2. No beneficial effects were observed from its use in these patients.

3. Definite and immediate deleterious effects were observed in at least one, and death was accelerated in both of the patients as a result of the injection of the acacia.

4. This is in accord with the deleterious effects of acacia in animals and man reported by others.

5. It is doubtful whether acacia is an absolutely harmless agent when used in shock, hemorrhage and allied conditions.

PRESENT STATUS OF THE TREATMENT OF TUBERCULOSIS*

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One of the most potent factors in retarding progress in the treatment of tuberculosis is the pessimistic psychology which has surrounded this disease from time immemorial, and which, in spite of the great progress recently made, still holds sway in the minds of both medical men and laymen. Regardless of our lack of a specific remedy for its treatment, if the measures which have been gradually evolved during the last half century are applied during the early clinical stage, and continued for a sufficiently long time, with the hearty cooperation of the patient, nearly all patients with tuberculosis can be restored to health.

This optimistic statement presumes that:

1. Present measures used in treatment are sufficient to cause tuberculosis to heal.
2. These measures must be applied early.
3. The treatment must be carried on for a sufficient time.
4. The patient must give a whole-hearted cooperation.

This paper will consist of a discussion and elaboration of these four points.

In this statement of the present status of therapy I believe that a discussion of fundamental factors is of more importance than a discussion of each particular remedy. Such a discussion should outline what we are attempting to do by therapy; and, when this is made plain, the measures will naturally fall into the classes to which they belong.

HOW TUBERCULOSIS HEALS

Nature heals tuberculosis by keeping the anatomic elements of the host, that is, the body cells, in a condition of high physiologic activity. An individual overcomes an infection when once established by destroying what bacilli he can by his own natural defensive elements supplemented by a specific reaction with which his body cells have been endowed as a result of the infection, and by sealing up and burying in a wall of fibrous tissue those bacilli which he is not able to destroy.

It is self-evident that the nearer the body can come to maintaining a physiologic equilibrium, the more able it will be to overcome an infection. It is also self-evident that the intensity of the process, or the amount of physiologic disturbance, is of greater weight in prognosis than the extent or the amount of anatomic

disturbance, except in widespread fibrosis, when the amount of lung destroyed becomes the really serious factor. It is further self-evident that the less the anatomic and the physiologic disturbance, the better the chances of healing, because under these conditions fewer bacilli and toxic bodies are gaining access to the circulating fluids.

There are two methods of approach to the cure of an infectious disease; one by specific remedies which combat the organisms or their toxins directly, such as antitoxin in diphtheria and quinin in malaria, and the other by aiding the natural defensive forces of the patient so that he cures himself. So far, tuberculosis has baffled search for a truly specific remedy; and while the search for such a measure still goes on and the hope of some such boon to the race being discovered is deeply embedded in the minds of investigators, yet many of those who are most interested in the solution of the tuberculosis problem have greater hope that some method of vaccination may be discovered which will protect the individual against massive infection, during the early years of life.

AIM OF THERAPEUTIC MEASURES

The measures which have secured general recognition in the treatment of tuberculosis have one common aim, that of keeping the patient's physiologic equilibrium so balanced that his body cells function to the best advantage. These measures include open air; a sufficient supply of adequate food; sun, air and water baths; rest when the disease is active; exercise when the disease is quiescent, provided there are no other contraindications; medicinal tonics; measures which are directed against harmful symptoms and complications; psychotherapy, and artificial pneumothorax. One and all, these improve in one way or another, either in a large measure or in a small one, the physiologic working of the organism. The value of measures in treatment will differ according to how great a service each can render to the patient.

The physiologic action of the important viscera is not only influenced but also controlled by the vegetative nerves and chemical substances which are termed internal secretions. This nerve and chemical control of the body is influenced by physical and psychic stimuli. Stimuli of both varieties may be salutary or harmful. Symptoms of disease represent the effects of the latter. Is it not possible that there is a marked stimulation of normal physiologic activities caused by the disease? May we not judge this from the fact that the sympathetic system is stimulated by toxins, and that the suprarenals and thyroid also respond? While in fatal disease we see the breaking down of the entire physiologic response, yet in the great majority of infections it proves sufficient to withstand the attack and to bring the patient safely through.

There is a generally accepted treatment of tuberculosis today which consists of hygienic living in the open air with rest and a sufficient supply of adequate food. This is the nucleus around which all recognized regimens are established. To this, one man may add climate; another, water or sun baths, and still another, psychotherapy, tuberculin, pulmonary compression or some other favorite measure; but the basis is always the same.

This treatment is so generally accepted that it always comes to mind when the disease tuberculosis is mentioned. It is so well established that it is instituted as

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a matter of routine; but, since things which are so instituted are not always employed with the greatest intelligence and discriminating judgment, it is well to pause and analyze the effects exerted by such measures on the disease.

The outstanding fact in such a therapy is that it is a natural one. It is a method of making the well, no less than the sick, stronger. In early clinical tuberculosis, before serious harm has been done to the organism, the main purpose of therapeutic effort is to keep the physiologic processes of the body running in the most natural manner possible until the disease can heal. This is relatively easy of accomplishment, because there are no great hindrances working in opposition beyond those peculiar to the individual in question. Later, the physiologic processes of the individual are disturbed not only by whatever peculiar deficiencies he may possess when in usual health, but also by harmful influences incident to the disease, such as toxins, reflex impulses, and anatomic and psychic changes.

That patients differ greatly in the manner in which they react toward disease is well known. That this may be due to differences in physiologic activity which are fundamental to the individual does not seem to be realized so fully; yet every one must recognize when the facts are presented that such fundamental factors as those which control growth, development and visceral activity exert a determining influence on the manner in which such a patient will react when affected by such a disease as tuberculosis. When patients with early clinical tuberculosis, either with or without fundamental physiologic handicaps, are put upon a hygienic dietetic regimen, the really outstanding measures for improving this physiologic activity have been instituted. They may be supplemented in one case by one measure, in another by others; but the purpose of all such measures is to fortify the patient and call out resistance to oppose the progress of the disease.

INDIVIDUAL THERAPEUTIC MEASURES

There are certain measures which are of value throughout the disease, from the time it is first recognized as a clinical entity until the process heals or destroys the patient. Then there are others which are particularly directed to certain conditions.

Rest is always advisable when the disease is active and when exertion produces any of those symptoms which we have learned to assign to the action of toxins. Exercise, while just as valuable in building up the patient's physical strength as rest is in favoring a quiescence of the disease, is applicable only when the clinical process is so quiescent that exertion fails to cause toxic symptoms, and when the patient is able to provide the extra energy required without interfering with his ability to supply the demands made by the normal physiologic processes.

There are hydrotherapeutic measures which may be added to the requirements of the patient in all stages and conditions met in the disease; but some of those which are applicable in early and quiescent conditions are not at all suitable in active toxic cases.

The value of light and air baths is not sufficiently understood. In all nontoxic conditions, exposure to the direct rays of the sun is of great value. This procedure may not have any specific effect, but it is probably one of the best measures that we have for improving the physiologic reactions of the patient. Through the action of air and light on the skin, the sensory nerve endings are stimulated and the entire

physiologic mechanism of the body is favorably influenced. The value of open air is rendered many times greater by accustoming the patient to little clothing so that the air can circulate freely about the skin, and by exposing the naked skin to the air and light. Full sunlight for a portion of each day can be given with great benefit to all nonfebrile patients and even to some who have slight elevation of temperature, and air and light baths can be used very generally.

HOW TUBERCULOSIS DISTURBS THE PATIENT'S PHYSIOLOGIC BALANCE

Tuberculosis affects the patient's physiologic balance in two ways; through the toxins which produce a general disturbance, and reflexly, which is more specific in that the effect is directed more specifically to certain tissues and organs. It is toward the toxins, however, that we must direct much of our therapeutic effort. Patients do not die because of the extent of the pulmonary disease alone, or because of the reflex disturbances in other organs, although at times cough of reflex origin calls for a tremendous expenditure of energy and proves to be very harmful, and the reflex gastro-intestinal symptoms may become very troublesome; but the chief factor which exerts the harmful influences in tuberculosis is the toxemia. Toxins acting on the nervous and endocrine systems are responsible for disturbances in physiologic control of the body and ultimate injury to the body cells which may defy all efforts at repair and eventually lead to death. In this I am omitting from consideration all serious complications.

MEASURES WHICH COMBAT EFFECTS OF TOXINS

There are accepted measures for treating tuberculosis which aid the body in preventing the disease from becoming severely toxic, and further help it to combat the effects of the toxins when present. There are three outstanding measures in the treatment of tuberculosis when the toxic stage has been reached: rest, artificial pneumothorax, and alkalis with large quantities of water.

If only we knew how toxins acted, we might be able to defend the body against them. One of the most common misconceptions is that fever and toxemia are synonymous terms. The effects of toxemia are usually wrongly attributed to the fever. An elevation of temperature, however, is only one of many symptoms which result from the action of toxins. Malaise, lack of strength and endurance, nerve instability, loss of appetite, decrease in motility and secretory activity throughout the enteral system, and rapid heart action are just as much due to toxemia as elevation of temperature; so is necrosis favored by it.

Another effect of toxemia, and possibly its chief effect, is interference with oxidation and the causing of retention of acids in the tissues. This disturbs the acid-alkali balance of the body cells, and produces an increase in their water-binding power. Balcar, Sansum and Woodyatt¹ believe that temperature elevation is due to the lack of free water in the body caused by an increase in the water-binding power of the body colloids. It certainly seems as though all toxic symptoms were associated with a retention of acid in the body cells which necessarily results in an increase in the water-binding power and a diminution of the free

1. Balcar, J. O.; Sansum, W. D., and Woodyatt, R. T.: Fever and the Water Reserve of the Body, *Arch. Int. Med.* 24: 116-128 (July) 1919.

water in the body. Whether it is the retention of acids or the lack of free water, or both, or neither, which causes the symptoms is not quite clear. Recent study of the normal activity of the intestine by Hammett² indicates that hydrogen-ion concentration stimulates the sympathetics predominantly. Toxemia is accompanied by hydrogen-ion concentration, and this observation might be used as a basis for surmising that hydrogen-ion concentration is an important factor in the predominant sympathetic activity observed during toxic states.

Rest.—One of the important functions of rest as a therapeutic agent in this disease is undoubtedly based on its influence on the acid-alkali balance of the tissues. Exercise calls for an amount of oxidation over and above that which is present during rest, and, even in health, results in a temporary storing of acids in the tissues. When the patient is suffering from toxins, this disturbance in the normal acid-alkali balance is still further disturbed both from the exercise itself and because of an increase in the amount of toxins thrown into the tissues. The fatigue which results from exercise in the normal is exaggerated and marked by those symptoms which are recognized as toxic in the tuberculous. Therefore, rest proves to be a potent measure for good during all stages of tuberculosis when the physiologic mechanism is being disturbed by toxins. When intelligently applied, it is unquestionably the most effectual remedy that we possess in the treatment of tuberculosis. Not only fever but all toxic symptoms as well as other conditions must be considered in determining when rest shall be instituted and how long it shall be continued.

Artificial Pneumothorax.—For the last decade, pulmonary compression has been gradually coming into use and has shown itself to be particularly beneficial in the treatment of cases of rapidly spreading caseation. At times this method is very effective and relieves the toxemia, and restores the physiologic balance. In other instances, however, when satisfactory compression cannot be had, or when other active foci in the other lung exist, the procedure, of necessity, fails. In some cases necrotic areas and cavities are compressed and eventually brought to a stage of quiescence. One serious objection to this procedure is that it is available in only a limited number of cases, those in which the activity is almost completely one-sided and the pleura is either free from adhesions or the adhesions, if present, will readily separate. The other lung must be fairly free from disease, and should preferably be entirely free from activity. The importance of the condition of the other lung is not sufficiently recognized. If collapsing a diseased area is to be successful, the probability is that the entire lung will be compressed for an indefinite number of months because the normal collapses along with the infiltrated tissue. In some instances it is permanently put out of use by fluid in the pleura followed by the laying down of dense scar. No lung should be compressed, then, unless the other will be fully competent to carry on the requirements of respiration.

Compression is not a cure for tuberculosis. Any patient is better off if he can secure a healing without rather than with it; but in a small number of cases a cavity, particularly a recent one, may be compressed

which would otherwise continue to secrete; and in acute softening, toxemia which otherwise might prove fatal may be cut short. It requires considerable judgment to know when to compress and when not to do so. When once the technic is learned, one is often impelled to compress when a result more favorable to the patient could have been obtained without it.

Alkalis and Water.—Four or five years ago, a patient with advanced tuberculosis under my care in the sanatorium had a prolonged siege of toxemia accompanied by the usual symptoms, including rise of temperature. She became so ill that death seemed imminent. I assumed that there must be a relative increase in the acid balance of her tissues under the conditions which were present, and ordered a rectal drip, using 3 per cent. sodium bicarbonate instead of sodium chlorid. The patient was given the soda solution for about four hours a day. To our great gratification, after two or three days she showed signs of improvement, and made a gradual recovery from her serious condition. She later attained a better state of health than she had enjoyed for a long time.

The interesting thing was that all of those symptoms which we recognize as being of toxic origin improved. She became less nervous, lost her malaise and slept better. The appetite improved and was accompanied by better digestion. I attributed this to a restoring of the acid-alkali balance of the tissues. We then adopted the use of soda drips for other patients who were severely toxic, and later extended it even to those who were only mildly toxic. Coincident with the gradual extension of this line of therapy, we found that the digestive disturbances of many of our patients were improved by a mixture of sodium bicarbonate, magnesium oxid and bismuth subcarbonate. Finally, we were led to believe that the alkalization of the tissues was a factor in the improvement of these patients too.

Our observations were in this state of evolution when the experiments of Balcar, Sansum and Woodyatt,¹ and Schmidt and Sansum,³ dealing with the importance of free water in the body, came to my notice. While these papers were dealing primarily with the relationship of fever to the free water in the body, they caused me nevertheless to take this water factor into consideration in accounting for the good results that we had obtained.

There does not seem to be any doubt about toxins decreasing the alkali balance in the tissues. There is also no doubt that this shifting of the acid-alkali balance causes the body colloids to bind more water.⁴ Furthermore, there is no doubt that a reduction of the alkali balance of the body cells interferes with their normal action, and that the lack of free water, if sufficiently great, causes a rise of temperature.⁵

Alkalis, when administered, will combine with the acid radicals of the tissues and set water free, thus relieving the cells and increasing the free water reserve of the body. The administration of water alone will keep up the free water supply and thus provide conditions more favorable for the functioning of the cells. Sansum has been able to carry pneumonia patients through their illness with little rise of temperature by the administration of water.

3. Schmidt, E. C., and Sansum, W. D.: Further Studies in the Nature of Fever, California State J. Med. 19: 371 (Sept.) 1921.

4. Fischer, M. H.: Oedema and Nephritis, Ed. 3, New York, John Wiley and Son, 1921, p. 238.

5. Balcar, Sansum and Woodyatt (Footnote 1). Schmidt and Sansum (Footnote 3).

2. Hammett, F. S.: The Role of the Change in Hydrogen-Ion Concentration in the Motor Activities of the Small Intestine, Am. J. Physiol. 60: 52 (March) 1922.

We have tried some tuberculous patients with fever on large quantities of water (from 10 to 15 glasses a day) by the mouth, and have felt that it was of value; but it is our impression that from 4 to 6 gm. of sodium bicarbonate daily, taken with the free use of water, gives better results. We find it difficult for many patients to drink large quantities of water; particularly is this true in those advanced cases in which the patients suffer from an atonic condition of the gastrointestinal tract. It seems to me that alkalis plus water are better than either one alone in the clinical treatment of these conditions.

The effect in the more toxic cases has led us to employ this method in less toxic ones. I wish to insist again that rise of temperature and toxemia are not synonymous terms. We have been gradually coming to the conclusion that many patients suffer from a toxemia of sufficient gravity to undermine their ability to oppose the tuberculous infection with little or no elevation of temperature. With this conception, we have gradually extended our application of these measures to some patients who are practically fever free. The result has been gratifying.

It is difficult to judge of the value of remedial measures applied in a disease such as tuberculosis, because it has so many variations in its course, each of which is expressed in the patient's general feelings, that one's opinions can often be little more than impressions. We are decidedly of the impression, however, that the alkalization of toxic tuberculous patients, accompanied by the free use of water, preserves a better physiologic equilibrium and relieves them of many toxic symptoms, which if continued would ultimately break down the mechanism with which the patient resists the disease.

Since the disease is chronic and the toxic state often lasts for weeks or months, it is necessary that these measures be applied in ways that are acceptable to the patient. We have used the rectal bicarbonate drip for a period of four hours daily for a month or six weeks in some cases without interruption. As a rule, however, we use it for about two or three weeks, then interrupt for a few days, and resume again. We added glucose in some instances, but it proved too irritating for continuous employment. Needless to say, local disease of the rectum, such as hemorrhoids, may prove to be a contraindication to the rectal method.

The bicarbonate by mouth may also be continued for several weeks at a time without interruption. Patients sometimes get tired of the taste of soda. In such instances it can be administered in tablets of 10 grains each. A purified product should always be used. From 60 to 90 grains of soda a day by the mouth keeps the reaction of the urine neutral or slightly alkaline in most of these cases.

It is now evident that, even without a specific remedy for tuberculosis, we have measures which, if understood and applied rightly at the right time, will help the human organism to overcome early active tuberculosis in nearly all instances. Open air, suitable food, water and sun or air baths, rest and exercise suited to the condition at the time, psychotherapy, and other tonic measures are applicable to all cases for their effect in producing as strong a physiologic equilibrium as possible. In those cases which are beyond the early stage, aside from these measures which produce a general action, pulmonary compression in a few suitable cases and rest and alkalis with the free use of water may be utilized to combat the effect of the toxins.

TUBERCULIN

While there is no remedy extant that may be considered as a specific in tuberculosis in the sense of antitoxin and quinin, there are certain remedies which exert a specific action on tuberculous tissue, and call for discussion because of this fact.

All preparations made from the bacillus and the medium on which it has grown will cause a specific reaction in and about the tubercle, which, when slight, is accompanied by a hyperemia and, when severe, may be accompanied by more marked inflammatory change. If one understands these remedies, and has the patience to administer them carefully, the reactions may be kept under control and a hyperemia may be produced at intervals which brings about conditions favorable to the separation of the tuberculous from the nontuberculous tissue and to the laying down of fibrous tissue which is essential to healing.

Tuberculin preparations are imperfect remedies, but they imitate as nearly as we have been able to do the products which nature provides for curing the disease. It is probable that no patient could overcome a clinical tuberculosis if he were deprived of the specific reactivity with which the tubercle bacillus and its products endow his body cells. He would die of acute disseminated tuberculosis the same as the small child when infected with massive doses of bacilli. Every tuberculous patient treats himself with his own tuberculin, and as a result builds up a specific resistance, which becomes so high that millions of bacilli can pass over the bronchial mucous membrane without infection occurring, while before such resistance had been established a few bacilli would have caused infection.

Immunization is essential to the preservation of the life of the infected patient. The defense against the disease consists not only of an increased resistance to the living bacilli which are found in the body, but also of a protection against the specific reaction which takes place between the patient's bacilli and their products, on the one hand, and his body cells, on the other. We can conceive of the latter being produced by some antibody which is developed by the body cells. That it exists is evidenced by the fact that, while bacilli are going into solution and setting free bacillary products in the tissues and blood stream more or less constantly, particularly in the bodies of patients with advanced tuberculosis, yet the tuberculous tissue is not the seat of continuous focal reaction.

This protection, however, does not seem to extend to the products of other bacilli grown on mediums other than the patient's own tissues; for, on injecting into the tissues a very small quantity of a heterogeneous tubercle protein, a focal reaction may be produced at will. This property by which tuberculin is able to cause a reaction in tuberculous tissue is, in my estimation, the foundation for the healing properties of tuberculin when administered in therapeutic doses.

It is not absolutely necessary that tuberculous patients be treated with artificial tuberculins; but it is my opinion, which has been strengthened by many years of experience, that by using tuberculin we can hasten the formation and increase the amount of fibrous tissue about the tubercle, and produce a firmer and more lasting scar in which to encapsulate or bury the tubercle bacilli. This further can be done without subjecting the patient to any risk. All suggestion of reactivating quiescent foci and causing a spread of the disease presumes upon the wrong use of the remedy.

Where one patient has been harmed by tuberculin, hundreds, yes thousands, have been harmed by over-exertion; yet a degree of exertion incompatible with the state of the tuberculous disease is permitted and even prescribed by men who are honestly afraid of tuberculin. Unfortunately, while tuberculin, like exercise, may become a valuable aid to healing when properly administered in the right dose at the right time, few men will study the application of either of these remedies so as to be safe guides for patients. When one does not know the technic of administration, it is better to omit tuberculin in the one case, and stick to rest in the other.

TUBERCULOSIS SHOULD BE TREATED EARLY

That tuberculosis should be treated early should be self-evident, for the earlier any disease is treated the better; but in a disease like this, in which extensions occur and necrosis, with its accompanying symptoms, is favored by time, it is especially desirable that the disease be treated early.

The time between early clinical tuberculosis and the advanced disease may be only a few weeks. On the other hand, it may be months or even years; but the relationship between the percentage of healing and the percentage of failures is reversed when the advanced stage has been reached. Early cases will yield from 80 to 90 per cent. of apparent healings, with from 10 to 20 per cent. of failures; far advanced cases from 10 to 20 per cent. of apparent healings, with from 80 to 90 per cent. of less favorable results. No further argument should be necessary to establish the necessity of early treatment.

NECESSITY OF SUFFICIENTLY LONG TREATMENT

Not only should treatment be instituted early, but it also should be carried out long enough to determine whether the patient can or cannot get well. Most patients suffering from clinical tuberculosis are treated for an insufficient time. The statistics of tuberculosis do the disease, the patient and medical science an injustice, because they are compiled from sanatoriums and are based on an average of the results obtained in all patients who remain in the institutions for three months or more. Thus, we are judging the ability of scientific medicine to cope with this disease by a length of treatment which is wholly inadequate. Therefore, our statistics misrepresent its curability and retard the general acceptance of medicine's ability to restore tuberculous patients to health. It would be no more ridiculous to stop operating on appendixes, gallbladders or gastric ulcers after ten and fifteen minutes, and average the results with those when the operations were complete, in making up the statistics of the curability of these affections, than it is to compute the results of all cases of tuberculosis which are treated over three months in making up the statistics of tuberculosis. Ten minutes of operation for appendicitis is no more ridiculous than three months' treatment of tuberculosis.

Excellent institutions show by this method of computation no more than 30 per cent. of arrestments in early cases. My own statistics of early cases during the last ten years do not show a single failure among the patients who remained in the sanatorium for a period of six months or more. Some of these, however, required nearly two years of treatment to secure a favorable result. In this group, two relapsed but are again well and working. This shows the difference

between results based on a given time and those based on a sufficient treatment, regardless of how long it may be.

NECESSITY OF COOPERATION BY PATIENT

The proper treatment may be instituted during the early period of active clinical disease when the process should yield, and it may be carried out sufficiently long to permit a healing to occur, and yet failure may result unless the patient is in earnest and cooperates with his physician. Many patients are by nature passive and so do not make good fighters; others are naturally unwilling to follow a regimen, and, as a result, lessen their chances. An intelligent appreciation of the disease and the conditions to be met in its cure and a willingness and active, aggressive desire to cooperate are among the greatest aids to healing.

ABSTRACT OF DISCUSSION

DR. WILLIAM C. VOORSANGER, San Francisco: There is hardly anything to discuss in this paper. All I can do is to concur. We should have Dr. Pottenger's optimism. We need optimism in treating tuberculosis. We are not narrow tuberculosis men. If we treat tuberculosis properly, we are clinicians. Every man who treats tuberculosis properly today was an internist before he took up tuberculosis. We do not care what method is used and where it is used, but we do deplore the fact that the patients we get nowadays have advanced cases, and the general practitioner wants to get rid of them before they die to ease his conscience with himself and the world and the family. We do not care if one treats tuberculosis. One can treat tuberculosis as much as one likes; but it should be diagnosed early and treated properly. One should not wait until the man is about to die and ask somebody to come and cure that man and then when that man cannot be cured, say that tuberculosis cannot be cured, and that everybody dies of tuberculosis. Dr. Pottenger stated that every one of his patients with a beginning case recovered. I am not quite willing to admit that. We can divide tuberculosis today, for therapeutic purposes, into two classes—patients who get well and those who will not get well. I believe that for those who will not get well, we can do very little. These are the advanced cases and the patients that improve in the beginning state but with practically no natural resistance. Those patients will not get well. Then there are the patients who, if they give one enough time to build up their lowered resistance, must get well. After all, methods do not count for much. Some of us believe in tuberculin and some do not. It is like treating any other disease. We have our personal beliefs and our personal unbeliefs. What we must realize, though, is that we have no option but to keep on fighting. There are fundamental principles of treatment for tuberculosis. Very early cases will yield to some extent. There are cases that are early but break down in spite of absolute rest and in spite of everything one can do. But those are the patients that will not get well no matter what one does for them. Dr. Pottenger has simply outlined the methods of treatment on which all men who treat tuberculosis must absolutely concur.

DR. J. J. SINGER, St. Louis: For years and years people have been interested in tuberculosis. Some societies have made it their business to bring out tuberculosis papers to be sure of an attendance. We all have one purpose in view, and that is to find out what is new in the line of treating tuberculosis. The old may or may not have been satisfactory, and we want something new. Dr. Pottenger did not give us anything new, but gave us the old, old story. It is our experience that the old, old story is the only true story. The old story of rest, in whatever form, has been the only cure for tuberculosis that has ever been discovered and that has ever served its purpose. Dr. Pottenger was very kind in bringing out the fact that tuberculosis must be treated according to the recognized methods, but that the methods are not used properly. I think he emphasized it sufficiently to have brought home the lesson that if we treat the patients, if we use known remedies, we are going to get results; but we can-

not get 100 per cent. results. Dr. Pottenger expressed my view when he said that certain patients are going to die no matter what one does. That is another problem. There are two classes of physicians treating the disease, the physicians who treat tuberculosis and the physicians who treat general diseases. Whether all in the tuberculosis game are optimists or not I am not prepared to state; but I do say that men who learn tuberculosis, learn the patients with tuberculosis, become optimists. They do see these people get well and get better. So I feel that if a man is pessimistic he at once condemns himself as an improper man to take care of tuberculosis patients. We see patients in almost any condition of tuberculosis, we see them downhearted and see the family depressed; and almost like a miracle, in two or three days, or a week, when they have been established in that communion of spirit between the optimist physician, the patient soon swings over and his pessimism becomes optimism. In regard to pneumothorax, I should like to ask Dr. Pottenger to discuss the reason for the relief of cough. It is my impression that by a steady mechanical pressure cough usually is lessened and the products are easily absorbed and the vicious circle of cough and congestion is overcome.

DR. EDWARD F. WELLS, Chicago: I am an optimist naturally and particularly in regard to tuberculosis. A long time ago, when presiding as chairman of a committee to the health commissioner of Chicago, I brought together a considerable amount of statistics, and at that time I learned with a good deal of astonishment that the prevalence of tuberculosis began to decline as early as 1851, and has been declining ever since. One of the most important features we can bring to the attention of the tuberculous patient is that his malady should be recognized promptly, not ultimately but promptly. If one asks, "How many people in your circle of friends have tuberculosis now?" very few can answer in the affirmative. They know of none. Not more than a generation ago every person in the community knew somebody rather intimately who had tuberculosis. With an early diagnosis and proper management, one of the most important features of which, in my opinion, is that of easy circumstances in which the patient can be surrounded by every means that experience has shown to be useful in the management of that case, there are comparatively few patients under those circumstances that will not recover from tuberculosis.

DR. F. M. POTTENGER, Monrovia, Calif.: Climate is very much misunderstood. Tuberculous patients can recover in any climate. This does not signify that they cannot recover more easily in certain climates, where they can be outdoors all the time, with comfort. Sunshine and altitude have their advantages, but the principal thing in the treatment of tuberculosis is the physician who understands the case, and the patient who cooperates. Tuberculin is a valuable aid in the treatment of tuberculosis. It has a specific stimulating effect on tuberculous tissue, and helps to lay down scar tissue. The reason it is not used more extensively is that it is not studied enough. It takes time and trouble to use it. Some are prejudiced against it. Dr. Voorsanger spoke of treatment by the general practitioner. If we are ever going to make headway, the general practitioner must know he can diagnose tuberculosis. By taking a history and carefully analyzing it, he can come within 80 per cent., at least, of making a proper diagnosis. But he does not have confidence in his ability, and pays more attention to his physical findings and less to the symptomatology. I do not say that in every early case the patient can recover. I said that in every early case in my institution within the last ten years in which the patient stayed over six months, the disease was arrested. What percentage of early cases do you think I am dealing with? One year I did not have a single early case. I average from 5 to 15 per cent. of early cases. I admit that there are certain cases of early tuberculosis that cannot be cured. The age period enters as a factor. A massive infection in children cannot be cured. The question of optimism versus pessimism involves the psychic side of the patient, which can no more be ignored than the physical side. Pneumothorax does throw off and relieve the cough in some cases. The main point I want to make is that there is no ground for the pessimism that surrounds this disease, if it is treated at the right time, sufficiently long, and under right conditions.

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H. W. E. WALTHER, M.D.

NEW ORLEANS

It is only recently that the clinician has been devoting serious attention to the ureter. We are now coming to appreciate the fact that not a few cases of intra-abdominal pain are directly traceable to abnormalities in this structure. Scarcely a decade ago ureteral calculus was considered an ailment which demanded surgical intervention. The possibility of there being a definite pathologic entity which might be termed ureteral stricture was but yesterday seriously questioned. Even today hardly a textbook on urology contains within its covers the term ureteritis. Thanks to the courage of such workers as Kelly, Buerger, Bransford Lewis, Hunner, Crowell and many others too numerous to mention, our methods of diagnosis and treatment of ureteral obstructions have reached a plane of scientific exactness which are a source of great satisfaction and pride to all American urologists.

The fact that, by dilation and medicinal treatment to the ureter through the cystoscope, cases of early hydronephrosis, hydro-ureter and pyelonephritis have responded to such a degree as to preclude the necessity of surgical intervention; that many patients with abdominal pain have been completely relieved of symptoms, and that the majority of ureteral stones are today being extracted in this way should furnish sufficient argument for reiterating briefly the most pertinent phases of the subject.

Obstructions in the ureter are either congenital or acquired; are partial or complete; are of intrinsic or extrinsic origin. Aside from calculus and stricture, the ureter may be obstructed because of ureteritis (chiefly of tuberculous origin), a kink over an aberrant renal vessel or because of a ptosed kidney, or external pressure from a tumor, pregnant uterus, enlarged calcareous glands, postoperative adhesions, etc.

For obvious reasons it is most essential to know exactly the nature of the obstructing factor when, in the course of ureteral catheterization, an impediment is encountered. Ureteral spasm, an exaggerated fold or valve in the mucous membrane, a temporary kink or twist, a stiffness or too great a flexibility of the catheter, transient pressure from without—these are among the agents that must be considered as causing obstruction not of pathologic import.

In arriving at a definite diagnosis, the case history, a careful abdominal, vaginal and rectal palpation, the urinalysis (of only catheterized specimens in females), a roentgen-ray study (including pyelo-ureterography), and a cystoscopy with ureteral sounding (by means of wax bulb or acorn-tipped bougie) are collectively employed.

URETERAL STONE

It is commonly observed that stones leaving the kidney become arrested at one of three points of narrowing in the ureter, namely, (a) at the uretero-pelvic juncture; (b) where the ureter crosses the iliac

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