes annoying. The odor from the pustular stage on is a peculiar greasy one.

After the rupture of large pustules the centers frequently dry and sink in, often in the shape of the Maltese cross. This is most typically seen on the backs of the hands and is pathognomonic. Toward the end of the third week the scabs fall, leaving red glistening pits which disappear or change into deep white striated scars. The hair falls but may grow again. The diagnosis is not certain until the eruption is seen. In the smallpox without eruption the diagnosis must be made from the history of exposure, the presence of an epidemic, fever, lumbar and head pains, delirium, and possibly the initial rash.

Mistakes in diagnosis may be made even by smallpox experts, but attention to the history, somatic findings and the course of the disease, rather than to the eruption, will prevent disastrous results. Always isolate any and all suspected patients.

Varicella Compared with Variola

Vaccination and smallpox never prevent	Smallpox may closely resemble chicken pox; especially mild cases.
AGE—usually before puberty, may occur in adults.	Usually after puberty (many exceptions.)
Initial stage practically absent.	Initial stage severe, even in mild cases.
TEMPERATURE,—no remission on onset of rash.	Typical remission and secondary fever.
White cells normal or decreased.	Leukocytosis.
Prodromal rash very exceptional.	Prodromal rash quite frequent.
Vesicles in crops.	Vesicles never in crops.
Vesicles rarely shotty.	Vesicles, following macules, are hard and shotty.
RASH EVOLUTION,—	RASH EVOLUTION,—
Very rapid, vesicles on first or second day.	Much slower, vesicles on seventh day.
Eruption is universal, successive crops, most abundant on back, begins on body, less on face, scalp, hands and feet.	Development progresses downward, face first, then wrists, trunk, arms and lastly legs. Less on trunk.
Vesicle is superficial and fluid transparent.	Fluid pearl-colored and NOT transparent. Thicker covering.
Halo (areola) usually absent.	Areola is marked.
Involution is quite rapid.	Involution is slow.

The **Secondary Toxic or Septic Rash** appears during the stage of decrustation, sometimes with a mild fever. It may be either scarlatiniform, morbilliform, or hemorrhagic. The skin immediately surrounding the drying pocks is often exempt leaving an anemic halo. The rash lasts about three days and fades or desquamates. With the development of the skin eruption, an exanthem appears upon the mucous membranes of the body cavities, developing into ulcers. This may develop before the dermal rash and be of diagnostic importance.

Forms or Varieties

- | | | |
|---------------------------|---|--|
| I. Variola Vera | { | a. Discrete. |
| | | b. Confluent. |
| II. Variola Hemorrhagica. | { | c. Purpura variolosa (black smallpox) |
| | | d. Variola hemorrhagica pustulosa. |
| III. Varioloid. | | e. Smallpox modified by vaccination or partial immunity. |

Discrete Variola Vera.—Incubation symptomless and averages 12 days.

Prodromal stage, from first symptom to eruption. Averages three days. The longer the stage the more severe the infection. Intensity bears little if any relation to prognosis; however, if onset is mild, disease will not be confluent or hemorrhagic.

Invasion begins with severe chill, often repeated. Initial fever rises suddenly to 103° or 104°, and reaches maximum on second or third day. Pulse is rapid and full. Skin is red, hot and dry. There may be sweating in the discrete form and in the favorable cases. The headache appears with the chill and is usually frontal. When severe and accompanied with neckache and vomiting it may suggest meningitis. The backache appears with the chill and lasts about two days. It is a lumbar pain, very like lumbago; it occurs slightly less frequently than the headache and vomiting. This pain is rare in other fevers likely to be confused with smallpox. Vomiting is constant in children and usual in adults. The initial eruptions, which are present in about 10 to 12 per cent, are of considerable diagnostic importance. They are usually limited to the lower abdomen, inner side of the thighs, axillæ, and sometimes on the extensor surfaces of the knees and elbows.

The Eruptive stage consists of the following sub-stages: **macules and papules; vesicles, and pustules.**

The macules and papules occur on the fourth day and progress for about three days. They begin on the forehead, near the hair, with itching and burning and resemble flea-bites. These soon become papules, which are reddish, elevated, circular, hard or shotty and discrete. On second day of this stage they appear on the body, and on the next day on the extensor surfaces of the extremities. If the eruption appears on the second day the confluent type may be anticipated; if on the third day of the disease, the discrete type.

The vesicles which occur on about the seventh day of the disease, contain lymph. Umbilication occurs in the centers of many of the vesicles, and it is suggestive of smallpox.

The suppurative stage begins about the ninth day with clouding of the vesicles and inflammation around them. This continues for three days. The pustules become opaque, then yellow, and a thick pus obliterates the umbilication. The inflammatory "halo" becomes more vivid and edema may follow around these haloes. This edema causes increased tension and deformity, particularly of the face, and produces great tenderness and pain. The pustulation follows in the order of eruption, from the face downward, and are the thickest on the extremities and head. The pustules evacuate spontaneously, or may dry up without rupture. The skin gives off a peculiar, offensive odor. Bed-sores are now most likely to develop.

The eruptions also may occur in the mucous membranes, particularly in the mouth and nasopharynx. These pass through the successive stages as do those of the skin, but less typically. With the pustulation there is usually a gradually rising **secondary fever**. In the discrete type the secondary fever does not remain high more than twenty-four to thirty-six hours, with morning remissions. A marked leukocytosis occurs with the secondary fever and its extent depends upon the severity of the infection. Delirium, albuminuria, acute exhaustion and heart paralysis are to be guarded against during this stage.

The state of involution, or decrustation, begins about the twelfth day. It follows the order of eruption, and is accompanied with a decrease in edema, redness and pain, but is attended with intolerable itching. Crusts form, the hair falls out and by the end of the second week the temperature returns to normal. If fever persists during this stage it indicates some complications. Scars occur when the true skin is involved and lasts three or four weeks. Complete convalescence follows the disappearance of the last crust.

Confluent Variola Vera.—This is a malignant type and used to be more prevalent than now. The initial stage is violent, and the headache and backache very agonizing. The fever remission is very slight or absent, and attended with hardly any improvement in symptoms. The earlier the exanthem occurs in variola the more likely it will be of the confluent type. The confluent eruptions occur especially upon the face and head, sometimes on the hands and feet. It is largely discrete on the body and extremities. Great edema appears with the fusion of the eruption, with the swelling and erosion of the mucous membrane, the

eyes close and the nostrils become obstructed. The fever is high, pulse high and rapid (often irregular), delirium, albuminuria, persistent nausea and vomiting, great thirst, husky voice, enlarged cervical glands, salivation in adults and diarrhea in children are symptoms present. Death occurs from acute toxemia, usually within a week, but may last a little longer. Recovery from confluent variola is very infrequent.

Purpura Variolosa.—This is "Black Smallpox." That is, smallpox with primary hemorrhage in the initial stages. It is the worst type and results almost invariably in death. It is very important because it is so difficult to diagnose. Its incubation period is short (6 to 8 days), invasion very severe, lumbar pains almost unbearable, prostration great, pulse soft, small and rapid and respiration unusually high. The initial pains and vomiting may last until death.

On the first or second day a plum colored eruption appears, with brick-red, purple or inky ecchymoses particularly about the eyes. The condition is desperate. Hemorrhages may occur from any cavity of the body, sometimes accompanied by gangrene of the pharynx. The disease does not usually reach the period of real eruption, because death usually occurs within four or five days. The diagnosis of this condition is by history of exposure to smallpox and the characteristic prodromes.

Variola Hemorrhagica Pustulosa.—This is the type with the **secondary hemorrhage**, or the hemorrhage after the eruption appears, and is more common than primary hemorrhage. It occurs in weakly and alcoholic subjects. The initial stage is severe, and the hemorrhages occur into the vesicles or pustules. There may be epistaxis, hematuria and metrorrhagia. The outcome is almost always fatal, though the hemorrhage at the vesicular stage may be followed by rapid abortion of the rash and recovery.

Varioloid.—This is modified or mitigated smallpox; also known as variola benigna. Persons exposed to smallpox sometimes suffer from varioloid, and persons who have had smallpox may suffer from varioloid at subsequent exposure to smallpox. Vaccination appears to initiate an attack in persons peculiarly susceptible, or as a result of improperly performed vaccination. The lesions remain in the epidermis, the course of the eruption is shorter, the papules vesicate by the fifth day, the process of suppuration is abridged, decrustation occurs rapidly with little or no scarring, and all symptoms are milder. There are many modifications.

Other varieties are (1) Variola sine exanthemate, which has the usual symptoms without the eruption; (2) Variola verrucosa, which has

large, solid, conical papules with small vesicles at their apices, which rapidly desiccate and form crusts, and finally disappear without scars; (3) Variola cornea (horn pox) which is known by the large mahogany crusts.

Complications and Sequelæ.—Variola is often accompanied by many complications and sequelæ which are an early severe toxemia and a later secondary infection. During the secondary fever, there may be bronchopneumonia, pleurisy, dysentery, hemorrhages of all kinds, ulcerative eye, ear or laryngeal conditions, purulent arthritis, orchitis, gangrene when the swelling is great and subcutaneous abscesses form, often attacking the penis and scrotum, erysipelas attacking the face, and rarely nephritis.

During convalescence, carbuncles, boils and other subcutaneous abscesses are very common. Disturbances of the peripheral nervous system as neuritis, paralyses especially of the palatal muscles, neuroretinitis, and otitis media are less common. The sequelæ most common are boils, abscesses, deep pitting, otitis media, blindness and permanent baldness.

The **urine** has the usual febrile changes. **White blood** cells reach 10,000 to 20,000 or more. Lymphocytosis occurs during pustulation; polymorphonuclear cells are decreased to 40%, sometimes to 12%; myelocytes and irritation forms are found. During the febrile stage there is a polycythemia followed by an anemia to 3,000,000 or less during the pustular stage. Regeneration is slow, lasting about fourteen days. Normoblasts are rare except in hemorrhagic forms. Exudate taken from the pustules show streptococci, staphylococci, and psuedodiphtheria bacilli.

Treatment.—The imperative demands of treatment are isolation, ventilation, cleanliness and disinfection.

If symptoms are suspicious of smallpox, **notify the proper authorities at once and isolate patient.** When diagnosis is made, cut hair and beard very short.

1. Isolate patient in room free from draperies, rugs, carpets, curtains, pictures, etc.
2. Disinfect all vessels used in room of the patient in carbolic acid solution or in bichloride of mercury solution.
3. Family of patient should be isolated for from sixteen to twenty days.
4. Room should be well ventilated, with windows screened and slightly darkened with red curtains to exclude the ultra-violet rays of

light. Temperature should be maintained at 65 degrees. Door-way may be protected by a sheet dampened with a 1:60 carbolic solution.

5. Nurse must be robust, perfectly immune and not afraid. If male nurse, hair must be very short and must have no beard; if female, hair must be short and must wear close fitting cap.

6. Absolute cleanliness is secured by plenty of baths, clean bed and personal linen, and careful nursing. Physician must put on special suit with cap and gloves which are kept in the house, but not in the sickroom.

The first symptoms being the headache, nausea and vomiting and the lumbar pains, the first points of attack in the treatment would be the relief of these pains in the head and back by thorough relaxation of the spinal muscles, paying particular attention to the suboccipital, mid-dorsal and lumbar areas. The headache may be partially relieved by steady pressure between the frontal and occipital regions. No inter-osseous adjustments requiring painful or difficult technique should be given after the more severe symptoms have appeared. Patient should be visited from one to three times per day, and the reflex contractures of the muscles must be relieved as often as they occur.

Dysentery and diarrhea are controlled by strong inhibitory pressure in the sacral and lumbar regions. Give vasomotor treatment to the superior cervical ganglion. Stimulate the anterior aspect of the solar plexus to stir up its acid function, the blood being alkaline in smallpox.

During all the stages up to the stage of pustulation, the patient responds very readily and successfully to osteopathic treatment. The headache, the backache and the aching joints respond to treatment as readily as, if not more readily than, the headache and backache of influenza do to osteopathic care. The constipation is usually quite readily relieved. It has been the experience of those who have handled smallpox cases, that the tendency to the confluent type is greatly reduced by this treatment and that the response of the patient to osteopathic treatment is very gratifying. Indeed, those of experience have less fear of the outcome of their smallpox cases than do they have of scarlet fever or pneumonia.

After the pustules have formed, each pustule is treated with iodine painted on the pustule with a camel's hair brush. During the pustular stage it is not necessary to give manipulative treatment, and indeed it is sometimes impractical because of the tenderness of the skin. However, about all that is needed during this period is good hygienic treatment and good nursing. During convalescence constitutional treatment should be given.

Diet.—During period of vomiting, pellets of ice in the mouth are comforting. During periods of fever give plenty of water with, preferably, lemon juice. As the fever declines begin with barley and oatmeal water with lemon juice; then follow with easily digested and nutritious diet of milk, eggs, broths, beef juice and gruels. Feed every three hours during that period but not large quantities. During convalescence a full, well-regulated, nutritious diet should be ordered.

Hygienic Care.—Keep nose cleansed with glycerine, cold cream or olive oil, which keeps the crusts soft. The mouth and nasopharynx may be cleansed with any mild antiseptic. The eyes are washed with warm boric acid solution. Cold compresses applied over the eyelids assist in reducing the edema. A daily tepid sponge bath is necessary. Bath may be given with bichloride of mercury solution (1:20,000) or creolin (1:500).

Headache.—Deep, steady digital pressure in the suboccipital fossa and at eighth thoracic spine; ice bag to the head; or a mustard plaster at the back of the neck may relieve.

Vomiting.—Thorough relaxation and adjustment of the great splanchnic and cervical areas, with deep, steady digital pressure in the occipital triangles, and at the fourth and fifth dorsal vertebræ on the right side will usually control the condition.

Fever.—Relaxation of the upper dorsal area, relaxation of the cervical area, and deep, steady pressure in the suboccipital region often reduce temperature. Warm sponging in lower grades of fever, bath at 70° F., and cold pack may be needed. If temperature goes very high give a continuous cool colonic irrigation.

Pitting.—Cold wet dressings of lint soaked in any comfortable mildly antiseptic solution, or of ice water and glycerine, are to be used on the hands and face to prevent pitting. Hot water dressings are more comfortable to some patients. It is well to protect the skin from the light, especially from the ultra-violet rays. This, however, must not lead to any lack of ventilation. When crusts are forming keep them moist with vaseline, oil, glycerine, or carbolic acid in lanolin or vaseline.

Odor.—Baths, the daily toilet and the use of dusting powder or 5% iodoform powder, an open bottle of smelling salts or of weak ammonia are good. Plenty of fresh air is best of all.

Cardiac Weakness.—If pulse is feeble and frequent, a general quieting treatment should be given, including relaxation of the cervical area and of the fourth and fifth dorsal segments. An ice bag in flannel

directly over the heart is often very useful. Gentle, careful spinal extension is very restful and eases the spinal circulation.

Delirium is usually relieved, or prevented, by spinal extension, the prolonged warm bath or the cold pack, if given when signs of nervousness appear. Morphia or chloroform may be necessary in violent and suicidal cases.

Laryngeal Obstruction.—Usually caused by edema and may require tracheotomy.

Bed-sores.—These and abscesses may occur even under the best of care. Place patient upon a water-bed or in a continued warm bath.

Convalescence is not complete until the skin is entirely free from crusts and is perfectly smooth.

Prognosis.—Prognosis depends upon age of patient; complications; and environment from which patient comes, as well as upon the nursing. In varioloid the prognosis is recovery; in the discrete variety, good; in the confluent type over 50% are fatal; in the malignant types practically all die. In patients under five years old and over forty years old the prognosis is very grave. A filthy environment predisposes to complications. Recurrences seldom occur; second attacks are usually varioloid.

Prophylaxis.—Usual rules of health authorities are: rigid quarantine or isolation, vaccination, disinfection of the skin and all fomites, and final fumigation. Quarantine of a suspected individual is sixteen days after exposure. Isolation continued until every trace of eruption has disappeared. The dead body is very dangerous and a public funeral is not permitted. The clothes used by the patient must be steamed and other articles must be washed with bichloride of mercury and fumigated with formaldehyde vapor. Disinfection of the hands, face, beard and hair of attendants with bichloride solution is imperative.

Vaccination

(VACCINIA; COW-POX)

Definition.—**Vaccinia** is an eruptive disease of the cow, communicable only by inoculation and causing, when transmitted to the human being, local reaction in the form of a pock and constitutional disturbances which are followed by a more or less lasting immunity against small-pox. **Vaccination** is the artificial inoculation of vaccine virus for the purpose of producing an immunity against small-pox.

Arm to arm vaccination was formerly very generally practiced but has been practically discontinued because of the possibility of infection