volunteer to follow me, take one pace to the front." So saying, he turned his head so as to give them time to think and act. On looking around a flash of indignation fell over his face as he saw the line was as solid as it was before. Turning to his men he said, "My God, the Scotch Guards and not a single volunteer." A sergeant sprang out of the ranks, touched to the quick by the rebuke, and said in a voice so loud that all could hear, "Sir, that whole line stepped forward." (Applause.)

Ladies and Gentlemen: What a great thing it would be for the nations of which we are citizens, for the homes that we represent, for the principles for which we fight, yea for the very kingdom of the Highest itself, if we could all catch that vision and, looking into the faces of the generations which are to be, say to them, "This has been a bloody business, but the whole line of civilization has stepped forward." (Prolonged applause.)

Original Articles.

THE PRESENT NEEDS OF THE TUBERCULOSIS CAMPAIGN IN MASSACHUSETTS.

BY JOHN B. HAWES, 2ND, M.D., BOSTON.

There is an old Latin motto, "Nosce te ipsum," in plain English, "Know thyself," which might well apply to the present needs of the anti-tuberculosis campaign in this State. The great need in this campaign, it seems to me, is a clear, accurate, and detailed knowledge as to exactly what our tuberculosis problem is, and the machinery and equipment at our disposal to combat it. I would briefly summarize our present needs therefore as follows:

- (1) Knowledge as accurate and up to date as possible, as to how much tuberculosis there is in Massachusetts.
- (2) Equally clear and accurate knowledge as to the machinery and equipment at our disposal to handle it.
- (3) Coöperation of all forces, state, municipal, and private.

THE AMOUNT OF TUBERCULOSIS IN MASSACHUSETTS.

There were 4638 deaths from pulmonary tuberculosis in this State during 1917. This

would indicate that there is at least twice this number of consumptives in our midst who are urgently in need of treatment of some kind, and probably institutional treatment, and a far larger number in need of educational and other measures to prevent their latent tuberculous infection from becoming active tuberculous disease. This, in brief, constitutes our tuberculous problem.

MACHINERY AND EQUIPMENT FOR HANDLING TUBERCULOSIS IN MASSACHUSETTS.

Our methods for handling tuberculosis may be divided into two parts. First, those methods that are purely administrative, dealing with large numbers of patients, rarely with the individual; and second, those methods that are purely clinical, resting in the hands of the medical profession, either in private or dispensary practice.

Massachusetts is indeed fortunate in its equipment against this disease. We have four state sanatoria, North Reading, Lakeville, Westfield and Rutland, with approximately 1000 beds. At the Rutland Sanatorium, which is reserved for incipient and favorable cases, every patient admitted is on trial for one month. If, at the end of that time he is found to be unsuited for treatment at Rutland, he is transferred elsewhere. There is a two-year limit of residence. At the other three institutions, patients in the incipient and moderately advanced stages are taken. Far advanced, active and progressive bed cases are not admitted if the facts are known beforehand. Unfortunately, such information is not given as often as should be the case. At the Westfield Sanatorium, children from all over the State are received and given schooling as a part of their treatment, when their condition warrants it. The cost of board at our State Sanatoria is \$4.00 a week, to be paid by the patient, or in case he cannot pay, by the town in which he has a local settlement, and in case of no settlement, by the State.

In addition to our sanatoria, there are 350 beds at the State Infirmary at Tewksbury, intended for so-called "state" or non-settled cases. There are likewise beds for consumptives in certain other state institutions, such as the State Farm at Bridgewater, and the Prison Camp at West Rutland.

There are 26 municipal tuberculosis hospi-

tals scattered throughout the State, with a total of 1500 beds. These municipal hospitals perform the very useful and important function of caring for advanced and progressive cases who should be near their relatives and friends, for emergency cases, and for certain others awaiting admission to a state sanatorium or elsewhere. For indigent patients with local settlements, treatment is usually free. For outside cases the usual charge is \$10.00 a week.

In addition to state sanatoria and municipal hospitals, we have one county tuberculosis hospital in operation, one about to be opened, and others in process of construction. The Hampshire County Sanatorium has now been in operation for over two years. County tuberculosis hospitals are intended for consumptives from the smaller towns and villages where beds in a local hospital are not available, for patients who are too sick to enter the state sanatoria, or who need treatment while on the waiting list. The Barnstable County Sanatorium at Pocasset is about to be opened and will be of immense assistance in caring for many distressing cases in the scattered villages and hamlets in the Cape district. The counties of Essex, Middlesex, Plymouth, and Bristol have plans and sites selected for similar institutions.

In addition to these hospitals and sanatoria, there are certain charitable or semi-charitable private institutions, notably among which are the Channing Home and the House of the Good Samaritan in Brookline, and the Prendergast Camp in Forest Hills. These institutions are extremely useful in caring for patients waiting admission to state or local institutions.

Along with our state and local sanatoria and hospitals, we now have a system of tuberculosis dispensaries, where suitable patients can receive excellent advice and treatment free of charge, while of still further help is the laboratory of the State Department of Health and the numerous laboratories conducted by local boards of health where free sputum examinations are made.

This is a brief description of our machinery and equipment for combating tuberculosis in Massachusetts from the state, municipal, and administrative point of view. It is of great importance that every physician engaged in

handling this disease,—and what physician is there who does not come across it sooner or later, whether in private practice or in some official position,—should have a clear idea of the machinery at his disposal to help him and his patients.

The other part of our equipment against tuberculosis is less tangible, but an even more important one, namely, the ability and willingness of the medical profession to diagnose tuberculosis in its early stages and to institute active, detailed, and common sense treatment. Although I believe that the medical profession of Massachusetts stands very high indeed in its ability to do this, we have still a long way to go. But I frankly do not see how we are to improve conditions to any great extent, until our medical schools are doing more than they are at present in giving students detailed and practical knowledge concerning tuberculosis. At present, the largest medical school in Massachusetts, (and if I am wrong in this statement I hope I shall be corrected, but I very much fear that I am not), graduates its students and starts them on their way as medical practitioners here and elsewhere with anything but an adequate and clear idea as to the size and extent of our tuberculosis problem from the social, economic, and administrative point of view, and a still poorer idea as to how to diagnose the disease in its early stages or to treat it when diagnosed. The present fourth-year medical student can perform certain tests in the laboratory and certain experiments on guinea pigs and rabbits concerning which I am in profound ignorance. The same medical student, however, when confronted with a patient with incipient tuberculosis is very apt either to overlook it altogether or to make a wrong diagnosis, and when it comes to the details of common sense advice and treatment, is usually quite at a loss as to how to proceed. Osler, I believe it was, who once said, "Know syphilis, and you will know all internal medicine." One might well paraphrase the same statement into, "Know tuberculosis in all its forms and you will not only know much of internal medicine, but also so much more of social, economic, and preventive medicine."

A certain eminent physician some years ago, gently chiding me for what he considered my over-frank statements on this subject, re-

marked, "You must remember, Dr. Hawes, that every detailed specialty cannot be given the attention at the school that those interested in it feel it deserves." Although still regarded so by many, the fact still remains that tuberculosis and the problems that it brings up is not a "detailed specialty." The mere fact that over 300,000 men, women, and children in this country are dying of it every year, is enough to make it a problem of world-wide importance.

As far as our machinery and equipment for combating tuberculosis in Massachusetts is concerned, we find ourselves therefore confronted with the following rather anomalous state of affairs: First, a remarkably complete equipment for handling the disease from the broad administrative point of view, and second, far from complete and adequate means for handling tuberculosis from the clinical side.

COÖPERATION OF ALL FORCES, STATE, MUNICIPAL, AND PRIVATE.

When our newer sanatoria at North Reading, Lakeville, and Westfield were opened in the years 1910 and 1911, providing four or five hundred new beds for consumptives, there was hardly one of us who did not heave a sigh of relief and feel that at last our problem was approaching solution. Unfortunately, this turned out to be very far from the truth. We found that although these new sanatoria were immediately filled, patients left them and were taken home by relatives and friends at the stage of disease when they were most contagious and most harmful to those about them. Thus, the need for local tuberculosis hospitals became apparent. Gradually these have been built, so that at the present time practically every large city in the State, with the striking exception of Brockton and the still more striking exception of Lowell, is provided with fairly adequate quarters for advanced and active cases of tuberculosis.

Having reached this state of affairs, again most of us felt that we had made a great step in advance and that this time, surely, we were going to see immediate and striking results in a falling death rate. Again we were disappointed, and now we are taking the next step, that of building county tuberculosis hospitals to fill in the gap that exists between local hospitals and state sanatoria, and to provide ac-

commodation for patients coming from the smaller towns and scattered agricultural communities.

After the war is over, when these institutions are in active operation, I feel very sure that most of us will once more be lulled into a rather false sense of security, feeling that at last our job is done. As far as the number of beds is concerned, Massachusetts will then be amply supplied, but we certainly shall not have approached the solution of handling tuberculosis in Massachusetts unless all this splendid equipment is in smooth running order, and unless every part of this big machine, no matter how small, is made to realize, and to realize clearly, that it is not an isolated unit, but an integral and necessary part of the whole.

At the present time this is not altogether the case. One large city, for instance, has a splendid tuberculosis hospital, but up to date, at least, this same city prefers to run this hospital rather as a sanatorium and as an independent unit, regardless of what the rest of the State is doing. Certain boards of health have persistently maintained their own ideas as to handling tuberculosis, which ideas are at utter variance with the policy of the State of Massachusetts. Fairly long experience has shown our State policy to be a proper one and one that has put Massachusetts in the forefront in this country.

The work of Miss Bernice W. Billings, who, in 1912, under the supervision of the Trustees of Hospitals for Consumptives, started to investigate the condition of every patient discharged from our sanatoria, has had far reaching consequences. When she began her work, the condition of the discharged sanatorium patient was a somewhat deplorable one. He was left distinctly to his own resources and to work out his own salvation as best he could. If his courage and intelligence were of a sufficiently high order to enable him to learn the lessons that he ought to have learned while at the state sanatorium concerning his future welfare, well and good. If, as far more frequently happened, he was quite unable to do this, he soon relapsed into his old condition, and the money which had been spent on him by the State was wasted. This was certainly not altogether his fault, nor was it the fault of our state sanatoria, which have

been blamed too often for this state of affairs and have been pronounced inadequate and inefficient because of these same relapses. The course of a consumptive from the time his case is diagnosed to the time he leaves the sanatorium to go back to his home or elsewhere, should be a smooth and uninterrupted one. When Miss Billings took up her work, she found that this was not the case. The patient's stay at the sanatorium was uneventful enough, but on discharge he found himself thrown back to his old quarters, usually unsanitary, to his old work, for which he was often unfitted, and without proper medical advice and supervision.

Thanks to the work Miss Billings has done, and now in her new position in the State Department of Health with a corps of nurses under her supervision her work will be amplified, and thanks to our tuberculosis dispensaries, which at last have been put in operation, I believe that the outlook for future health and happiness for the discharged sanatorium patient will be vastly improved. This improvement is chiefly to be the result of coöperation. Our state sanatoria must realize that their function is not done, and their duty is not completed when they discharge a patient from their doors with the disease arrested. Local boards of health and tuberculosis dispensaries must realize equally strongly that their duty is not done, but has only commenced, when they file application for a patient's admission to a state sanatorium and when they receive word that he is finally admitted. And of particular importance, the private physician must use more aggressive measures in the future than he has in the past in seeking out his discharged sanatoria patients, in examining the other members of the family, particularly children, and in seeing that the patient returning from a sanatorium is kept under some sort of supervision, even if it is against his will.

Some years ago, Richard Cabot said that the time had arrived when a case of typhoid fever was looked upon as a disgrace to a community, because it meant both dirt and ignorance. The time must come, and I hope is approaching, when there will be a similar feeling concerning tuberculosis, because this certainly, even more than typhoid, implies both dirt and ignorance.

We have already reached the point where the courts will back up health authorities in using force, if necessary, to quarantine cases of scarlet fever, small-pox, and diphtheria. It will not be long before public opinion will be aroused to the point when it will feel in a similar way toward the forcible detention of the careless, ignorant, and incorrigible consumptive. We will not reach this millennium, however, until all of us who are giving our time, strength and energy to this cause, are united in one common aim working shoulder to shoulder, to stamp out this disease.

In the preceding pages I have tried to amplify the three great needs of our tuberculosis campaign in Massachusetts. These, as I said before, are briefly:

- (1) Intimate knowledge of the amount of tuberculosis.
- (2) Equally intimate knowledge of our machinery and equipment against it.
- (3) Coöperation of all forces, public and private, municipal and state.

In conclusion, I should like to emphasize the following points, based on the three general headings that I have given above:

1. The medical profession in its private or public capacity should have a clear idea as to the extent of our problem, which, in brief, is that nearly 5000 persons in Massachusetts die of pulmonary tuberculosis each year, which means that there are in our midst, fully 10,000 patients in the active stages of the disease needing adequate care and treatment.
2. There should be an equally clear idea as to our equipment concerning sanatoria, local and county hospitals, private sanatoria and hospitals, dispensaries, etc.
3. Physicians and health officers should remember always that each one is a part of a big machine and not an independent or isolated unit.
4. The duty of a local board of health or private physician is not ended when a patient is admitted to a state sanatorium or to a local tuberculosis hospital.
5. The care and supervision of discharged sanatorium patients is one of the most important lines along which progress can be made.
6. We must all of us try in every way to develop a hearty spirit of coöperation; we must realize that we are all working together for one big end, and that to accomplish re-

sults, the wheels of our machine must run smoothly and with as little friction as possible.

7. It is the duty of every one of us to help to develop public opinion to the point when the dangerous and incorrigible consumptive can be accorded the treatment which he deserves. We must not, however, allow public opinion to reach the point where every person who is unfortunate enough to contract tuberculosis, is looked upon as a leper and ostracized from society; finally, I would urge that we remember at all times, and particularly those who are doing purely administrative work, that we are dealing with human beings who happen to have pulmonary tuberculosis, and not merely with "cases."

EPIDEMIOLOGY OF TYPHOID FEVER IN A NEW ENGLAND CITY.

BY D. M. LEWIS, M.D., NEW HAVEN, CONN.

IN no other field of preventive medicine have more brilliant results been obtained than in the reduction of typhoid fever by elimination of polluted sources of drinking supplies. Together with milk-borne epidemics of frequency, these factors represent the usual causes for investigation of all communities which have any continued yearly frequency of the disease. In being unusual but equally satisfactory from the standpoint of results, I believe the demonstration that a high frequency may show another factor is of especial interest and value from the standpoint of a Northern city.

Beginning the study of this disease in 1914, there was a very definite record of a past history, which was divided in two parts; the first comprised a period of twenty-five years following the incorporation of the Board of Health, 1872, during which period the yearly reports of the Board were almost entirely devoted to privy vaults, cesspools and typhoid fever. In 1885 there was made a survey of the city, which extended through the following two years and showed the following facts: There were 21,600 houses on sewered streets that were not sewer connected. There were 7771 outside privies and 4794 cesspools. As records of Prof. William H. Brewer and Dr. C. A. Lindsley, the two ablest sanitarians in the history of the city, the relation of such to typhoid

fever was most convincing. The second period was one of complacency. In 1897 there had been abolished 1236 of these privies and 164 cesspools. In 1914 it was estimated that there were but 100 privies existing on sewered streets. During this latter period, in 1901, there had ensued a water-borne epidemic of typhoid, which resulted in making the sources safe by cleaning off all habitations from the watersheds. There was also on record an institutional epidemic, where defective sanitation of the premises was found causal. The report was unsatisfactory to the county authorities who had charge of the institution, and an outside expert, on investigating, reported that the evidence was clearly from neighboring vaults and flies. In that this factor was on record then for the first time, and because of the later absence of such findings, it is emphasized for its bearing on this paper.

At the end of the first year's work, 1914, the general impression that the larger proportion of the typhoid was from privy vaults was fairly evident from the distribution of the cases by weeks and by wards and in the presence of neighboring outside vaults or outside sewer-connected hopper closets. In the absence of any milk factor both during this year and the nine previous years, which also had very generally a distribution around privy vaults, it was not until 1915 that definite results were obtained. Reporting the data on the case in the Board of Health Bulletin of this city for September, 1915, it was shown that one individual caused 13 recorded cases in a localized neighborhood where there was no record of any typhoid previous to her residence there, during the ensuing four years—1906-1909. Two of the cases were members of her own family. Removing to another neighborhood more thickly settled, there were immediate neighborhood cases to the reported number of 33 in the three following years, the next two years giving 6 reported. One further child and one boarder during the first two years of the latter residence were also cases in the family of this carrier. Well shown in the chart for 1915, this carrier was a reported hospital case in the 31st week (9th ward). She had returned from a visit of three weeks in another State to her home here, where she was ill for six days before her hospital admission. The 24 cases of the ensuing three weeks all dated their incubation period from the duration of illness to the