the heart do not depend so much on organic lesions as upon the lack of compensation. Even angina pectoris produces sclerosis of the coronary arteries so often associated with it and is not, as a rule, produced by this. The products of auto-toxemia, like toxins of the germ diseases, produce sclerosis. This auto-toxemia may be of local origin, due entirely to the failure to eliminate the toxic results of nerve stress.

Arrhythmia, bradycardia and tachycardia are cardiac manifestations dependent, as Dr. G. Jacoby pointed out years ago, on disturbance of cardiac innervation with interdependent auto-toxemia. Arrhythmia is often a pure neurosis, resulting from toxemia. It is very frequently found in auto-toxemias, where there is a condition of sexual erethism which itself depends on auto-toxemia. The same is true of bradycardia and tachycardia. So long as these so continue that repair out-balances waste, the condition is not dependent on more than biochemic conditions, but when waste exceeds repair organic disease often results.

Because of this mixture of auto-toxemia and disturbed cardio-nervous action, two requirements must be met: 1, the elimination of toxic products by alterative, and 2, the control and stimulation of the local cardiac ganglia, as well as of the cardio-respiratory centers in the medulla. This is but one of a hundred combinations which might be met by careful union of medicinal agents indicated by the patho-physiologic state.

A neglected but valuable alterative nervin is copper. The therapeutists of the close of the eighteenth century believed that copper was of peculiar value in nervous diseases, where an alterative was needed as in chlorosis and anemia, and where neither iron nor arsenic was beneficial. The action of copper on the eye structures indicates that this alleged alterative action had a foundation in fact. It is a normal constituent of the blood and its toxicity has been enormously overestimated. All the therapeutists of the English-speaking countries agree as to its value as an alterative nervin. It has been found of value in all adynamic states by the French therapeutists. Among the combinations peculiarly useful are copper arsenite and copper phosphate.

Massage has undergone the usual variations of trite and useful procedures. The tendency to fashion and fads in therapy, arising from the advertising desire of fashionable physicians, has led more than once during the last two centuries to the disuse and abuse of massage, and has opened a way for the old bone-setters, who are now called osteopaths. Two decades ago they were denominated in Illinois snapping doctors. Massage has also lost caste through the erotic results of misapplication. During the last two decades of the nineteenth century massage shops, as they were called, abounded in all great cities; they received extensive advertisement in quasi reputable newspapers and created a serious prejudice against massage, of which prejudice the osteopaths have largely availed themselves. The old action of massage, as a stimulant to exercise and tissue change, however, has received constant proof sufficient to remove all prejudices against massage in the mind of the scientific therapeutist. In most of the morbid states where exercise is needed, the initial volition of the resolve to take exercise is so fatiguing that all the good effects of the subsequent exercise are nullified. Here massage peculiarly fits the case, and starts the patient on the road to recovery through the physiologic rest it gives by local physiologic exercise and fatigue, without undue strain on a weak will-balance. The Swedish movement

cure is, however, contra-indicated in these cases by its mental effect on the patient, as well as its tendency to produce exhaustion. Both Swedish movement and massage in the hands of a masseur who believes in their occult origin are very dangerous, since mental suggestion of a hypnotic type is apt to affect the patient unfavorably. The most material explanation of their physiologic action should be given their patient, before they are employed, in order to avoid this untoward effect. The addition of massage and Swedish movement to the other measures employed in tabes dorsalis has peculiarly beneficial results, both from a physical and mental standpoint, since the patient learns thereby the amount of strength and motor power that he retains despite its seeming loss. Massage in sexual neurasthenic cases, while beneficial, should be carefully watched, since in this class of subjects, whether male or female, pervert tendencies are easily initiated. In all forms of chlorosis and anemia, a sluggish metabolism may be stimulated by massage as well as establishing the initial improvement in auto-intoxication. It should be remembered that in these last states, from neurotrophic causes the skin readily bruises, but such bruises from massage are of short duration, and rapidly disappear under the improvement effected by the procedure.

TUBERCULOSIS IN STATE INSTITUTIONS.*

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It will be impossible for me to give statistics bearing upon this disease, or to discuss the different methods in vogue in the various states in dealing with it. Such a course is not necessary however. It should be our purpose at the present time to discuss what seem to us the most approved methods, leaving the question as to what is actually done for consideration later. The institutions under the control of the state which demand our attention are schools, hospitals, reformatories and prisons, although we might well go further and discuss conditions in factories, workshops, stores, tenement-houses, etc.

EDUCATIONAL INSTITUTIONS.

Of schools there are the following: Those for children, either public or private or parochial; and the academies and colleges. Every one will concede, I presume, that tuberculous children should be excluded from the public or parochial schools for at least two reasons: 1, in order to prevent the infection of other children, for in these places the dangers of spreading infection by means of non-disinfected sputum through the use of common drinking cups, text-books, etc., is great; 2, for the good of the tuberculous child itself, for it is not good that these should be housed and cared for in the same manner as are the healthy children.

Tuberculous children should have fewer hours of study. They should have well-regulated physical exercise; especial precautions should be taken to protect them from inclement weather, wet clothing or other conditions tending to irritate the respiratory tract. Undoubtedly some one will say that these children should not be in school at all. It is hardly advisable to take such an extreme position, for many tuberculous children will, if properly cared for, overcome the disease

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and become useful, educated citizens. On the other hand, if excluded from school entirely, they might grow into adult life, lacking many of the qualities of good citizens. This should not be sought after. Tuberculous school children should have among their teachers, one giving entire attention to their physical training. Weeding out from our public schools the children that are tuberculous is one of the most important functions of medical inspectors. It may not be necessary to exclude all tuberculous children from private schools, academies, colleges and universities, but all of these institutions should have thorough medical inspection, and, in connection with such, there should be definite methods of living laid down for those that are affected. The student suffering from this disease should never be allowed to room with or sleep with the non-tuberculous. It is not long since my attention was drawn to a sad case. Two university students roomed and slept together. At the outset one was tuberculous; the other was not. Neither of these young men were familiar with the nature of the tubercular infection. Probably at the outset the tuberculous individual did not even know that he had this disease. Later, the affected student died of the disease; not, however, until his roommate had also become infected, following him to the grave within a year. Such an unfortunate occurrence should not have been possible in an institution for advanced study. The physical condition of this infected student should have been known. He should have been required to live in such a way as not to have endangered others. His advanced education, if permitted at all, should have been directed by a competent physician, and he should not have had a roommate.

So far we have been dealing with schools that are in a way free from state control. There are others for which the state is directly responsible. The state schools for the blind, the deaf and dumb, the epileptics, the dependent and neglected children, reformatories, etc., can and should be thoroughly inspected, and a careful watchfulness should be kept over any of these unfortunates who may show any symptoms of tuberculosis. While it may not be necessary in all cases to isolate such children, they should most certainly have separate sleeping rooms, together with a careful regulation of out-of-door and school life. It is quite possible that many of these children are more prone to tubercular infection than are those under our general public school system.

In the schools for the feeble minded we find quite a different class of people to deal with; a people who are irresponsible and incapable; a people whom it is difficult to regulate; a people whose habits are often filthy. Strange as it may seem, one of these filthy habits is to a certain extent protective. I refer to the habit of swallowing sputum. If it were not for this habit it would be almost if not quite an impossibility to prevent the general infection of the wards and rooms in these schools. With this habit we should naturally expect to find a large percentage of cases with intestinal tuberculosis and such is the fact. The record of one institution¹ with which I am familiar, is as follows:

Year.	Average Attendance.	Deaths.	Deaths from Tuberculosis.
1881	22	2	1
1882	30	2	1
1883	37	1	1
1884	45	4	1
1885	78	7	3
1886	78	9	2

1. Furnished me by Dr. Huxley, of the School for Feeble-Minded, at Faribault, Minn.

Year.	Average Attendance.	Deaths.	Deaths from Tuberculosis.
1887	104	6	2
1888	157	9	3
1889	198	11	3
1890	268	12	2
1891	301	18	4
1892	305	15	5
1893	352	13	6
1894	456	24	6
1895	440	22	4
1896	435	18	4
1897	511	26	3
1898	590	39	10
1899	630	24	6
1900	668	30	11
1901 (Jan. 1 to May 5).....	758	9	3
Total		301	79

The average attendance is for the fiscal year, July 31-July 31. The deaths are for the calendar year.

W. Huxley further states, that after a careful study of the records in regard to tuberculosis at the time of admission, I believe that the year beginning April, 1900, may be taken as a fair example. There were 107 admissions. Tubercular positive, 8; probable, 5; questionable, 6. The positive covers those cases sufficiently advanced to warrant the statement.

Under probable are included those cases in which the findings lead to a strong suspicion of tuberculosis, but which are not sufficient to justify a positive statement of the condition.

Questionable cases comprise those where the condition of the patient, shape of the chest, expansion, etc., would lead one to be on his guard as to a favorable prognosis, but where unfavorable conditions render it impossible to demonstrate the disease clinically.

Below is a list of autopsies, performed this fiscal year:

Case.	Age, yrs.	Sex.	Tuberculosis of lung.	Tuberculosis of intestine.	Diagnosis—clinical.
A.	4	F	Yes.	Yes.	Chronic enteritis.
B.	28	M	Yes.	Yes.	Tuberculosis—general.
C.	7	M	No.	No.	Nephritis.
D.	9	F	Yes.	Yes.	Tuberculosis—lung.
E.	8	M	No.	No.	Gastro-enteritis.
F.	34	M	Yes.	Yes.	Tuberculosis—general.
G.	50	M	Slight.	No.	Epilepsy.
H.	10	M	No.	No.	Chronic gastritis.
I.	26	M	Yes.	Yes.	Epilepsy and tuberculosis.
K.	50	M	Yes.	Yes.	Tuberculosis—general.
10			7	5	Three not tubercular.

* Tuberculosis demonstrated clinically about one month before death.

† In this case the patient expectorated freely and was provided with a sputum cup: tubercle bacilli were found in sputum; impossible to get sputum in other cases.

All of above were low-grade cases, except last.

Cases of marked tuberculosis are taken to the hospital, placed in a separate ward, cared for under antiseptic precautions. All outside cases are given the benefit of sunshine and open air as much as possible and those in charge are instructed as to the nature of the disease.

Dr. Rogers states that a few years ago, when the institution was not quite so badly crowded, the attending physician selected the tuberculous cases, or those in whom he suspected tuberculosis, and arranged to have them, under charge of a special attendant, out of doors in all good weather, and pretty well separated from other children when in the house. While this plan was carried out, there were fewer new cases developing in the institution than before.

As this institution is under most careful and efficient management, the record is probably up to, if not above, the average for others of a similar nature. It is noticeable that with this high mortality from tuberculosis among defectives, there is not a single instance of probable infection of attendants.

INSTITUTIONS FOR THE INSANE.

Still other conditions relative to the care of the tuberculous in state institutions are presented in the hospitals for the insane; conditions that are somewhat peculiar. It appears that it is not at all uncommon for tuberculosis to be held in abeyance apparently in the insane, and yet these patients in whom the disease exists in non-progressive form are capable of infecting others. We, therefore, find in these hospitals two sets

of tuberculous patients: viz., 1, those who were tuberculous before their admission but in whom the disease is apparently non-progressive; 2, those who have become infected since entrance into the institution and in whom the disease is progressive, later ending fatally. The records of three institutions with which I am somewhat familiar is as follows:

Year.	1		2		3	
	Population.	Deaths from Tuberculosis.	Population.	Deaths from Tuberculosis.	Population.	Deaths from Tuberculosis.
1890	949	8	967	8	82	..
1891	949	10	1054	15	122	..
1892	935	4	1058	11	245	..
1893	939	10	1071	19	352	..
1894	938	8	1115	27	532	..
1895	936	11	1120	18	725	..
1896	997	9	1138	21	783	..
1897	978	30	1126	19	984	16
1898	1007	20	1196	9	1061	13
1899	984	9	1186	22	1215	15
1900	936	15	1122	10	1306	31
Total	9669	134	12,153	179	7407	94

There is a tendency among the insane to swallow sputum, but this tendency is not so general as among the feeble-minded. On the other hand, it is no uncommon thing to find an insane person exceedingly filthy with reference to expectoration. It is no uncommon thing for attendants at asylums to become infected at such institutions and die. It would seem that of all state institutions in which an attempt should be made to control tuberculosis, the hospitals for the insane should take first place, for many of the patients recover in part or entirely from their insanity and are returned to their homes. If such restored patients have been infected with tuberculosis while in the institution, they will in all probability not only die of this disease, but will spread infection to other members of their families.

In a paper which I read before the Conference of State and Provincial Boards of Health at Nashville, in 1897, I presented the following statements and these hold equally good at the present time:

In a paper by Dr. George H. Rohé, upon sanitation in hospitals for the insane, he says: "The greatest scourge of these institutions is tuberculosis, and I fear the apathy with which this disease is regarded by physicians in charge of the insane is largely due to the prevalent belief that there is an etiologic relation between phthisis and insanity. I am convinced, however, that unprejudiced observation will show that the prevalence of tuberculosis in hospitals for the insane is due to the great facilities for infection and the lack of attention to the means of restricting the same. The American Public Health Association has, by the report of its committee on restriction of tuberculosis, pointed out the means of limiting the spread of this disease. By the adoption of these means, the percentage of tuberculous deaths to the general death-rate in one hospital, has been reduced in the course of three years from an average of 25 per cent. to a fraction under nine per cent.

I was interested in this hospital report from Dr. Rohé, at the Maryland Hospital, Catonsville, and wrote to Dr. Wade, his successor, to learn the present condition of the tubercular patients. He informed me that the death-rate from tuberculosis for 1896 was but 6.1 per cent. Dr. Wade described the manner of caring for the tuberculous insane in this hospital as follows:

"The sputa of the suspected case is examined, and if the bacilli are found the patient is placed in a single room, the walls of which are painted and can be easily disinfected. The furniture consists of an iron bedstead which is readily cleaned. There are no curtains at the windows and no carpet on the floor. The patient is persuaded, if possible, to expectorate into a vessel, which is disinfected at proper intervals. If the patient expectorates about the room, no harm can be done, however, as everything can be readily washed with a disinfectant. The bedding is properly cared for, and is used for no other bed. After the death of the patient, the room and all of its contents are thoroughly disinfected."

It may be well to place Dr. Wade's opinion, relating to tuberculosis among the insane, against the older views which I have already given. He states, as reasons for a high mortality from this disease in these hospitals: 1, the fact that the physical condition of the insane patient is very much depleted on admission; 2, the necessary confinement in the building; 3, the difficulty of isolation; 4, the lack of proper care and disinfection; 5, the fact that many of the patients do not complain of their ailments and that the tuberculous process is well established before discovered.

Dr. Tomlinson, Superintendent of the State Hospital for the Insane at St. Peter, Minnesota, believes in the transmutation of insanity and phthisis. At the same time he believes that most of the cases of tuberculosis in these hospitals originate by infection while in the hospital, and that patients having a direct heredity of phthisis are not likely to die from this disease. In proof of this he quotes from the hospital's statistics as follows: "During a period of two and one-half years, out of 695 patients admitted, 70 had a history of phthisis in the family; and 5 were suffering from phthisis when admitted. During this same period, 19 patients died of phthisis, and not one of these had a family history showing that disease."

He believes that the *materies morbi* for tubercular infection is always present in the old-style hospital and that the poor hygienic surroundings due to overcrowding have much to do with its development. This is illustrated by the fact that at times a patient who becomes infected with tuberculosis and is rapidly failing may improve and apparently recover when placed under better sanitary conditions. We should, therefore, have no hesitation whatever in saying that the isolation of the tuberculous insane should be insisted upon, even though such a procedure would require the establishment of a hospital especially for this purpose.

PRISONS.

It should be a simple matter to control tuberculosis in prisons, for the individuals are under absolute control. In all modern prisons each prisoner has his own cell. It is a simple matter, therefore, to set aside certain cells in which to confine tuberculous prisoners. These individuals should be given a special diet and should be kept at work in the open air, if possible. They certainly should not be placed at work in shops or factories with other prisoners. Such a system, I am happy to say, is carried out at the Minnesota state prison with most gratifying results, for at present there is not a single prisoner suffering from tuberculosis in confinement at that institution. Dr. B. J. Merri', physician in charge, established the system of isolation, special diet, etc., in the summer of 1894. At this time

he set aside a group of cells now known as "tuberculous row;" with the appearance of any suggestive symptoms of tuberculosis a prisoner is carefully examined from time to time and as soon as the presence of tuberculosis is recognized he is placed in one of these cells. This does not mean that he is placed in an infected cell; far from it, for these cells and their contents receive special attention. All bedding and clothing is disinfected and laundered separately. The prisoner is required to expectorate into a spit cup containing a disinfectant, and especial care is given to the cleansing of the cell from day to day. Should a tubercular prisoner die, his clothing and bedding are disinfected or destroyed and his cell is thoroughly cleansed before being placed again in service.

These methods adopted at Stillwater may not be unusual in prisons but it is not universal. In strong contrast with the condition at the Stillwater prison is that which exists at the Indiana State Reformatory at Jeffersonville. This institution is poorly located on low ground, and in spite of protests it is overcrowded to such an extent that bunks made of rough boards fill up all the available space on the floors of the cell room and many cells are made to accommodate two instead of one man. Buildings that were planned to accommodate 536 prisoners have now an average population of 900. Of course, it is not possible at this place under existing conditions to isolate tuberculous prisoners.

The records of this institution from Nov. 1, 1896, to Oct. 26, 1900, divided into two periods of two years each, show the following concerning tuberculosis:

First period.—Tuberculous inmates under treatment, 52; deaths from tuberculosis, 15. Total deaths, all causes, 23; percentage of deaths from tuberculosis, 65.

Second period.—Tuberculous inmates under treatment, 396; deaths from tuberculosis, 23; total deaths, all causes, 32; percentage of deaths from tuberculosis, about 72.

These numbers represent only the cases that have been on the sick list. Undoubtedly there were others who, if they had been examined carefully, would have shown symptoms of the disease. It would seem that this institution, with the assistance of that reaper whom we call death, might be able in the course of a few years to eliminate from Indiana its tuberculous reformatory prisoners.

As race has much to do with the susceptibility to tuberculosis and as negroes and people of mixed negro blood are said to be especially liable to contract this disease, and, as there are many more negroes in the Indiana reformatory than in the Minnesota prison, it may be said that a comparison of these two institutions is unfair. As a matter of fact, the difference in the susceptibility to tuberculosis of the people in these two institutions is not so great as might appear to the casual observer. If, however, it is conceded that climate and individuals favor the Minnesota institution, there is then the more reason for the use of strict sanitary measures at the Indiana reformatory.

Etiology of Diabetes.—Erichsen suggests in the *St. Petersb. Woch.*, that diabetes may be due to sclerosis of the vertebral and basilar arteries. Patients with diabetes frequently exhibit indications of arteriosclerosis. The vertebral and basilar arteries pass along the medulla oblongata and send ramifications to the floor of the fourth ventricle. He bases treatment of diabetes on this principle, and administers potassium iodid in combination with sodium salicylate, as in case of arthritis and arteriosclerosis in general. The favorable effect may reach the arteries of the medulla and thus ensure better nutrition of the "sugar center" and improve the symptoms of the diabetes.

PUBLIC SANITARIA.*

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The large number of alleged "cures" for tuberculosis which are constantly appearing as new remedies in the treatment of this disease, only go to prove that the medicinal treatment of tuberculosis, if depended upon empirically, is failing in the object to be attained. We have elsewhere (Columbus meeting of the American Medical Association) claimed that the hygienic treatment of this disease should occupy first place, in no matter what climate or under what conditions the patient was being treated; that climate should occupy second place, while medication in point of preference should be given third place. The consensus of opinion of all writers who deal largely with this disease now practically agree in this, the same proving that the hygienic care of the patient is of the greatest importance.

The question immediately arises as to how we can place our patients under the best hygienic conditions. I understand that under "hygienic conditions," one of the things of greatest importance is the education of the patient in what to do and what not to do. It becomes the duty of the physician to instruct his patients carefully and to see that these instructions are carried out. This is generally a very difficult matter where the patient is engaged in his daily work and is frequently one of the greatest drawbacks where our patient is in the ordinary boarding-house of a health resort. The sanitarium undoubtedly offers the best possible advantages for the proper instruction of a patient, both as regards exercise, diet and the many little things which go to make up the daily round of life.

Unfortunately, a large percentage of the phthisical of this country are so situated that they can not enter a private institution for such treatment on account of the expense involved; this brings us to the point of our paper, i. e., does the state owe a duty to the phthisical poor?

The communicability of this disease makes sanitation a necessity, always. It is foolish for us to create the impression among the laity that the disease is violently contagious; but nevertheless, each case is a menace to those with whom he comes in contact, and particularly among the poor is the death-rate in this disease high. Each state takes care of its insane and spends large sums yearly upon the maintenance of such hospitals. The inmates of these institutions are hopeless as far as future citizenship is concerned, and, while the state recognizes that it can not hope to bring them to a point of usefulness, it has already become the fashion in the different states to take good care of the insane as well as their blind, their deaf and dumb, their epileptic and their criminals (and who shall say that the latter are not simply persons of diseased minds?). If the state acknowledges the duty of caring for all these, it should certainly recognize the same duty toward this large class of patients who become diseased through no fault of their own, particularly as in the case of the phthisical, where each and every patient is a menace to those with whom he comes in contact, and in many cases becomes a charge upon the community in which he resides. He is a danger to his friends, he is a danger, to a certain extent, to the community at large, and, as the state now sees fit to enforce laws and regulations in most

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