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OF INCIPIENT TUBERCULOSIS.

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EXPERIENCE gained in the development of the Adirondack Cottage Sanitarium during the past thirteen years, representing as this institution does a practical experiment in the direction of the subject under discussion, may furnish evidence of interest as to the practicality, necessity, and safety of special hospitals for the treatment of pulmonary tuberculosis.

Few will dispute the urgent need of putting forth our best efforts to stem the destructive tide of so formidable a disease, and still fewer will deny that comparatively little is done at present to that end. If we recognize that tuberculosis in its earlier stages and more chronic forms is a curable disease, and that in its more acute types, or when far advanced, its victims have, on humanitarian grounds, a claim to be cared for; if we also bear in mind that most tuberculous patients are a danger to the community in which they live, it is evident that, in dealing with tuberculosis in the poorer class of patients, the two main problems to be met are to furnish one class with a place where they can be treated in the earlier stages of their disease with a reasonable prospect of success, and to afford the other class an asylum where they can be properly cared for until they die, and that

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by so doing the spread of the infection in the community will be greatly lessened.

The lot of the consumptive, when poor, at best a hard one, has been rendered still harder by the discovery of the infectious nature of tuberculosis, and has resulted thus far only in his being shunned and refused admission to the wards of general hospitals where hitherto he was allowed to die, while no provision has been made for his care elsewhere. The urgent necessity for special hospitals for the reception of the poor consumptives of large cities, who are beyond the hope of recovery, is a crying need at present, which will be conceded by all on humanitarian as well as on sanitary grounds. Such hospitals should be located outside but within convenient distances of large cities, and should consist of one or more pavilions connected by galleries, and so constructed that each ward can easily be kept clean and free from dust according to modern methods, while an ample air space is allowed for each patient, and the most thorough ventilation with an abundance of sunlight is secured.

Such institutions would afford the unfortunate victims of the disease a place where they can be cared for when helpless, and where they would no longer be a menace to the health of the community. The large amount of infectious material now scattered by such patients among the closely packed inhabitants of crowded tenements could be easily cared for by this plan and rendered harmless, and it would seem reasonable to hope that such hospitals would decrease the number of cases occurring each year. This view already finds support in the observation that since the establishment of hospitals for consumptives in England on a large scale the general death-rate from tuberculosis has fallen perceptibly.

The curability of pulmonary tuberculosis in its earlier stages is amply demonstrated by evidence obtained in the autopsy room and by clinical observation. Early phthisis is therefore a disease which should be treated, and which yields under intelligent management a fair proportion of cures. The special hospital or sanitarium for the curative treatment of early tuberculosis should

be so located, constructed, and managed as to afford its inmates, first, security from reinfection either by the tubercle bacillus or by septic organisms; secondly, the most favorable hygienic and climatic environment obtainable. A discussion of the best climates for tuberculous patients will not be considered here, further than to state that although it may be conceded that there is no specific climate for tuberculosis, the favorable influence of certain localities upon the course of the disease has been abundantly proved by experience, and is a factor which we can not afford to neglect in combating a malady which, in the majority of cases, runs its course to a fatal issue in spite of the most intelligent and best-directed efforts to arrest it.

Since the records of general hospitals have long ago shown that aggregation is a real danger to the consumptive, the best plan to be adopted for a sanitarium in which to attempt the cure of early and favorable cases of pulmonary tuberculosis is the one which would most certainly obviate the evils of aggregation; and for this reason alone, at a time when the germ origin of tuberculosis was as yet unproved, I adopted at the Adirondack Sanitarium the cottage plan as the best to meet the requirements of such a hospital. The new light thrown by science on the infectious nature of tuberculosis, and an experience of thirteen years in developing a sanitarium on this plan, have but strengthened my confidence in this method of construction. The cottage plan represents an attempt at segregation, and if the principle which it stands for could be applied to the tenement-house residents of New York by the adoption of cheap rapid transit, a great and practical step in the direction of curtailing the ravages of tuberculosis would have been taken.

This plan of construction separates the patients as much as possible from one another, and affords each individual so large an air space as to make it difficult, when rigid precautions as to the care of the expectoration are enforced, for the buildings to become contaminated. Besides, it affords patients a regular walk to and from

their meals, which are served in the main building, encourages them to lead an outdoor life, and allows them to select as companions those who are congenial to them, and avoid unnecessary contact with those who are not.

The cottages of the Adirondack Sanitarium are one-story buildings, which accommodate from two to ten persons, but the greater number have a capacity for four or five inmates only, and these have been found the most satisfactory. Each patient has his own room, which opens into a central sitting room in direct communication with the veranda, on which the outdoor plan of treatment is carried out. The partitions between the sleeping and general sitting rooms reach but seven feet from the floor, an arrangement which gives the patient the benefit of the entire air space of the cottage, and allows of its being heated by a single fireplace or stove located in the central sitting room; but the walls which separate the sleeping rooms from each other reach to the ceilings, and are of solid construction. Good ventilation is insured by transoms located over the front veranda. In the main or administration building are to be found the dining room, kitchen, reception and general sitting rooms, superintendent's and doctor's offices, rooms for servants and nurses, while the upper floor of the building is devoted to large rooms for a limited number of patients. The library, recreation pavilion, doctor's cottage, chapel, and infirmary, are all separate buildings. Should any patient in one of the cottages become rapidly worse or be taken suddenly ill, he is at once removed to the infirmary, where every convenience for his care and proper treatment is at hand. The separation of those who are failing rapidly or are acutely sick from the comparatively well not only furnishes the former with the constant and necessary attention and nursing which they require, but withdraws them from the daily observation of their more fortunate cottage mates, and prevents in these the depression of spirits which would otherwise occur from the contact with the very sick. The success of this plan is attested by the general cheerfulness of patients while in the institution, who, contrary to what

might be supposed, are very rarely depressed in spirits at their enforced exile.

The efficacy of the cottage plan, when combined with rigid measures for the care of the expectoration, in protecting the patients from the dangers of infection, has been well shown by the experience gained at the sanitarium. A study of the dust of all the buildings, by Dr. Irwin H. Hance, indicated that with one exception the dust taken from these cottages was free from tubercle bacilli or septic germs, although the buildings had been inhabited by consumptives for many years. The exception was a small cottage accommodating but two patients, one of whom had already been reported for carelessness in the matter of expectoration. Additional evidence bearing on the protection against infection afforded by the methods in use at the sanitarium is furnished by the significant fact that during thirteen years not a single employee has been known to have contracted tuberculosis in the institution.

It is greatly to be desired that the actual degree of danger entailed by necessary contact with a tuberculous patient, and a more accurate knowledge of just what this danger is and where it lies, should take the place of the unreasoning terror which is now beginning to seize the lay and to a marked extent the professional mind; which often, without accomplishing the desired end of protecting those who are exposed, does a grave injustice to the afflicted patient. Education in this direction, while pointing out the real danger which lies in carelessness as to the disposal of the expectoration, should insist as well that the presence of the consumptive entails little or no risk where the expectorated matter is properly cared for; that his breath and proximity are not infectious; that the tubercle bacillus in the present state of our civilization is somewhat ubiquitous, and its presence is not confined to the immediate proximity of a tuberculous patient; that the risk is limited to the susceptible, and that susceptibility to infection is greatly increased by all such unfavorable conditions of environment as are grouped under the term of "bad hygiene."

It has been objected by some familiar with all the foreign institutions which are not on the cottage plan, that this method of construction makes it impossible for the patient to be under the constant supervision of the physician. To my mind, however, this objection has but little weight when applied to an institution which treats only early and favorable types of pulmonary invalids, because almost all these patients are so well as not to require such constant supervision, and those who are in need of it are placed at once in the infirmary, where they are constantly under the physician's and nurse's eye. Indeed, the infirmary should represent on a small scale the ideal foreign sanitarium, with its nurses, conveniences, and many appliances for treating the more advanced and acute types of the disease. But in such a sanitarium as I refer to the number of this class of patients should be limited to those who are suffering from some of the accidents incident to the disease, or who have grown worse while in the institution. The only valid objection which I know of to the cottage plan is the greater expense entailed in constructing and operating so many detached buildings.

A laboratory for bacteriological work is also an indispensable requisite of the outfit of every well-equipped sanitarium. Besides the valuable aids which laboratory methods bring to the study of the disease and the diagnosis of obscure cases, it is to these methods that we must look in future for much-needed light upon many of the still unsolved problems relating to ætiology, prophylaxis, and disinfection, and through their application only can we reach satisfactory conclusions as to the real value of many of the specific methods of treatment which are constantly proposed, or make any progress in the development of such methods.

Rigid rules as to the selection of suitable cases for treatment are by no means easy to lay down in a disease which runs so irregular a course. The first rule is to make as early a diagnosis as possible, for the earlier the diagnosis is made the better will be the prospect of effecting a cure or arresting the progress of the

destructive process. The first few months after the onset of the disease present often the one golden opportunity of re-establishing the balance of health, and many lives are constantly sacrificed to the neglect of this opportunity. If the curability of the earlier stages of tuberculosis could be more generally accepted, and for this reason the grave responsibility which rests on the physician in making an early diagnosis better realized, the patient's best chances of recovery would not be so constantly sacrificed.

The apathy of the profession as to the importance of making an early diagnosis seems almost incomprehensible, and would indicate that the general opinion held is that climatic and sanitarium treatment should be advised only as a last resort. The microscopical examination of the expectoration, instead of being repeatedly applied as soon as any expectoration is obtainable, is very generally neglected, or only resorted to when the symptoms have become unmistakable in order to confirm the diagnosis. Thirteen years ago but few really incipient cases presented themselves for treatment, and the earlier stages of the disease were generally labeled pleurisy, bronchitis, or malaria, until hæmoptysis, rapid emaciation, marked hectic or cavity signs appeared. But the microscope and the light which has been thrown on the ætiology of pulmonary affections by the discovery of the germ origin of tuberculosis, and the variety of its many manifestations, have wrought already some change for the better in this direction. The occurrence of slight hæmoptysis as an initial symptom, and before any constitutional impairment is noticeable, should be a most fortunate event for the patient, and in many cases proves to be the first symptom of pulmonary tuberculosis. Such an occurrence makes imperative a most careful study of the rational and physical signs, together with a biological examination of any expectorated blood or sputum obtainable from the patient. Unfortunately he is too often lulled into a false and to him a most acceptable sense of security by the verdict that it is nothing; that the bleeding came from his throat or his stomach; and he con-

tinues his usual mode of life until a more alarming hæmoptysis or the occurrence of constitutional impairment makes the nature of his malady evident.

The fully developed chest or comparatively robust appearance of many patients with early tuberculosis often proves misleading to the examiner, and induce him to relax his vigilance, to minimize the symptoms, and to wait for further developments. Too great reliance is perhaps placed on the physical signs alone, which at first may be either absent or can be detected only by a trained ear, and too little importance is attached to the study of the history and the rational symptoms. In insidious cases, lassitude, some loss of appetite, a little quickening of the pulse rate, a temperature reaching occasionally 99.5° to 100° at irregular intervals, with or without slight loss of weight, are a group of symptoms which usually attract little attention but which should be regarded with suspicion. And if, in addition to these, morning pallor disappearing toward evening, some cough, prolonged expiration, or even impairment of vesicular murmur are noted, the patient should be closely watched, every effort made to obtain more positive evidence, and if it is not obtainable otherwise, the aid of laboratory methods in helping to clear up the diagnosis should not be neglected. If there is expectoration, and the presence of the bacillus can not be detected by repeated and thorough examinations, a positive conclusion can often be reached within three weeks by inoculation of the expectoration in the guinea-pig, and when there is no expectoration, by the tuberculin test.* By this method a positive opinion one way or the other can often be reached; and if the initial dose does not exceed half a milligramme, the constitutional disturbance caused by it is slight, and no injury to the patient has in my experience ever resulted from such a test in the limited number of cases in which

* In using this test an initial injection of not more than half a milligramme of Koch's tuberculin or its equivalent should be made. If the temperature remains normal this can be increased at intervals of three days, first to one, and then, should no rise of temperature have occurred, to two milligrammes.

it has been necessary to employ it. The value of the tuberculin test in shedding light upon obscure cases of suspected tuberculosis, whether pulmonary or surgical, has not yet been generally realized.

As soon as the diagnosis of tuberculosis is established, particularly if the bacillus has been demonstrated in the expectoration, no matter how well the patient may appear, he should at once be told the grave nature of his malady and an immediate removal from his surroundings should be urged, while it is explained to him that the best and possibly the only chance of restoration lies in prompt action and the adoption of thorough measures. Although obedience to this advice undoubtedly necessitates great sacrifices on the part of the patient, he will, if it is at all possible, rarely hesitate to make them, provided the gravity of the situation is plainly laid before him and the necessity for prompt action explained; and if this is not done, he will be called upon to make the same sacrifices later, and when they can prove of little or no avail.

The position physicians take who purposely deceive patients as to the nature of their malady by telling them the bleeding comes from the throat or that they have gripe, malarial disease, or bronchitis, is difficult to understand, and does the patient a grave injustice.

It will be justly urged that in a great majority of cases among the poorer classes it is absolutely impossible for the patient to follow the advice given. This is greatly to be regretted; and while it in no way relieves the physician of the responsibility of making an early diagnosis, and advising prompt and radical measures to those who can afford to follow his advice, it is a strong plea for attempting to provide for a greater number of these unfortunates sanitarium where they can find the climatic and hygienic surroundings necessary for the treatment of their disease as soon as its presence is recognized.

The principal aim of the modern sanitarium treatment of tuberculosis, which can only be briefly outlined here, is to improve the patient's nutrition and increase his resistance to the disease, by placing him under the

most favorable environment obtainable. The main elements of such an environment are an invigorating climate, an open-air life, rest, coupled with the careful regulation of the daily habits, and an abundant supply of nutritious food, with the exhibition of such restoratives and tonic measures as may be indicated in each case. A discussion of the advantages of various climates will not be considered further than to call attention to the fact that for truly incipient cases the more tonic and colder climates seem indicated by the comparatively good condition of the patient; and this view is strengthened by a study of the influence of cold on the weight of the patients at the sanitarium, the average gain in weight every year being greater during the fall and winter months than in the spring and summer.

The invigorating influence of a life spent constantly out of doors for many months can hardly be overrated. To remain, in most cases, the greater part of the time quietly sitting, well wrapped up, out of doors in all weather, is one of the main duties imposed upon every patient at the sanitarium, and, irksome as such a course would at first seem, it is in a majority of cases faithfully carried out by them after their timidity and prejudices as to its danger have been gradually overcome by the benefit derived in their own persons. This constant exposure to atmospheric influences in so severe a climate as that of the Adirondacks, at all temperatures and in any weather, proves the best possible stimulant to the assimilative powers of the patient whose life has been almost entirely spent in close and overheated rooms, and has in my experience been free from danger when intelligently applied. Patients but rarely suffer from colds or intercurrent attacks of bronchitis, and only one case of lobar pneumonia has occurred at the sanitarium among the hundreds treated there during the last thirteen years.

Besides warm clothing in winter, protection from the wind is the only requisite for this treatment, and a good shelter is obtained by a single glass or wooden screen placed on the exposed side only, the usual glass-inclosed

piazza being an abomination never allowed. The outdoor method is applied to all patients, but the details of the treatment, and above all the amount of exercise allowed in carrying it out, are regulated by the activity of the patient's disease, his nutritive condition, and more especially his temperature record. Thus the few infirm cases who may be suffering from progressive tuberculous processes or cheesy pneumonias, and running high temperatures, are carried outdoors daily and kept there in a recumbent position in bed or on a lounge the greater part of the day, while those who have less fever and are improving, are allowed to sit up in steamer chairs on the veranda, and to walk about the infirmary, but not to go over to their meals in the main building until their temperature record and improved condition warrant it, when they are returned to their cottages. In the class of cases which is represented by the inmates of the cottages, the temperature rarely goes above a hundred in the afternoon, or they are entirely apyretic. The former are ordered to remain quiet out of doors during the afternoon, when slight fever is apt to occur, and to walk to their meals at the main building but not to go off the grounds; while the apyretic cases are generally allowed, so long as they live out of doors and obey rules, to go where they please, and, while under daily observation, to take as much exercise as their condition seems to render permissible.

It is much better, however, always to err on the side of overcaution in prescribing active exercise to tuberculous patients, and I feel confident that many lives are constantly sacrificed to a deep-rooted and very general misconception, which exists in the lay and to a great extent in the professional mind as well, in regard to the advantages of active exercise in this disease. If there is any one rule that should be generally applied to the treatment of tuberculosis it is, that when any degree of fever is present the course of the disease will be injuriously affected in direct proportion to the amount of active exercise the patient is allowed to take. Still further, I constantly see an apparently quiescent and arrested

process fanned into renewed and often uncontrollable activity by one single violent overexertion.

This position in regard to exercise may seem rather an ultra one, but it has been amply sustained by abundant and unfortunate experience in this direction. What is but moderate exercise for a man in health means overexertion and exhaustion to the phthisical invalid. To see a man with a daily afternoon temperature of 101° to 102°, and a pulse above one hundred, trying to gain strength by rowing a boat, riding a bicycle, or attempting to climb a mountain, as he is often advised to do, and to note the baneful effect of this course on his disease, will prove more convincing than any form of argument. Absolute rest, so long as it is taken in the open air, is the best measure at our command to reduce the pyrexia of tuberculosis and to conserve the patient's energies, and should be persisted in for some time after the afternoon fever has ceased to be present, moderate exercise again being allowed only with caution.

At the sanitarium the utmost attention is given to the alimentation of the patient, and every attempt is made to induce him to take and digest as much nourishing food as possible, but the details of this part of the treatment can not be entered into here.

Alcoholics are never prescribed in early cases as a part of the treatment.

Little stress is laid on the administration of drugs, except when necessary to relieve symptoms, but cod-liver oil, the hypophosphites, and arsenic are very generally made use of. Creosote is prescribed in small doses only, and in cases where cough and profuse expectoration seem to indicate its administration, or where its tentative use has shown that it improves rather than impairs the patient's appetite and digestion.

Tuberculin treatment has been employed for the past four years with the utmost caution and in selected cases only, in order that some evidence as to its specific influence when given under the most favorable conditions of environment might be obtained. Its use has been found inadmissible in the active types of the disease, and its

administration in large enough doses to produce marked reaction inadvisable and even injurious in all cases. In the apyretic types of the disease, when the patient's nutrition is good, if given in very small and very gradually increasing doses, so as never to produce any rise of temperature, its use has been found free from danger, and the proportion of recoveries in the patients treated has been encouraging. In such cases, if the treatment be extended over a period of from six to eight months, the dose may be gradually raised from the equivalent of a tenth of a milligramme of Koch's tuberculin to so large an amount as a hundred milligrammes without causing the slightest reaction. As the cases, however, in which this treatment seems permissible are likely to do well under the ordinary climatic and open-air treatment alone, little evidence as to its curative value can be claimed from their recovery. The injections, nevertheless, seem to have had a favorable influence in preventing the natural tendency of the disease to relapse, which occurs in a certain number of patients who recover under climatic and hygienic methods alone. Of the twenty cases treated with tuberculin which have been discharged as cured during the last four years but two have died, one of an acute mania, in an insane asylum, and the other of alcoholism, while none of the eighteen others has thus far suffered any relapse. Unfortunately it is impossible to determine whether this apparent immunity to relapse is the direct result of the tuberculin treatment, or whether the tolerance to large doses of tuberculin shown by these patients indicates that from the first their tuberculosis was of a subacute or benign type.

The exact results obtained by the combined climatic and sanitarium treatment are difficult to express in figures, because these results are greatly influenced by the class of cases accepted for treatment, and the classification of these cases is necessarily purely arbitrary. In addition, the term "cure," as indicating the results obtained, can also be used only in a relative sense. If, however, all attempt at classification is abandoned, and the gross results obtained in all the patients admitted to the

sanitarium are considered, it may be stated approximately that twenty per cent. are apparently cured, and that in thirty per cent. more the disease is more or less permanently arrested. If the most favorable of all the cases admitted are separated under the term "incipient," the proportion of cures obtained would be as high as from thirty to thirty-five per cent., and the importance of making an early diagnosis and of the immediate application of radical measures is strongly emphasized by this experience.

The education the patients receive at the sanitarium as to the nature of their disease and the methods to be relied upon in combating it, is of the utmost value to them in enabling them to care for their health and avoid relapses after they have left the institution.

Conclusions.—Sanitaria for the reception of advanced cases of tuberculosis occurring in the poor are greatly needed on philanthropic and sanitary grounds.

Tuberculosis, if detected in its earlier stages, is curable in a fair proportion of cases.

It is of vital importance, therefore, that the diagnosis be made early.

The best results in treating incipient tuberculosis are obtainable in special sanitaria situated in good climates.

The best plan of construction for such sanitaría is the cottage plan, or some of its modifications.

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