retention of the less hopeful cases at Rutland, in order that we may have at least one large institution which is kept to its original purpose, — a place where people can be restored to health in a large percentage of cases.

There is a great deal of useless and harmful talk at present about our having "begun at the wrong end" in our endeavor to eradicate tuberculosis, or at least to control it. People are apt to say that because sanatorium treatment has not accomplished everything, it is, therefore, of no use, — an utterly foolish and untrue statement. Those who have had most to do with this question have for years been urging the necessity of attacking the disease from every side, and have urged the necessity of hospitals for advanced cases near our large towns as one of the most important steps; but we need hospitals, sanatoria, home treatment, tuberculosis schools, every means, in short, for combating the disease, and as far as it is possible I regard it as essential that far-advanced cases should not be admitted with the hopeful cases in sanatoria.

If, however, we wish to accomplish the end we are working for in the shortest way, it is necessary for the profession at large to awaken to the importance of not shillyshallying with suspicious cases; of seeing that patients are thoroughly examined, and that if there be doubt at all as to the nature of any given case, expert advice should be asked for without delay. In my opinion, if a physician fails on these points, he is recreant to his trust as one who is supposed to look out for the welfare of the community.

Dr. Hawes: It has been a hard and not very pleasant task to collect these figures which I have shown, which do not throw an altogether favorable light upon us physicians. I believe, however, that there has been shown to exist a serious condition of affairs in this lack of the prompt and early diagnosis of consumption. How to remedy these existing conditions is a problem which I believe we should all face fairly and squarely. If the figures that I have shown to-night will make the problem clearer and easier of solution I shall be very glad.

I feel that the best part of what has been said this evening is not my paper, but the discussion which it has brought out, and to those who have taken part in this discussion I am very grateful.

THE INFLUENCE OF RACE IN THE PREVALENCE OF TUBERCULOSIS.

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From association with tuberculosis in home, dispensary and hospital practice for the past six years I have been tremendously impressed by the marked variation in the course of tuberculosis met with in the various races of people in the United States and the tropics.

From the apparent almost hopelessness of this disease among the Indian and negro races to a far more favorable outlook in the Hebrew, we readily see how racial influences stand out prominently to workers in this disease as factors in the study and control of tuberculosis.

The influence of racial variations in immunity and susceptibility plays an all-important rôle in the prognosis of the disease, and also in methods of attack and control of this terrible scourge.

* Read at meeting of Norfolk District, Massachusetts Medical Society, Dec. 26, 1911.

Practically all my observations in regard to tuberculosis among the negro and Indian, together with certain mixed races of the tropics, were noted during a two years' service in the Canal Zone, Panama. A close association with the disease among the different white races in and about Boston has been made possible by living with these patients in hospitals for a period of four years, the last two being spent in the Boston Consumptives' Hospital at Mattapan, which has at present a capacity of 250 cases of tuberculosis.

Various writers have covered the ground thoroughly as regards the prevalence of the disease in different races, especially Woods Hutchinson,[1] whom I quote freely in some of the remarks of this paper; but I feel there are a few unmentioned facts in the prevalence of tuberculosis in certain races which would be interesting to note.

A table showing the relative mortality from tuberculosis in the different races is here shown.

	Per 100,000.
Indian (nine reservations),	2,800
Negroes (United States Census, 1900),	750
Negroes (Rural United States),	400
Chinese (Cities),	700
Irish (New York City, 1890),	650
Irish (Total United States, 1900),	400
Japanese,	300
Scandinavians,	280
Italians,	220
American Whites,	210
Polish Jews,	170

Let us first consider the race having the lowest mortality, namely, the Jewish people. Anybody who has come in contact with this disease to any extent cannot help being impressed with the decided relative immunity manifested by the Hebraic race against this disease. Living as the Jewish people do in the congested cities, the majority of them under very crowded conditions, it is interesting to note the relative low mortality from this disease among them. Their unusual resistance is shown more clearly when we consider the large number of emaciated, overworked employees of the sweat-shops, and the relatively lower mortality among these people than among the more sturdy Irish population.

There can be but little doubt that Jews are peculiarly resistant to microbic disease in general. During the Middle Ages, when epidemics of various diseases carried off a large percentage of the population, their immunity was so marked and their low death-rate by comparison with the rest of the population so noticeable, that they were often accused of poisoning the wells.[2] It is said that they have an especial fitness for residence in malarial districts.

Various reasons may be given for the unusual resistance of the Jewish people to tuberculosis. While tuberculous meats as a source of contagion only play a very minor rôle in the spread of tuberculosis, it is reasonable to believe that the rigid inspection of their meat which is practiced to a high degree among a large percentage of the Jews undoubtedly does limit their danger of infection from this source.

The Jews, essentially a sober and temperate

people, are users of alcohol in fairly constant amounts, but not enough to undermine the constitution, whereas among other races alcohol is undoubtedly a much greater factor in lowering resistance for the invasion of tuberculosis.

The fact that the Jewish people take care of their health in general, and the frequency with which they seek medical advice for every slight ailment, to my mind is a definite cause for the infrequency of tuberculosis among them.

I have had a considerably larger number of early and questionable cases of tuberculosis among the Jewish race than in any of the other races treated for this disease, and I feel that their eternal vigilance as regards the early symptoms of tuberculosis, and their taking advantage of medical treatment during the very early stage of the disease, has to a great measure prevented a large number of tubercular infections from ever getting a hold on the organism.

Without any question, the main reason for the lower mortality from tuberculosis among the Hebrew race is the immunity that has been handed down from generation to generation as a result of the Jews being city dwellers for centuries, and by their urbanization, exposed to infectious diseases during the existence of their race. Centuries ago, they undoubtedly succumbed as readily to this disease as the negro does to-day, but the law of the survival of the fittest solved the question.

The temperament of the Jewish race is another factor in determining the relative resisting power of the race against tuberculosis. They resist the ravages of the disease until the very last, and follow out the treatment as no other race,

There have been very few deaths from tuberculosis among the Jews in the Consumptives' Hospital at Mattapan. This is partly due to the fact that most of the Jewish patients when they become too sick to come to the Day Camp or to attend the dispensary clinics prefer to remain at home to die.

I have not had a single case of miliary tuberculosis, and relatively few rapid cases, among the Jews out of several thousands of cases of consumption I have observed during the past six years.

As a direct contrast to the low mortality from tuberculosis among the Jewish race, let us inquire into the relatively much higher mortality among the Irish race, whose death-rate from tuberculosis is greater than any of the other white races.

Temperament, as in the Jewish people, also affects the progress of the disease in the Irish people. As a race the Irish are very indifferent to many things that would cause considerably more concern to many of the other white races. This indifference is manifested very clearly as regards the early symptoms of tuberculosis. One of the prime causes of the extent of this disease among the Irish people is their utter disregard of definite tuberculous symptoms which have lead to advanced cases of consumption. Many of the early cases could be discovered, treated and cured if it were not for the indifference displayed by such a large number of the Irish race. After once getting the disease, I have seen many lose heart absolutely, refusing or failing to take any treatment to effect a cure, and allowing themselves to fall victims of the disease, making no fight against it. I have also observed this same attitude among some of the other white races.

To illustrate the difference in temperament between the Irish and Jewish races, I will cite the following incident that occurred recently in the hospital at Mattapan.

For about a month, one of the Jewish patients made it a practice to come out on the piazza at the dawn of day, and, after taking in several long inhalations, would begin to pace up and down the piazza like a sentinel on duty, occasionally stopping to strike his chest with his hands. This morning exercise would continue for about one-half hour each day. One morning shortly after he made his appearance on the porch, he was joined by an Irishman who came out to have a smoke. The Jewish patient remarked to the newcomer who was enjoying his pipe, "I beat you out this morning. I got all the good fresh air before you got here." The Irishman replied, "Sure there is plenty of fresh air for everybody." To which the Hebrew retorted, "Yes, there is plenty up above," at the same time pointing upward, "but I got it all down here."

The Jewish patient is a fibroid case of eight years' duration, while the Irishman is a fairly acute case of one year's duration.

Alcohol is another factor to be considered as having a direct relation to the prevalency of tuberculosis in a race. Experiments on animals have shown that those fed with alcohol have a much less resisting power against tuberculosis than others. By lowering the resistance of an individual, it paves the way for infection with tuberculosis and plays a more important part among the Irish people than most of the other races.

In 1864, the tuberculosis death-rate in Ireland was the lowest in the three countries of the kingdom, making it the lowest in Europe. Since that time, it has gradually increased, until to-day Ireland has the highest death-rate of any country in Europe. At the present time, tuberculosis has reached the high percentage of 16% of all deaths, against 9% for England and about 10% for the United States. Fortunately, through the able efforts of Lady Aberdeen, and others, a definite crusade is being waged in Ireland to-day with the hope of materially reducing the number of deaths from this disease.

In this country the Irish people and their descendents show a higher death-rate from tuberculosis than any other white race, almost reaching the high mortality of the negro. In other words, we have a strong, vigorous, hardy, physically superior race, industrious and intelligent, who have been relatively little exposed to tuberculosis in the past, but who in more recent times have come more in contact with the disease both in this country and at home, and, as a result, at the present time are showing a frightful susceptibility, with a consequent high mortality from this preventable disease.

To my mind, the great factor which explains the present condition of the high death-rate from tuberculosis among the Irish people is that they have not as yet acquired the immunity which exists in a race who have been exposed to disease over a long time. The Irish have been unquestionably in contact with tuberculosis for a much shorter period than many of the other European races, who show a more marked resistance against the disease.

How this immunity is acquired by certain races is still open to some question. It seems very probable that all acute infectious diseases tend to diminish in virulence with successive generations and centuries. Theobald Smith pointed out that any infectious organism which is to continue as endemic in a race must modify its original virulence to such a degree as to allow its victim to live long enough to permit of its ready transmission to another patient. Whether the immunity is acquired or inherited is also an interesting problem, and undoubtedly both influences play their part. Judging from post-mortem examinations, authorities have found evidence of both active and healed tuberculous disease in from 60 to 90% of all people. In a series of 300 autopsies which I performed at Ancon Hospital, most of the cases being negroes or mixed races, there was evidence of tuberculous infection, mostly healed, in about 75% of the cases. In those who give evidence of healed foci of tuberculosis in the body, it seems highly probable that they have acquired a certain increase in resisting power against this disease.

For the past half century, tuberculosis has been getting a firm grip on the Indians of the United States and may be said to be the chief cause of their practical extermination. Dr. V. W. Brewer,[3] of Fort Huachuca, Arizona, made a careful study of tuberculosis among the Indians of the Southwest. His findings were summed up as follows:

Among the Mojaves, tuberculosis caused 95% of all deaths. Among the Pima and Maricopa, tuberculosis caused 66% of all the deaths.

Among the Havasupai and Walapai, tuberculosis caused 75% of all deaths, making an average of 72% of all deaths among the Indians from tuberculosis.

The appalling mortality of 280 per 1,000 due to tuberculosis is nearly sixteen times the average white mortality for the registration area of the United States.

Before the Indians came under the influence of civilization, tuberculosis was unknown among them, but outside of the moderately unsanitary condition of their houses and wigwams, the only environmental condition which would account for the prevalence of this disease among them would be alcoholism. However, the real reason is their susceptibility, due to the disease being a new one among them, and the absence of immunity as a result.

The clinical duration of the disease among the Indians, from the beginning of its symptoms until the death of the patient, averages in adults about nine months, but there is a relatively larger number of acute miliary cases lasting but a few weeks than in the other races.

In Panama, I saw a few cases of tuberculosis among the San Blas Indians, a tribe of 200,000, whose country adjoins the Canal Zone. Among these Indians, the disease runs a very acute course, averaging about six months. At autopsy, large caseous areas of tuberculous pneumonia with early cavity formation formed the pathological picture in the lungs. Not only to tubercular infections of the lungs, but also to pneumonia, the Indian population showed a marked lack of resisting power. I have seen at autopsy an area of pneumonia involving less than one third of a lobe cause death in a few days after the onset of clinical symptoms.

But the Indian, the Eskimo, the Hawaiian Islanders, the negroes of the West Indies, in fact, all the aboriginals throughout the world, are ready victims not merely to tuberculosis, but to infectious disease of civilization.

While in Panama, I was told by an old Jesuit missionary working among the Indians of the terrible ravages from measles and smallpox among them; in many instances fully one half of the population of a village would be wiped out.

Thousands of cases of influenza and complications of pneumonia and meningitis occurred among the West Indian negro working on the canal, with a high mortality. The death-rate from pneumonia, which seemed to be closely associated with the influenza epidemics, was as high as 50% of all cases, at one time.

Tuberculosis among the Japanese in this country causes a death-rate of 239 per 100,000, according to the United States Census of 1900. The disease tends to a more chronic course than among the white race, indicating probably that the Japanese have been longer exposed to this disease.

Among the Chinese, on the other hand, the mortality was 656.8 per 100,000 in 1900, according to the Census, nearly four times that of the general white population and over twice that of the Japanese. The conditions under which they live undoubtedly account in this country for a higher rate than their Mongolian brothers, the Japanese. In the slums of the large cities they live together under the most overcrowded conditions of any class, and exposure to contagion is definitely greater as a result.

The Irish population in the lower wards of New York showed a mortality of 645.7 per 100,000, while similar wards in Chinatown showed a death-rate of 565,495, 502 per 100.000.

I have had a few Chinamen die at the hospital at Mattapan and the clinical course did not seem to vary from that among the whites.

The question of the prevalence of tuberculosis among the negro population has been prominently discussed in recent years, but very littl headway in the arrest of the mortality rate has been accomplished.

In the early days of over a century ago, the negro population had relatively little tuberculosis, but as long ago as 1822 their death-rate began to

show a gradual rise, reaching 400 per 100,000, about as great as the whites. This was followed by a slight decline up to the Civil War. Following the war and their liberation from slavery, the mortality rate rose with great rapidity until it reached its present pitch of nearly 700 per 100,000, carrying the negro ahead of all other races in the United States except the Indian. There has been a slight decline within the past few years, and it is probable the death-rate will diminish materially as the crusade against the disease progresses.

To give one a general idea of the relative death-rate from tuberculosis, the following figures can be cited.

The negro death-rate from tuberculosis is two to seven times that of any other race, excepting the Indian, in the United States.

The Irish rate is about two thirds that of the negro mortality.

The Scandinavian comes next, somewhat less than the Irish rate.

The German, English and Canadian mortality rate is each less than one third of the negro rate.[4]

Boston, with a negro population of about 20,000, has the highest rate of negro mortality from consumption of any city in the United States.

In the Canal Zone I had an opportunity of coming in close contact with the disease among the negroes and natives, who were a mixed race of negro, Indian and Spanish bloods.

The West Indian negro seemed even less resistant than the American negro to the disease, and clinically most of the cases died within seven or eight months after the beginning of symptoms. They come from virgin islands where tuberculosis has only been of recent occurrence, and on coming in contact with the native Panamanian, who has had tuberculosis for a much longer period, they soon fall victims of the disease. In over 600 autopsies which I have seen on the canal, I have observed but one case of healed tuberculosis in a negro where the focus was of any considerable size. This case showed a left apical cicatrix about one and a half inches in diameter, with no evidence of active disease elsewhere.

Pathologically, the lungs in most of the cases showed caseous areas of bronchopneumonia with cavity formation, and rarely any attempt at fibrous repair. On the other hand, I have seen among American negroes a few cases where cicatricial tissue had replaced to a considerable extent what was formerly active tuberculous foci. This pathological picture of fibrous repair going on in the lungs of negroes suffering with tuberculosis indicates some element of resistance and proves definitely that the disease is curable even in such an unfavorable host as the negro.

Except for the few cases of tuberculosis occurring in the San Blas Indians who have mingled with the natives and have become infected, this tribe living in their aboriginal state remains free from the disease.

Tuberculosis plays great havoc among the mixed races of the tropics, for here we have a susceptible admixture of negro, Indian and Spanish races. The tuberculosis death-rate seems to be as high or even higher than in the West Indian negro, and is especially due to their mode of living. Housed together in their thatched houses of only one room, to which air and light have only one access, namely, the door, which is often kept closed, whole families are infected, the disease being spread one to another with complete extermination of whole groups of natives. The relatively high birth-rate tends to neutralize the ravages of the disease and prevent the natives from becoming extinct. The Panamanian police force of 600 men in the cities of Panama and Colon are made up of Indian, negro and Spanish bloods and seem to be all infected with consumption.

Tuberculosis among the Italians in this country shows a higher mortality than the disease at home in their native clime. Various parts of Italy vary in the death-rate from tuberculosis within wide limits. In the northern part the rate, according to Dr. Steller,[5] is from 300 to 320 for 100,000, while in the southern provinces and Sicily the mortality is lower, 140 to 160 per 100,000.

In the United States, on account of the hardships they endure living in the large cities under very crowded conditions, the death-rate from this disease is higher and seems to be definitely increasing. The disease in other than pulmonary forms is relatively more common among children under fifteen years than among most of the other white races, especially peritonitis and glandular tuberculosis. The death-rate in the United States among the Italians, according to the Census, is less than the Scandinavians, who, next to the Irish, have the highest mortality from tuberculosis of any of the white races in the United States.

Tuberculosis attacks the Scandinavian population in the United States with particular virulence, the mortality being about 280 per 100,000. The death-rate at home in Norway, Sweden and Denmark is very high, although some progress has been made of late in checking the mortality. Here again, as in the Irish, we have a physically strong, virulent race, whose susceptibility is due to the disease being a new one among them.

As a result of the clinical and pathological observations of tuberculosis in the different races of people covered in this paper, the following conclusions may be made.

(1) That a definite resistance has been acquired by certain races as a result of contact with tuberculosis over a long period of time, brought about by urbanization.

(2) That the Indian and negro races have acquired as yet very slight resistance against the disease, and preventive measures are practically the only means of stemming the mortality.

(3) That the present high mortality rate among the Irish can be brought to a considerably lower level by the educational and preventive measures now in vogue.

(4) That in the fight against the disease, we have on our side the knowledge that it is possible

we may raise the resisting power of a race against tuberculosis as shown by the relative low mortality in the Jewish people against the high rate among the aboriginal races.

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FURTHER OBSERVATIONS ON THE FLY PROBLEM AT THE WORCESTER STATE HOSPITAL, MASSACHUSETTS, 1911.

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In 1910 the writer, with the aid of W. L. Dodd, published a study of an epidemic of bacillary dysentery at the Worcester State Hospital in which the conclusion supported by experimental means was reached that the house fly was, in large part at least, responsible for the spread of the infection through the hospital, and in which, measures for attack on the fly were outlined.

The present article deals with the further observations on the problem and the results accomplished and anticipated.

As reported in 1910, great swarms of flies were found to be breeding in the piggery manure piles and in piles of brewery waste (especially the barley malt) which had been hauled on to the grounds for use as fertilizer. These two sources have been practically eliminated this year by the abandonment of the piggery and attention to immediate spreading of the fertilizers, both brewery waste and manure. This spreading seems to be a fairly effectual check on fly production as it renders the material with its maggots more readily available to insectivorous birds and tends to allow sufficient drying to inhibit or prevent active breeding, although even a thin sheet of such material will show a few maggots.

Of the breeding places discovered last year, however, two remain. These are the masonry manure pit at the stable and the manure cellar under the farm barn — the former containing horse manure only, and the latter, a large proportion of cow manure. During the 1910 review the stable pit was thoroughly examined and it was found that, due to its comparatively fly-tight construction, it was then acting only as a limited producer.

The early months of the fly season of 1911, i. e., May, June and early in July, there was a very marked reduction in the number of flies about the hospital when compared with the preceding summer, and, in fact, throughout the season, the reduction was noticeable, but in the latter months, the numbers present were sufficient to constitute a pest and were believed to have been the major factor in the spread of many cases of dysentery.

The excessive drought of the early summer months would undoubtedly have played a part in aiding reduction had the sources of supply been outside ones, but could hardly be held responsible in the case of covered manure pits.

Early in July flies began to appear about the stable in considerable numbers, and attention was directed toward the manure pit. It was found that during the year there had been considerable rotting of the flooring, leaving many small cracks which gave access to the flies. In order to determine the numerical importance of this source and the possibility of cleaning it by means of rendering it tight, the floor was repaired and over one of the trapdoors was constructed a large box with four small openings which led into ordinary wire fly traps and a large screened opening to admit light and serve to attract the flies toward the traps. It was anticipated that these procedures would prevent "seeding" of the bin and thus, after sufficient time had elapsed to allow of hatching and capture of the individuals already present, this source would no longer be a troublesome one. The traps were emptied daily and counts made of the daily yield of Musca domestica and allied species and of the larger "blue bottle" flies and of other insects.

The following table gives the results:

Date.	Musca domestica.	Blue bottles.	Other insects.
July 6,	714	0	1
" 7,	1,068	1	1
" 8,	282	0	0
" 9,	528	7	0
" 10,	514	0	1
" 11,	480	0	2
" 12,	868	25	0
" 13,	515	61	1
" 14,	1,127	38	1
" 15,	1,615	90	0
" 16,	738	34	1
" 17,	659	24	0
" 18,	724	7	0
" 19,	519	10	0
" 20,	411	2	0
" 21,	362	13	0
" 22,	203	29	3
" 23,	190	47	0
" 24,	148	17	0
" 25,	145	7	0
" 26,	391	1	0
" 27,	671	3	0
" 28,	107	0	0
" 29,	68	0	1
" 30,	43	0	0

The table shows a great variation in the daily output and does not show a sharp drop in the number between the 16th and 18th, as would be expected had careful closure of all openings on the 6th proved effective. Observations made on the 13th and subsequent days show the reason for this. It has been the custom to keep in the stall room of the stable a small box to store droppings which occur between the morning and evening cleanings, and to this the flies had access, and innumerable eggs were found in it. For a few days such accumulations were thrown into the bin immediately on collection, but further observations showed that "seeding" might occur in the stable very soon after the manure was dropped and while still warm, so that constant attention would be necessary to prevent the inclusion of batches of eggs with the manure.