

WEEKLY ABSTRACT OF SANITARY REPORTS.

VOL. IV. { Abstract }
 { No. 43. }

TREASURY DEPARTMENT,
OFFICE SUPERVISING SURGEON-GENERAL,
U. S. MARINE-HOSPITAL SERVICE,
Washington, D. C., October 25, 1889.

Abstract of Domestic and Foreign Sanitary Reports received during the week ended October 25, 1889, published in accordance with section 4, Act of Congress, approved April 29, 1878.

UNITED STATES.

Special Reports.

FLORIDA—*Key West.*—The State health officer publishes the following:

KEY WEST, October 11, 1889.

TO THE PUBLIC.

The occurrence of four sporadic cases of yellow fever in Key West, within a period of one month, and in different portions of the city, one of which cases is still sick, warrants the assumption of belief of the possibility of the presence of infection, from whatever source introduced, still remaining. Therefore, in accordance with the provisions of Paragraph IX of the act creating a State board of health, the following regulations are announced and will be enforced:

"1. Communication by unauthorized persons with the Methodist parsonage of the First Methodist Church, in Key West, is forbidden.

"2. The occupants of said parsonage are forbidden to appear upon the streets of the city, and any person is forbidden to take any article of bedding or wearing apparel from said premises.

"3. A detail from the police of the city has been instructed to watch the above-named premises, for the purpose of preventing the unacclimated from entering the same, and promiscuous visiting by all others.

"The physician in attendance, the spiritual adviser, and the necessary acclimated nurses will not be denied admittance.

SHIPPING.

"1. Masters of steam and other vessels are forbidden to take on board and carry to the main-land of Florida, or to any settlement on any of the keys of Florida, as passenger or passengers, or in any other manner, any person who can not produce a certificate of acclimation (or permit) from the State health officer of Florida; and agents of steam or other lines of vessels are forbidden to sell tickets to any one not holding the above-named certificate."

The weather is now cool, and the lateness of the season, with the probability of the near occurrence of strong and cold north winds, in-

creases the hope, devoutly to be wished for, that this fever, seemingly sporadic in character, may cease at the termination of the present case. At present there is no indication of an epidemic ensuing, and no reason why, under needful and proper restrictions, the traffic, travel, and business interests of the place should be materially damaged.

JOSEPH Y. PORTER, M. D.,
State Health Officer.

MINNESOTA.—*Minneapolis.*—Month of September, 1889. Population, 180,000. Total deaths, 183, including enteric fever, 15; diphtheria, 11; and scarlet fever, 1.

MASSACHUSETTS—*Chelsea.*—Two cases of small-pox are reported.

Reports of States, and Yearly and Monthly Reports of Cities.

CALIFORNIA—Month of September, 1889. Reports to the State board of health, Sacramento, from 106 localities throughout the State, with an estimated population of 799,500, show a total of 876 deaths, including whooping-cough, 1; diphtheria and croup, 31; scarlet fever, 3; and enteric fever, 27.

The monthly circular of the State board of health, says:

Reports received from 128 localities throughout the State continue to indicate an exceptionally favorable condition of the public health, many of our correspondents reporting no sickness whatever in their localities. Dr. H. L. Nichols, the efficient health officer of Sacramento, remarks "that the death rate for September in Sacramento was lower than for many years, and if we exclude the accidental and violent deaths, it is wonderfully low. There were but 2 deaths from zymotic causes, as against 9 in September, 1888." Among the reports of health officers in other parts of the State we find many expressing surprise at the immunity from sickness, which, as a rule, is generally prevalent at this season of the year. A great deal of it may be ascribed to their diligence in having their towns made clean, and no breeding-places for disease allowed to exist without abatement.

San Francisco.—Month of September, 1889. Population, 330,000. Total deaths, 453, including diphtheria, 11; scarlet fever, 2; enteric fever, 11; and leprosy, 1.

CONNECTICUT.—Month of September, 1889. Reports to the State board of health, New Haven, from 167 towns, having an aggregate population of 757,822, give a total of 1,040 deaths, including scarlet fever, 3; diphtheria and croup, 54; and enteric fever, 44. The monthly Bulletin says:

The following diseases were more fatal in September than in August: Diphtheria, malarial fevers, puerperal fever, pneumonia, and bronchitis.

The following diseases were less fatal in September than in August: Scarlet fever, cerebro-spinal fever, whooping-cough, typhoid fever, diarrhoeas, consumption. There were no deaths in the State from

small-pox or measles—only 3 from scarlet fever, and 3 from whooping-cough.

The difference in the mortality in September and August was 150. The difference in the mortality in September and August from diarrhoeal diseases was 152. There are no very considerable differences in the number of deaths from other diseases, hence the general health of the State is practically the same as in August, excepting the diminished sickness and death from intestinal disorders.

New Haven.—Month of September, 1889. Population, 85,000. Total deaths, 120, including enteric fever, 2; and diphtheria and croup, 8.

GEORGIA.—*Savannah.*—Month of September, 1889. Population, 57,000. Total deaths, 94, including diphtheria, 1.

KENTUCKY.—*Louisville.*—Month of September, 1889. Population, 227,000. Total deaths, 220, including diphtheria, 4; enteric fever, 11; and whooping-cough, 1.

MICHIGAN.—Week ending October 12, 1889. Reports to the State board of health, Lansing, from 56 observers, indicate that measles, inflammation of bowels, inflammation of brain, membranous croup, pneumonia, scarlet fever, diphtheria, puerperal fever, and influenza increased, and cholera-infantum, cerebro-spinal meningitis, dysentery, cholera-morbus, diarrhoea, inflammation of kidneys, tonsillitis, and typho-malarial fever decreased, in area of prevalence.

Diphtheria was reported present during the week at 21 places; scarlet fever at 25 places; enteric fever at 50 places; and measles at 4 places.

Detroit.—Month of September, 1889. Population, 250,000. Total deaths, 303, including diphtheria, 19; enteric fever, 6; whooping-cough, 4; and scarlet fever, 1.

MORTALITY TABLE, CITIES OF THE UNITED STATES.

Cities.	Week ended.	Estimated population.	Total deaths from all causes.	Deaths from—									
				Cholera.	Yellow fever.	Small-pox.	Varioloid.	Varicella.	Typhus fever.	Enteric fever.	Scarlet fever.	Diphtheria.	Measles.	Whooping-cough.
New York, N. Y.....	Oct. 19.....	1,585,669	641	.....	.....	.....	.....	.....	12	3	24	1	5
Brooklyn, N. Y.....	Oct. 19.....	843,602	294	.....	.....	.....	.....	.....	5	2	17	.....	.....
Baltimore, Md.....	Oct. 19.....	500,343	165	.....	.....	.....	.....	.....	6	.....	6	.....	1
St. Louis, Mo.....	Oct. 19.....	450,000	164	.....	.....	.....	.....	.....	4	4	12	.....	.....
Boston, Mass.....	Oct. 19.....	420,000	175	.....	.....	.....	.....	.....	6	.....	10	.....	.....
Cincinnati, Ohio.....	Oct. 19.....	325,000	102	.....	.....	.....	.....	.....	1	.....	6	.....	1
New Orleans, La.....	Oct. 12.....	254,000	105	.....	.....	.....	.....	.....	1	.....	3	.....	.....
Detroit, Mich.....	Oct. 12.....	250,000	59	.....	.....	.....	.....	.....	2	.....	4	.....	.....
Cleveland, Ohio.....	Sept. 21.....	235,000	80	.....	.....	.....	.....	.....	5	.....	2	1	.....
Cleveland, Ohio.....	Sept. 28.....	235,000	96	.....	.....	.....	.....	.....	8	.....	7	.....	.....
Pittsburgh, Pa.....	Oct. 19.....	230,000	86	.....	.....	.....	.....	.....	13	2	13	.....	.....
Louisville, Ky.....	Oct. 12.....	227,000	57	.....	.....	.....	.....	.....	7	.....	.....	.....	.....
Minneapolis, Minn.....	Oct. 12.....	200,000	46	.....	.....	.....	.....	.....	4	2	4	.....	.....
Minneapolis, Minn.....	Oct. 19.....	200,000	44	.....	.....	.....	.....	.....	6	1	7	.....	.....
Providence, R. I.....	Oct. 19.....	127,000	47	.....	.....	.....	.....	.....	2	.....	4	.....	1
Denver, Colo.....	Oct. 18.....	125,000	52	.....	.....	.....	.....	.....	15	.....	1	.....	.....
Indianapolis, Ind.....	Oct. 18.....	124,450	32	.....	.....	.....	.....	.....	3	.....	2	.....	.....
Richmond, Va.....	Oct. 12.....	100,000	41	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
Richmond, Va.....	Oct. 19.....	100,000	36	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
Toledo, Ohio.....	Oct. 18.....	89,000	29	.....	.....	.....	.....	.....	.....	.....	3	.....	.....
Fall River, Mass.....	Oct. 19.....	69,000	25	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
Nashville, Tenn.....	Oct. 19.....	65,153	25	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Charleston, S. C.....	Oct. 19.....	60,145	48	.....	.....	.....	.....	.....	1	.....	.....	.....	.....
Lynn, Mass.....	Oct. 19.....	53,000	19	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Portland, Me.....	Oct. 19.....	42,000	13	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Galveston, Tex.....	Oct. 4.....	40,000	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
San Diego, Cal.....	Oct. 16.....	32,000	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Binghamton, N. Y.....	Oct. 19.....	30,000	6	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Yonkers, N. Y.....	Oct. 18.....	30,000	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Auburn, N. Y.....	Oct. 19.....	26,000	8	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Haverhill, Mass.....	Oct. 19.....	25,000	11	.....	.....	.....	.....	.....	1	1	.....	.....	.....
Newport, R. I.....	Oct. 17.....	22,000	7	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Keokuk, Iowa.....	Oct. 20.....	16,000	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Rock Island, Ill.....	Oct. 13.....	16,000	4	.....	.....	.....	.....	.....	.....	.....	2	.....	.....
Pensacola, Fla.....	Oct. 12.....	15,000	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pensacola, Fla.....	Oct. 19.....	15,000	3	.....	.....	.....	.....	.....	1	.....	.....	.....	.....

FOREIGN.

(Reports received through the Department of State and other channels.)

GREAT BRITAIN—*England and Wales.*—The deaths registered in 28 great towns of England and Wales during the week ended October 5 corresponded to an annual rate of 17.6 a thousand of the aggregate population, which is estimated at 9,555,406. The lowest rate was recorded in Leicester, viz, 10.7, and the highest in Manchester, viz, 25.8 a thousand. Diphtheria caused 7 deaths in Manchester, 5 in Salford, and 2 in Liverpool.

London.—One thousand three hundred and eighty-one deaths were registered during the week, including measles, 9; scarlet fever, 20; diphtheria, 45; whooping-cough, 14; enteric fever, 19; diarrhœa and dysentery, 52, and cholera nostras, 1. The deaths from all causes corresponded to an annual rate of 16.6 a thousand. Diseases of the respiratory organs caused 225 deaths. In greater London 1,739 deaths were registered, corresponding to an annual rate of 16.1 a thousand of the population. In the "outer ring" the deaths included diarrhœa, 18; scarlet-fever, 5, and diphtheria, 7.

Ireland.—The average annual death rate, represented by the deaths registered during the week ended October 5, in the 16 principal town districts of Ireland, was 22.4 a thousand of the population. The lowest rate was recorded in Drogheda, viz, 0.0, and the highest in Londonderry, viz, 41.0 a thousand. In Dublin 177 deaths were registered, including measles, 1; enteric fever, 7; whooping-cough, 3; diarrhœa, 10, and dysentery, 2.

Scotland.—The deaths registered in 8 principal towns during the week ended October 5 corresponded to an annual rate of 18.6 a thousand of the population, which is estimated at 1,314,274. The lowest mortality was recorded in Paisley, viz, 11.6, and the highest in Perth, viz, 22.2 a thousand. The aggregate number of deaths registered from all causes was 476, including measles, 8; scarlet fever, 6; diphtheria, 13; whooping-cough, 15; fever, 11, and diarrhœa, 16.

FRANCE—*Marseilles.*—Seven hundred and eighty-seven deaths were registered during the month of September, 1889, including small-pox, 23; enteric fever, 42; diphtheria and croup, 17; measles, 9; whooping-cough, 4, and diarrhœa and enteritis, 120.

DUTCH GUIANA—*Paramaribo.*—Ninety-three deaths were registered during the month of August, 1889, including typhus fever, 1, and malignant fever, 2.

DEMERARA—*Georgetown*.—One hundred and eighty-three deaths were registered during the month of August, 1889. None from contagious diseases. Population, 56,000. The prevailing diseases were malarial fevers, diseases of the bowels and kidneys, and phthisis.

BRAZIL—*Bahia*.—The United States consul, in his dispatch dated September 4, 1889, says :

Since my dispatch, No. 37, of July 25, concerning the sanitary condition of the city, I have the honor to say that no change worth noting occurred until about ten days since, when several cases of small-pox were reported in the lower part of the city. The authorities have taken means to prevent its spread, and removed to the hospital cases whenever found, so that now there are nearly 100 in the hospital affected by it. The authorities say it is not epidemic, and no apprehension need be felt as to its increasing. The rainy season seems suddenly to have come to an end on or about the 25th ultimo. There has been no rain since, and it is becoming very warm and dry.

AFRICA—*Leprosy in Cape Colony*.—The United States Consul, in his dispatch of August 28, 1889, furnishes the following report upon the prevalence of leprosy at Cape Colony :

Since the death by leprosy of Father Damien at the leper station in the Sandwich Islands, a renewed interest is manifested in the measures to be undertaken to prevent the spread of this loathsome disease, and to care for the unfortunate beings already stricken with the malady for which it appears medical science has discovered no remedy.

In point of fact it appears that some members of the profession still deny that the disease is contagious, or at least declare it not proven, just as some combat the practice of vaccination. The nature of the disease is, however, so terrible that once public alarm is aroused no half measures will be tolerated.

It is difficult to reconcile oneself to the fact that in this colony public efforts to restrict and extirpate this disease have, in fact, retrograded instead of advanced.

Ancient history points to the only method of dealing with this scourge, and shows how stringent was the law of segregation in its application to leprosy, a law as necessary now as ever it was, and the only method of arresting and confining the disease.

It is interesting to note how indifferent people become to any disease that has become common among them, especially in the case of those where death does not quickly follow the attack, and the sufferer lingers and death approaches gradually. Leprosy has probably existed in Cape Colony from near the time of its early settlement, and as a rule been confined to the lower classes, who are huddled together in close quarters, without sanitary safeguards, and peculiarly liable to the contagion by reason of their environment. About 20 per cent. of the cases are white.

Recent inquiries made by a select committee of the colonial council have brought to light such a condition of affairs in relation to this matter that the facts would hardly be credited had they emanated from any less reliable source.

That leprosy existed in the colony was well known, but that persons afflicted with this malady were allowed to engage in the ordinary business and traffic of life was hardly to be supposed. Yet legislative inquiry has established the fact that there are more than 600 lepers in the colony, and as the evidence shows, some are engaged in the handling of articles of food whereby the contagion may be brought to the doors of those whose habit of life would seem to warrant exemption from infection. In one house was found butter-making carried on by lepers, there being three so afflicted.

One medical witness testifies as follows:

"I know a house where the business of a green-grocer is carried on. There are two lepers residing there, and you will find the lepers, the vegetables, and the family occupying the same room. I have seen lepers making butter for sale. In one small room there stood the pans of milk, and there was a woman with leprosy kneading butter with her hands." It was also shown that lepers are engaged in carrying on the business of fish-curing, fish-mongering, and wood-cart driving, by reason of which the public is exposed to great danger.

The chief witness, who has had an experience of fifty years in the colony and has made a special study of this disease, is of the decided impression that leprosy is spreading, and that it is contagious; but that it can be cured. His opinion is in effect that the disease is caused by a specious of bacillus which gains lodgment in the system in persons whose vitality is low. It is said that a leprous cook at the leper station accidentally killed the bacilli by boiling his fingers off, thus arresting the disease.

When the effect of heredity in spreading the disease is considered, the fact that these leprous subjects are allowed to cohabit and rear children subject to all the revolting conditions which will naturally occur to the reflective mind, the position of the colony in this regard is not to be praised. At Robben Island, 7 miles from town, is situated the asylum for the insane, and the leper station, where only about 100 of the afflicted are gathered. But the management is so lax that it is reported that even sexual intercourse is not unknown among the inmates.

An effort is now being made to remove the insane to a more favorable site, and to segregate the lepers on the island under proper restrictions. It is to be hoped that this investigation, which has brought to light the grave dangers to which the public are exposed, will result in such remedial measures as the people have a right to expect, and that the lively interest now aroused will not be allowed to slumber until the isolation of every person in whom the taint of leprosy can be traced, is effected.

CUBA—*Havana*.—For the week ended October 11, 1889, there were 7 deaths from yellow fever.

Santiago de Cuba.—The United States consul furnishes the following report for the second half of September, 1889:

The heavy rains, moist atmosphere, and high winds have increased the mortality of children, especially of the negro race, and have also caused lung diseases to claim a considerable share of the 51 deaths in the district of this city. Yellow fever is entirely confined to the military hospital outside of the city limits. There has been very little

shipping, this being the dull season, and the health of the port is excellent.

Cause of death.	Whites.	Negroes.	Troops at military hospital.	Total.
Yellow fever.....			11	11
Pernicious fever.....	4	2	1	7
Remittent fever.....	3			3
Diphtheria.....	1	1		2
Croup.....		1		1

BAHAMAS—*Nassau, N. P.*—October 12, 1889. City healthy. Weather hot and rainy.

CANADA—*Pelee Island.*—Reports having been received that an epidemic of small-pox was prevailing at Pelee Island, Lake Erie, the secretary of the State board of health of Ohio sent the following telegram, in reply to one from this bureau :

COLUMBUS, OHIO, *October 18, 1889.*

Dispatches from Dr. Bryce, Toronto, report but 1 case on island. This was imported. Quarantine at Sandusky removed.

C. O. PROBST.

PERSIA—*Cholera.*—

LEGATION OF THE UNITED STATES,
Teheran, September 4, 1889.

SIR: I have the honor to report that having been consulted by the acting prime minister, His Excellency Emin-el Mulk, as to the most effectual measures to be adopted for preventing the extension of the cholera to the interior, I recommended that the native and foreign physicians in Teheran be summoned to meet in sanitary council; that all information received by the Persian Government concerning the appearance of the scourge and its progress be communicated to the said council; and that it be requested to at once formulate a plan to serve as a guide to the Government in combating the epidemic's further encroachments. Acting upon this suggestion, the council in question was called to assemble yesterday, the 3d instant. The United States legation was represented on the occasion by W. W. Torrence, M. D., a copy of whose report of the proceedings I beg respectfully to submit inclosed for your consideration.

I have the honor, etc.

E. SPENCER PRATT.

Hon. JAMES G. BLAINE,
Secretary of State, Washington, D. C.

[Inclosure 1 in dispatch.]

TEHERAN, *September 4, 1889.*

SIR: I have the honor to report to you that at the meeting of the sanitary council convened at Teheran on the 3d instant, and composed of the six European and American physicians resident here and various Persian physicians, it was recommended, after considering the information furnished by the Persian Government, of which I submit the inclosed *résumé*, that severe quarantine be maintained at Ahvas for

fifteen days, and on the frontier also; five days' quarantine at Kennan-shah; fifteen days at Bushire for arrivals by sea from infected ports, and fifteen days for arrivals by land from between Mohammerah and Shaster; ten days' quarantine at Khānākin, and that a sanitary cordon be established between Inendeli and Khānākin and vicinity, along the Persian frontier, to prevent as far as possible the extension of the epidemic by means of pilgrims now returning from the shrines at Keblah and Nedjif.

A weekly meeting of the sanitary council is to be held, and everything possible is being done, it appears, by this Government to protect the interior against an invasion of the pestilence.

I am, etc.,

W. W. TORRENCE.

Hon. E. SPENCER PRATT,
United States Minister, etc.

[Inclosure 2.]

Résumé of information relating to the cholera, furnished by the Persian Government to the sanitary council convened at Teheran on the 3d September, 1889.

Cholera first made its appearance this year at Schātrā, Nasirijeh, and one or two other places on the 12th of Zohādjéh 106 A. H., corresponding to July 10, 1889, A. D., also at Sakih Sheikh, on Turkish territory, about the same time. Instructions were at once given by the post-office authorities to disinfect all mail matter, and the transmission of leathern or woolen articles was prohibited. On the 26th of Zohādjéh (24th July) the scourge was reported at other places, and at Bushire a week earlier (July 17). Mirza Abdul Rizah, health officer on the part of the Persian Government, reported cholera as present at Bushire, where the said Government had established a strict quarantine for all vessels coming into port, at Kharaji, an island some 12 or 15 miles from Bushire. Eight deaths in all occurred at Bushire up to August 23, since which time no cases of cholera have been reported at Bushire or its vicinity; in fact it is reported by Drs. Mullen and Ross, English physicians at Bushire, that cholera does not now exist there, thanks to a strict quarantine. Of the 8 deaths occurring at Bushire, 6 had occurred before quarantine had been established, and these among passengers arriving on steamers who had been allowed to land before cholera was suspected. A report from Khānākin, in Turkish territory, where quarantine was soon established, under date of September 1, says that cholera rages at Bagdad, 600 persons having died in one quarter of the city, and that the newest quarter. Latest telegraphic advices from Bushire read as follows:

“Cholera does not exist here or in vicinity. Strict quarantine maintained. Cholera milder at Bassorah. Increase at Ahvaz, Bagdad, and Mohammerah, 150 deaths daily at Bagdad, 30 daily at Mohammerah.

CONSULATE OF THE UNITED STATES,
Bagdad, August 22, 1889.

SIR: I beg leave to state that a fatal malady, described by the sanitary department as “pernicious malaria,” now officially reported as

"cholera," originated among the Arabs, who live in the marshes of southern Mesopotamia, and drink the water flowing through the marshes or standing in stagnant pools. The swamps and marshy lakes of lower Mesopotamia cover a vast area of land lying below the level of the river beds, and were originally caused by the neglect and consequent breaking down of the embankments of the ancient system of irrigating canals, and the annual inundation of the two great rivers.

This year neither the Tigris nor the Euphrates have risen to their average height, in consequence of which many of the marshes, but partly filled by the spring floods, are now rapidly drying up.

A thick blue mist hangs like a heavy cloud every morning over these drying marshes, while the Arabs who live near them and drink the putrefying water were the first victims to the disease.

The disease was first diagnosed and reported on the 26th of July by a qualified medical officer of the Government at Shatra, a Government and military station situated on the right bank of the Shat-el-Hai, a large stream flowing in a southerly direction from the Tigris into the Euphrates near Nasruji. From Shatra the disease followed the line of marshes bordering the Shat-el-Hai to Nasruji, a Government and military station situated on the left bank of the Euphrates some 25 miles south of Shatra. The marshes bordering the Euphrates on its right bank conveyed the disease from Nasruji to Bassorah, where it was next reported on the 6th of August. On the 12th instant Souk-el-Shiouk, and the following day Konna and Fammar, were visited by the cholera. Although the Government acted with promptness, energy, and keen vigilance, imposing strict quarantine measures, both by river and by land, at a safe distance from Bagdad, the dreaded disease in its rapid progress made its appearance in this city on the 16th ultimo, when 4 deaths from cholera were officially reported. Since that time the number of daily deaths has rapidly increased, 59 being reported on the 21st ultimo.

Unlike the plague which visited this city in 1876, the cholera has so far been confined to the cleanest quarter of the city, while among the first victims were members of the best families, whose sanitary and physical conditions were regarded as perfect. Sanitation and good living insures no one, rich or poor, against the disease this time, and for that reason the poor are possessed of a double fright.

On Sunday, the 18th ultimo, one of the Sisters of Charity, a French woman, died after a few hours' illness. The sad news flew from mouth to mouth, and before nightfall several hundred Jewish and Christian families hastily gathered together a few necessary things and fled with hurrying feet from the city of death. Terror reigned in every heart, a panic prevailed, and on the following day, the 19th ultimo, nine-tenths, it is said, of all the shops, bazars, and offices throughout the city were closed. It was with difficulty that the barest necessities of life could be obtained. Many thousands, of all religions, deserted their homes for the burning deserts. For many miles, both above and below the city, the banks of the Tigris are lined with tents and booths, which the Jews still call "tabernacles," while multitudes have sought refuge in the more distant villages, or hidden themselves in the solitudes of the surrounding desert, if haply they may escape the scourge. At the present moment almost the entire Christian and Jewish population, and many of the wealthier Mohammedans, live outside the city limits.

Though quite unable to gather statistics, I judge half the people have

temporarily abandoned their homes until the fury of the disease is spent.

The population of Bagdad is variously estimated from a minimum of 60,000 to a maximum of 200,000 people. No census has been taken for many years. It is, therefore, impossible to make an authentic statement. I adopt the views of Doctor Bouman, who ventured in his report to estimate the whole population at 180,000, of whom about one-half are Mohammedans, five-sixteenths Jews, and three-sixteenths Christians of all denominations.

I have the honor, sir, to be your most obedient servant,
 JOHN HENRY HAYNES,
Consul.

Hon. WILLIAM F. WHARTON,
Assistant Secretary of State, Washington, D. C.

SANITARY WORKS AT MUNICH.

By Prof. Dr. MAX VON PETTENKOFER.

GERMANY—*Munich.*—The United States consul, in his dispatch to the Department of State, under date of September 28, 1889, says:

I have received frequent inquiries from the United States concerning the healthfulness and sanitary condition of Munich, from persons who wished to send some member or members of their families here for the advantages offered for study in music and painting, and I have from time to time answered their inquiries. I had gathered more or less data from which I had partly prepared a report upon the subject for the Department of State, when a series of communications, written by Prof. Dr. Max von Pettenkofer, appeared in the newspapers here, which treated the same subject. I concluded to send, instead of the report I had partly prepared, a translation of Dr. von Pettenkofer's article, as he had covered the ground very fully, and in addition his communication was very interesting to sanitary engineers and health officers.

I have the honor to send herewith the article of Dr. Max von Pettenkofer freely translated by me, hoping it will be found interesting and useful.

A bad reputation sticks to places as well as to people, and is frequently reiterated long after the man has repented and the locality has been freed from the cause of its unsavory reputation. The society for ticket-of-leave-men has less trouble and more praise in providing situations for their wards than the board of health of a city has in restoring its good reputation for health once it has been lost. Munich is in this unfortunate condition.

If typhoid fever makes its appearance anywhere, at once attention is directed to Munich as a much worse hot-bed for the disease, although, for some years past, there has been less typhoid fever in this city than in the majority of the large cities of Europe. Lately this disease broke out in Vienna, and the *Neue Wiener Abendblatt*, of December 20, 1888, says: "In Munich, a city which has a bad reputation because of the frequent and severe outbreaks of typhoid fever there, etc." It seems to be an opportune time to give the facts concerning typhoid fever in Munich; and I am glad of the opportunity offered me through the columns of the *Münchener Neueste Nachrichten* to enter into the details; and, as I

have lately written a paper upon this same subject, which seems to have escaped the notice of the *Wiener Abendblatt* and the Vienna physicians, I am well prepared to do so.

I will discuss the movement of typhoid fever in Munich from 1851 to 1887, thirty-seven years, in order that I may embrace a fairly long period of time, and will use the official police reports of deaths from typhoid fever. An objection may be urged at the outset that the fatal cases of typhoid fever do not present an accurate picture of the amount of sickness due to this disease, partly because this epidemic is at times very different in character and intensity, sometimes more other times less of the afflicted die; partly because the diagnosis of different physicians is not always correct, and also partly because the disease is more skillfully treated now than formerly, and therefore fewer persons die. The thorough investigations of Dr. von Ziemsen and Dr. Port fully dispose of this first objection. Dr. Ziemsen made statistics of all cases of typhoid fever treated in the hospitals for twenty years, and compared the number of cases thus treated with the number of fatal cases in the city. He made a chart or diagram of both series of numbers so that one can easily see that up to the present time, as the cases treated in the hospitals vary in number, so likewise varies the number of fatal cases reported from private houses, and that therefore the hospitals are a correct index of the prevalence of typhoid fever in the city. Dr. Port has obtained the same result, confining his observations to the Munich garrisons; though forming only a part of the population, between five and six thousand men, yet large enough to allow conclusions to be deduced therefrom. Dr. Port was able also to follow closely the varying treatment and conditions that obtained in the various barracks.

As to the second point: The uncertainty of the diagnosis of some physicians. Some years ago I examined it carefully and found it of no importance. I collected the fatal cases of typhoid fever reported by all the physicians to the police authorities from 1851 to 1867 and calculated the monthly average. Professor von Buhl, director of the Pathological Institute, also calculated the monthly average of typhoid mortality in the general hospital from 1856 to 1864, having first, as I did, gathered the reported deaths together by months. In von Buhl's table there is no case of mistaken diagnosis, as only those cases have been counted in which the presence of typhoid fever had been verified by a *post-mortem*, whereas in my tables here and there an error was probable, for the returns for the city were furnished by physicians, who diagnosed the cases as typhoid fever, without, as a rule, having held a *post-mortem* examination. But the numbers in the city being much larger, we may conclude that the sporadic errors are equalized, as probably some doctors diagnosed the cases as typhoid fever too often and others not often enough. This is the result of the law of large numbers, as has been clearly explained by Dr. von Mayr, subsequently imperial under secretary for Alsace-Lorraine. However, the comparison of the monthly average at the hospital, where the figures are correct, with the monthly average of the whole city, which includes the cases of mistaken diagnosis, shows that the Munich physicians in the main have diagnosed correctly.

MONTHLY AVERAGE OF DEATHS FROM TYPHOID FEVER.

1. *In the general hospital.*—January, 13.1; February, 14.1; March, 12; April, 6.9; May, 5.2; June, 5.2; July, 6; August, 4.8; September, 6.8; October, 4.2; November, 7.6; December, 12.2.

2. *In the whole city.*—January, 33.5; February, 36.8; March, 31.8; April, 23.1; May, 17.6; June, 15.2; July, 15.8; August, 16.7; September, 16.1; October, 15; November, 19; December, 28.5.

One sees immediately that typhoid fever varies in different seasons very much, but also that the movement is the same in the hospital and in the city; in both the maximum is found in February, the minimum in October. This correspondence will be found still more striking and surprising if from the death-rate of the whole city we calculate the death-rate of the hospital, and compare the numbers so obtained with the facts. A ratio between the city and hospital is necessary, and we will use the ratio for the month of February, the worst typhoid month of the year. The average number of *post-mortem* examinations, declared to be typhoid fever, in the hospital, for the month of February, is 14.1; the city reports 36.8 deaths from the same cause; that is 2.61 times more deaths from typhoid fever in the city than in the hospital. If we calculate the monthly mortality in the hospital by dividing the figures given above as the monthly mortality of the city with this divisor, 2.61, we will at once discover if we are dealing with an accident or a law. If it is all an accident, the result for February, which furnished the ratio or divisor 2.61, will be right, but for the other eleven months the results would most likely be far from the observed facts and figures. Making the calculation thus, we find the monthly mortality in the hospital as now given in the figures below:

January, 12.8; February, 14.1; March, 12.2; April, 8.8; May, 6.7; June, 5.8; July, 6; August, 6.4; September, 6.2; October, 5.7; November, 7.3; December, 10.

The correspondence of the figures thus calculated with the observed facts is quite unexpected, especially in the months of most typhoid fever. That the correspondence is less marked in the months of least typhoid fever is no surprise to a statistician, as accident is much more telling upon small numbers than on large ones. I am, therefore, entirely satisfied that the mistaken diagnosis of a physician here and there exerts no appreciable influence upon the figures that show the condition of typhoid fever in Munich. Finally, the change in the manner of treating typhoid fever can not greatly alter the general result which shows the aspect of mortality from typhoid fever in Munich. In the treatment of this disease improvement has been made, and it would be unjust and ungrateful not to acknowledge it. This can be examined more satisfactorily in a large garrison and in the military hospitals. But Port comes to the following conclusion in his classified examinations concerning the movement of typhoid fever in the Munich garrisons:

“Typhoid fever, in common with other infectious diseases, has this peculiarity, that the epidemic displays the most varying degrees of intensity or severity. Statistical experience contradicts the assertion that by proper treatment it is possible, under all circumstances, to reduce the fatality from typhoid fever to a certain minimum percentage. Statistics prove that in a severe epidemic of typhoid fever it is just as praiseworthy not to lose more than 20 or even 28 per cent. of cases, as in a mild one to lose no more than 2 per cent. The causes upon which the severity of the epidemic depends will be discussed later; here I only wish to emphasize the fact that from the death-rate of typhoid fever in a city a substantially correct picture can be obtained of the movement of typhoid fever.”

In the following table I will show the yearly movement of typhoid fever in Munich from 1851 to 1887, both inclusive:

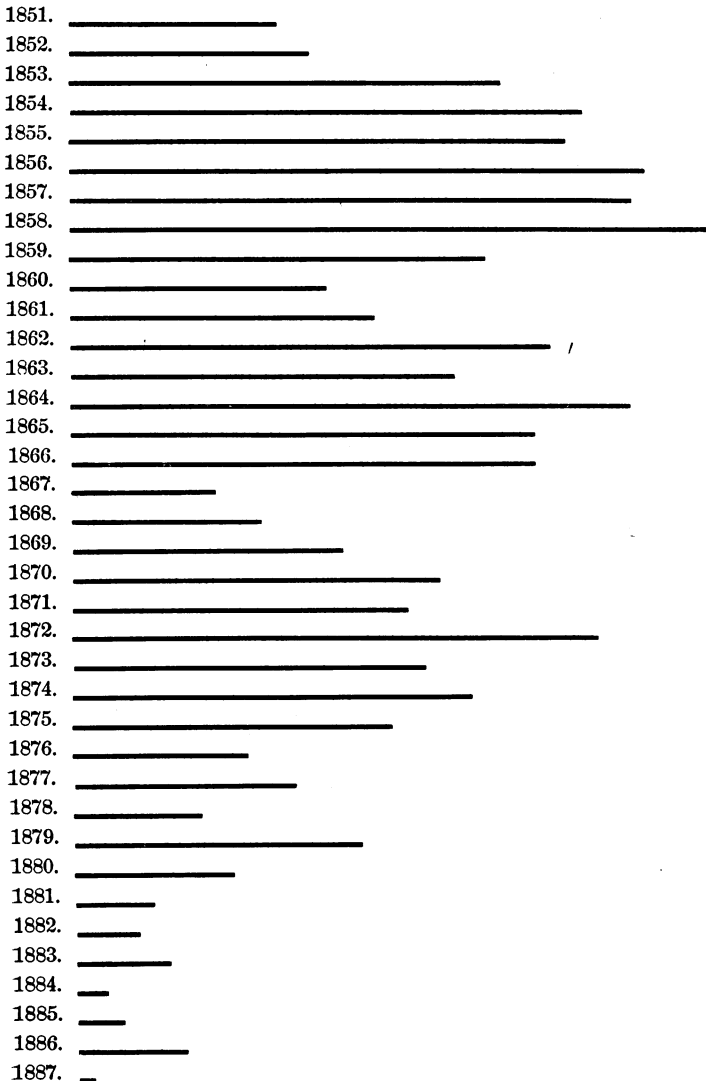
TABLE A.

Year.	Population.*	Deaths from typhoid fever.		Remarks.
		Annual.	Per 100,000 of population.	
1851.....	123,967	123	99	
1852.....	125,588	152	121	
1853.....	127,219	235	184	
1854.....	128,850	293	227	Cholera year.
1855.....	130,481	253	193	
1856.....	132,112	384	291	
1857.....	133,847	390	291	
1858.....	135,733	453	334	
1859.....	137,005	240	175	
1860.....	140,624	153	109	Cess-pools made water-tight.
1861.....	144,334	172	119	
1862.....	148,200	300	202	
1863.....	154,602	252	163	
1864.....	160,823	397	247	
1865.....	167,054	338	202	Opening of Pettenkofer's water-works.
1866.....	168,265	342	303	
1867.....	169,476	88	52	
1868.....	170,688	136	80	
1869.....	170,000	190	111	
1870.....	170,000	254	149	
1871.....	170,000	220	129	
1872.....	169,693	407	240	
1873.....	175,500	230	131	Cholera year.
1874.....	181,300	289	159	Do.
1875.....	187,200	227	121	
1876.....	193,024	130	67	
1877.....	205,000	173	84	Sending, a suburb, included in the city (annexed); cattle market and abattoir opened.
1878.....	211,800	116	55	
1879.....	217,400	236	109	
1880.....	223,700	260	72	
1881.....	230,028	41	18	
1882.....	236,400	42	18	
1883.....	242,300	45	19	Opening of the highland water-supply.
1884.....	249,200	34	14	
1885.....	255,600	45	18	
1886.....	262,000	55	21	
1887.....	268,400	28	10	

* At the beginning of the year.

Persons accustomed to study statistical figures will be surprised at the decrease in the frequency of typhoid fever in Munich. From 1851 to 1860 there were years when about twenty-eight times more people died than in some of the years between 1879 and 1888, although more people had immigrated into the "plague-cursed city," and its population was doubled. The periodical movement of typhoid fever will be made thoroughly intelligible to every one, professional and layman, by the following diagram, in which the length of the separate lines correspond with the number of deaths from typhoid fever in the several years:

TABLE B.



At a glance we see how typhoid fever during this period increased and decreased, and that the increase was gradual, the decrease more sudden. This has always been the case with this disease, even prior to 1851. According to the reports of Dr. Frank Seitz, the disease reached the greatest malignity relatively in 1840, when, out of a population of nearly 100,000, from January, 1840, till March, 1841, 511 died from this cause. In the foregoing diagram four periods may be distinguished: The first from 1851 to 1860, the second from 1860 to 1867, the third from 1867 to 1876, and the fourth from 1876 to the present time. The past year, 1888, being fully as satisfactory as the preceding year, not more than 10 deaths per 100,000 of the population. The first period embraces ten years, the second seven years, the third nine years, and the fourth ten years. In the four different periods the highest points marking the ravages of the disease are gradually lessened; the first period culminates in 1858, with 334 deaths per 100,000 inhabitants; the second in 1864, with 247 deaths per 100,000; the third in 1872, with 240 deaths per 100,000; and the fourth in 1879, with 109 deaths per 100,000. The minimums were in 1851 with 99, in 1860 with 109, in 1867 with 88, in 1876 with 67 deaths per 100,000 of population, and from 1881 to 1888 the average minimum is 17 deaths per 100,000. These periods correspond, as Buhl and I demonstrated on another occasion, with the movement of the subsoil water, typhoid fever decreasing with high and rising subsoil water, and increasing as the subsoil water fell. Our celebrated mathematician, Ludwig von Seidel, took the reports and figures of Buhl concerning typhoid fever when the observations only embraced nine years, and calculated the probabilities of a connection between the movement of typhoid fever and the condition of the subsoil water, and found that, even for this short period, the chances were 36,000 to 1 that there was some physical relation, although still unknown, between the two sets of phenomena. What the chances of 36,000 to 1 signifies may be learned by consulting page 54 of my book hereinbefore mentioned.

Here I desire to state again, perhaps for the one hundredth time in my life, that I do not consider subsoil water either favorable or unfavorable to the development of the typhoid germ, as many still believe, but I consider it as harmless as any thing in the world, and that the subsoil water work is merely an indication to me of other things, such as dampness and the processes dependent on it in the soil above the water and near the surface of the earth, and, in my opinion, when this dampness and favorable condition of the soil is present, typhoid and cholera epidemics may occur even in places where there is absolutely no subsoil water. That this ground or subsoil water and its oscillations and the presence of the typhoid germ are not potent of themselves to produce an epidemic of typhoid fever is most clearly proved by the history of typhoid fever in Munich. The coincidence between the oscillations of subsoil water and of typhoid fever in Munich, in the sense Buhl meant it, lasts until the year 1880, but not since then; and there is no explanation there why the second typhoid period of the diagram, from 1860 to 1867, was so much milder than from 1851 to 1860, and still less does it explain why typhoid fever has almost disappeared from Munich since 1880. Typhoid germs and subsoil water movements exist in Munich now as in 1851 to 1860, when many times more people died from typhoid fever than now. We must therefore inquire what has been done since that time, what has been

changed that typhoid fever should steadily decrease and finally almost disappear. I can not here discuss the entire etiology of typhoid fever, that would require a large volume, but I shall touch on some of the most prominent points. The favorite and popular notion is that typhoid fever does not proceed from a locality, but from those affected by the disease; that the specific germ, a microbe, discovered by Eberth and more closely studied by Koch and Goffky, in point of fact is but seldom transmitted from sick to healthy persons direct in such an active condition or in sufficient numbers to produce disease; sporadic cases only being due to this mode of transmission; and that the disease germ is propagated endemically in a locality, but that a disastrous outbreak, an epidemic, from such a germ, can only take place if some portion of the excrement of a typhoid patient, be it ever so little, gets into wells or water-supply which furnishes drinking water to the people of the community. The drinking-water theory has the most followers among students of typhoid fever. Naturally so, for it is the most obvious, the simplest, the easiest understood by physicians and laymen, and it never fails; for if there is no epidemic nothing from a typhoid patient has polluted the drinking-water, but if the epidemic breaks out, well, then, *something* must have gotten into the water. The Vienna people seem to be satisfied with this explanation, and even such an eminent, meritorious, and sagacious clinical physician as Nothnagel rests content with it. Upon a careful examination of the facts the drinking-water theory turns out to be unsatisfactory, and can only be believed in if one carefully avoids a thorough examination and only takes into account a few cases that accidentally fit in with this hypothesis. In earlier days, when typhoid fever was much more prevalent in Munich, this was *often* done by physicians and laymen, and *sometimes* even nowadays.

Traveling between Nuremberg and Munich some time during the sixties, I overheard a conversation in a railroad car between a stranger and a Munich man, which was very instructive to me. The stranger visiting Munich for the first time inquired of his neighbor, who had made himself known as a Munich man, concerning the sanitary condition of the city, and if it was true that typhoid fever was so prevalent. The Munich man, beaming with health, unhesitatingly answered yes; and when asked further where it was best to lodge to avoid this disease, answered, that it made no difference, the Bavarian Hotel, Oberpollinger Hotel, or Schlicker's in the Thal, it was the same in every quarter of the city; the only sure preventive was not to drink a drop of water; that he was a Munich man who never drank a drop of water, and that one had only to look at him to see that he was all right. To be sure, there was some bad beer in Munich that might cause typhoid fever, but that he only drank Hofbrannhaus and Sternecker beer. That this disease depended on beer and water could be seen from the fact that the disease was more virulent in winter, when the beer was new, than in summer, etc.

This drinking-water theory has, however, done so much for Munich that within the city limits 30,000,000 marks' (about \$7,500,000) worth of beer is consumed yearly; the annual malt-tax shows this. The fact that typhoid fever is more prevalent in winter, from November to March, than in summer, from April to October, as we see from Buhl's tables, might be reconciled with the drinking-water-beer theory, for in the manufacture of beer much water is always necessary, but for the

light beer of winter more water is used than in the heavier or stronger beer of summer, hence the latter is always a little more expensive. Admitting all this, nevertheless the drinking-water theory fails to account for and explain the frequency of typhoid fever in Munich, as will be plainly seen from the history of the water supply of the city. A glance at the figures and the diagram hereinbefore given makes it impossible to believe that variations in the prevalence of typhoid thus made plain to the eye were due to variations in the water supply. Investigation shows that since the beginning of this century the water supply of the city was partly from springs on the right bank of the river Isor (Gasteig, Brunnthal, Lilienberg and Nockherberg), partly from wells on the left bank of the Isor, the water being forced by water-power furnished by the river through pipes into the houses (the largest of these wells are the Hofgarten, Jungfernthuren, Glockenbach, Katzenbach, and Sünde), and partly from wells dug in the gravel, some of which become famous for their wholesome water, particularly the one in the court-yard of the building set apart for the courts of justice.

Water was supplied by the royal water-works and also by the city board of magistrates, and they have always been rivals and in competition for business; frequently in the same street one house was supplied by one system and the next house by the other system; in the same house even families living in the different flats used water from different systems, others again used water exclusively from the sunken wells, while others used both well water and the water-works. Munich was consequently an exceptionally good place to study the effects of different kinds of drinking-water upon cholera and typhoid fever. Before I had given my attention earnestly to the study of epidemic diseases I believed in the simple theory of the drinking-water, and that in the cholera year, 1854, the different outbreaks of the disease in the different parts of the city were to be accounted for by this theory, the water used coming from different sources. I took the trouble to ascertain the sources of the water supply of the city, house by house, by inspecting the books containing the water rates paid to both the royal and the city authorities and by personal inspection, but I was greatly disappointed. I could find no relation or connection between the water and the disease, neither as to place or time. A water-main, for instance, belonging to the royal service ran through Canal, Rumford, and Miller streets to the Sendlingerthor Square, thence through Sonnen street and beyond; families living in houses on the Miller street supplied from this water-main suffered severely. But on the Sendlingerthor Square the same water suddenly became healthy; in Sonnen street it was again unhealthy but not very destructive, but became again fatal as soon as it turned from Sonnen street into Josephspital street and Herzogspital street. In Canal street, where the water enters the main, thence flowing to Miller street, the epidemic broke out two weeks later than in Miller street. Canal street then had fifty houses, and it so happened that twenty-five were supplied with water from the water-works and twenty-five used well water, but the epidemic showed the same virulence in both groups of houses and disappeared equally from both.

So the cholera raged in the different streets and quarters of Munich with widely varying intensity and at different times, but no connection between these varying phases of the disease in various quarters and the water supply can be traced, and it would have appeared necessarily in the different houses, since some were supplied from springs on

the right bank of the Isor, others from wells on the left bank of the Isor supplied through the water-works, and other houses were supplied directly from wells sunk in the gravel. It must be admitted that it would be impossible for all these different sources of water supply to be polluted at the same time by cholera excrement and to be disinfected also at the same time. There are cases where the coincidence between the water supply and the occurrence of cholera and typhoid fever is more marked, but even these cases do not stand a close investigation, as I have shown in my larger work, "The Present Aspect of the Cholera Question," pages 180 to 256, not even the celebrated case of the Broadstreet pump in Golden Square, London. It is impossible to show the appearance of a connection between drinking water and typhoid fever in Munich. Up to the year 1865 and for many years before 1854, the water supply of Munich was substantially the same that it was in the cholera year, 1854. In the year 1865 the Pettenkofer water-works were added. The pure water furnished by this system did not take the place of any water heretofore used, but was simply an addition to the supply for some quarters of the city. In the year 1883 the water supply from the springs in the high-lying Mongfall Valley was completed by the city authorities, and it was not until this year, 1883, that the old municipal water-works, *i. e.*, pumping water from wells into the mains, was abolished. Now, if we look at the diagram showing the prevalence of typhoid fever in Munich for the various years and compare it with the time of the opening of the Pettenkofer water-works and the Mongfall highlands supply, opened respectively in 1865 and 1883, we are forced to the conclusion that neither of these water supplies can have had the slightest influence. The utilization of the Pettenkofer water-works coincides with a period of severe typhoid fever prevalence, which rather increased than decreased the following year. And the sudden decrease, even to a minimum in 1867, can not be attributed to the Pettenkofer water-works, for the great majority of the inhabitants drank the old water as formerly and notwithstanding they suffered but little from typhoid fever. And, again, after this healthy year, 1867, in spite of this great addition to the pure water supply, typhoid fever steadily increased to the very considerable extent it reached in 1872. The introduction of the very excellent supply of water from the highlands in 1883 is still more unfavorable to the drinking-water theory. True it is that in 1883 only 45 out of 242,800 inhabitants, *i. e.*, 19 per 100,000, died of typhoid fever, but in the two preceding years the mortality was even somewhat less. It would have been very fortunate for the drinking-water theory if the highland water supply had been finished and put in general use by 1881, then it would have been considered a triumph of this theory and its disciples would have pointed to the diagram for a triumphant vindication of their favorite theory, and yet the decrease of typhoid fever would have had no connection with the water. Of course such coincidences occur in some places, and these only are taken into account, the great majority of cases which do not support them being ignored by the believers in the drinking-water theory. But even if by chance the water supply from the Mongfall Valley had been completed in 1876, when the marked decrease in typhoid fever began, there is one fact that clearly proves that this decrease has nothing to do with the drinking water. As before remarked, the royal and the city water service have always been competitors, and even now they are rivals for trade in one hundred

and fourteen streets. The royal water-works have not changed in any particular, and still furnish water from the same sources they always did, the same water, in fact, which our Munich friend, who was returning from Nuremberg, said he never touched, and therefore was healthy, and the same water which others, not so abstemious, drank and therefore died.

To procure reliable information, I asked the director, Count Gustav von Castell, who has always been warmly interested in sanitary matters, to permit me to examine the books containing the water rates according to which house proprietors must pay. As people never pay more than they can help in the way of water rates or taxes, I am sure no more houses and streets are registered than should be. I found that 871 houses are still supplied by the royal water-works. Having the number of houses so supplied, I went to the statistical bureau of the city, the director of which, Mr. Probst, furnished me with the number of inhabitants in these houses, and according to the last census there were 23,302 people living in these 871 houses, and that according to the vital statistics they suffered no more from typhoid fever than the other population of Munich, who are supplied with drinking water from the other water-works. As the Pettenkofer water-works were too early, so the highland water-works were too late to be of service to the believers in the drinking-water theory; and now comes the old unchanged royal water-works and makes the theory more and more ridiculous.

Just here many persons might ask what is the use, then, of water-works, and why have so many millions been spent on them lately in Munich? A few words about that, also. Although no believer in the drinking-water theory, I am a fanatic on the subject of water, and demand for every human dwelling-place plenty of good pure water, if possible, upon every floor of every house, not only for drinking, but also for cleanliness. Everybody concedes that pure water is needed for drinking. According to the observations of Dr. Carl von Voit, an adult in repose secretes through the kidneys, intestines, skin, and respiratory organs 2,000 grams (2 liters) of water a day; if at work, 3,000 grams (3 liters) or more a day. Our food, it is true, contains a considerable quantity of water, but not enough to dispense with drinking, and a working-man, especially, needs drink. Exactly as the adipose and albuminous tissues waste and change, and must be replaced by the same substances, so it is with the watery tissues, if the man is to keep in a healthy condition. Instead of water we can, of course, drink other liquids containing water, such as beer, which ordinarily has about 92 per cent. of pure water. But beer also contains about 3 to 4 per cent. of alcohol, and we must avoid taking too much alcohol. A general warfare is being waged against the demoralizing effects of so-called alcoholism, but without a plentiful supply of pure and palatable water the contest will be in vain. Except in cases of necessity people will not drink what they do not relish, consequently the drinking water must be palatable and drunk with pleasure. Moreover, it is the most innocent and the cheapest drink for the young, the adult and the aged, for the sick and the healthy, and it is, therefore, from a hygienic standpoint of much greater importance that a city should have good water than good beer or wine.

If the people of Munich can spend *yearly* 30,000,000 of marks for beer, we certainly can spend once for all 10,000,000 of marks for water.

According to present rates of interest this is not quite 400,000 marks a year; not the seventy-fifth part of the amount spent annually for beer, and water is of equal benefit to rich and poor. This also settles one part of the social problem. In addition, we need much more water for cleanliness than for drinking. We can not clean with impure water, for the water not only smirches what it touches, but when evaporated leaves behind its impurities in a highly concentrated form, thus adding impurity to the dirt already accumulated. Consequently, I consider it important to have pure water for all cleansing purposes. Water may contain some pathogenic germs, so diluted that it may be drunk with impunity; but to cause disease, these germs must not only have a certain quality, but there must be a certain quantity of them, and so it is possible that a few germs from the water might find a favorable lodging-place in the house; there they might multiply to such an extent and to such a virulency that infection would ensue. Hence I go much further in the matter of providing pure water than the believers in the drinking-water theory, who only consider it as a preventive of typhoid and cholera. I claim it to be universally necessary to health, as much so as is pure air.

The simple reason why I have sworn enmity to the drinking-water theory and propose to wage against it war to the knife is, that it is not only an obstacle to forming a correct theory, but also because it prevents attention to the proper draining of the ground on which we live, and seems to have occupied the thoughts of many to the exclusion of every other idea. This rock in the path must be blown to atoms, and the débris removed, in order that progress may be made in the proper direction. Although seventy years of age, it is possible that I may live to see this difficult and thankless task accomplished, for I have now gained an ally in *bacteriology*, and I hope that this young and growing science may succeed where the old science, *epidemiology*, fell short of perfect success. But I had better treat of this subject at another time.

Finally, I will now explain what may account for the surprising decrease of typhoid fever in Munich. What has been done in our art-renowned typhoid city since 1851 that could account for this improvement? Has medical science accomplished it? Typhoid fever is most certainly better treated in 1888 than in 1858. The sick are no longer kept on such meager diet as formerly; in fact, they used to keep the patient hungry, but now the patient is urged to eat, and even to take plenty of wine and other alcoholic drinks, which I was taught to regard as criminal when, as a student, I practiced in the hospital under Ringseis' direction. A typhoid-fever patient in my charge, with high fever, who saw a convalescent in the ward drinking red wine, begged me piteously to prescribe wine for him also. I explained to him that it would be poison for him in his present condition and would greatly aggravate his disease, but held out to him the prospect of having the wine when he was free of fever like the patient he saw drinking wine, and who had survived the fever only through careful diet and abstinence from alcoholic drinks. The poor fellow never enjoyed his wine, as he died in a few days. Now I often think he might have recovered if I had prescribed meat and wine for him. Formerly, a patient with fever was wrapped in warm bed-clothes to protect him from the air; nowadays, thanks to the work of Brond, the patient is given a cooling bath, and a window is kept open, etc. It is undoubtedly true that

medical skill now relieves more typhoid patients than formerly; but the great decrease in typhoid fever in Munich can only be accounted for thus to a very slight extent, for any physician of long experience will testify that the doctors have decidedly fewer patients to treat. The records of admissions into the hospitals for typhoid fever, both the military and other hospitals, prove this clearly, and these records are most accurately kept. I refer to the work of von Zinnsen, which distinctly proves that not only the fatal cases have decreased in so marked a manner, but cases of all kinds are much less frequent than formerly, even when typhoid fever was being treated as it now is and when there was still a considerable number of deaths from it. If more recover now than formerly, it is in part due most certainly to the fact that the epidemic is in a milder form, and that in turn is due to the decrease either in the quantity or virulence of the infectious matter.

It is an established fact, as Port has shown for military hospitals, that there is a vast difference in the results of typhoid-fever cases in the different occurrences of the epidemic, notwithstanding the same treatment had been used. It is possible that as typhoid fever became rarer it also took a milder form. Neither will the change in the constitutions of the inhabitants, the so-called individual disposition, explain the great decrease of typhoid fever in Munich, although this individual disposition plays no small part in typhoid, as well as in other diseases and epidemics. It often happens that of many people exposed to the same epidemic but few are affected, and these in very different degrees. But we can prove that the constitution of the Münchener has not altered. A favorite argument for the explanation of the decrease in an epidemic is the immunity obtained by having passed through the contagious disorder; they say when the disease has attacked all persons liable thereto it must cease or at least decrease, because of a failure of subjects for the disease to attack, for all or almost all the inhabitants have been subjected to this "*seasoning*" process, and it takes some time to restore the individual disposition to its normal condition. If this were the case typhoid fever long ago would have decreased in Munich, for the inhabitants of no place in Bavaria have been so often and so thoroughly *seasoned* in epidemics as the people of Munich. To this seasoning was attributed the fact, that strangers coming to Munich "*unseasoned*" (such as servants, soldiers, students, etc.) were more readily attacked by typhoid fever than the "*seasoned*" Münchener. This is in point of fact true, but it by no means proves that the infection came from typhoid patients, or from the drinking water which might be supposed to contain the typhoid germ; for when the typhoid fever had least power the strangers as well as natives shared the benefit. In the years 1851, 1859, 1867, and 1876, with a minimum of typhoid fever, no fewer students, servants, and recruits came into Munich than in the years 1858, 1864, 1872, and 1879, when typhoid fever reached its highest points. In fact, if the prevalence of typhoid fever depended upon the advent of "*unseasoned*" persons then it ought to have steadily increased, for since 1851 the population has increased from 123,957 to 268,400, more than double. Up to this point I have been discussing what can not account for the decrease of typhoid fever in Munich; it yet remains for me to give my opinion as to the actual causes of its decrease.

If typhoid epidemics do not arise from the patient, nor from drinking water that is infected from patients, Munich itself, the locality on

which Munich is situated, must be the source of the trouble. Typhoid fever and cholera show as clearly as malaria and ague, a relationship to the locality and the season of the year, and just as a successful fight against malaria is only possible when we can do the proper work on the ground or soil itself, so it is with typhoid fever and cholera. It would be rather remarkable if malaria was the only infectious disease that arose from the soil. The horrors of the cholera in 1854 for the first time drew attention to the condition of the soil of Munich. The cholera of 1836 had been very conveniently explained by ascribing it to the invisible "*genus epidemicus*."

Here in Munich we have a very porous soil, which is able to absorb a great quantity of stuff that may serve as food for the pathogenic germs in the soil. Human excrement forms an important and clearly-perceived part of the pollution of the soil of a city, and also cess-pools, if they are not water-tight, and the ground is as porous as it is in Munich. The first thing the health officers did after the cholera of 1854 was to order that all the cess-pools should be water-tight for all houses to be built thereafter, or at least the cess-pools should be water-tight casks, and that by the year 1860 water-tight cess-pools should be substituted for the old ones in all houses. A police official was appointed inspector, to whom all sewers and cess-pools were reported, and whose duty it was to examine into their condition and to order such repairs as were needed. Until that all cess-pools had been sinks whose liquid contents had been mostly absorbed by the soil. Many house-owners complained bitterly of this severe and, in their opinion useless, novel regulation. I once overheard a very reputable citizen complaining bitterly to Police Director von Düring that such cess-pools had been required to be provided. He had built a new house and had conformed to the law, but now he was required to furnish his old house also with a water-tight cess-pool, and the old cess-pool was much better than the one for his new building. The cess-pool at his new house was full to overflowing in a few months' use and had to be emptied, while the old cess-pool in twenty years had needed no attention. The introduction of water-tight cess-pools had the same effect as if Munich had been supplied with a much less porous soil, as the result would be the same if the soil got less to absorb or it absorbed less.

Another source of trouble was the great number of sinks for rain-water and waste water used for domestic purposes, and since 1860 every effort has been made to improve them; where regular sewers were not yet available, the impure water was conducted by gutters into the town streams, the rivers, or the canals; but this mode of providing for the sewerage left much to be desired. These measures were far from producing all at once a perfect sanitation of the badly-contaminated soil of Munich; but still they had effected a very obvious improvement, as seen in the second typhoid-fever period. A contaminated soil can not suddenly be purified by the best of regulations against contamination, any more than corpses in a cemetery are all decomposed the moment they cease burying therein, or a manured field becomes unfruitful as soon as manuring is stopped. All this needs time; the harvest from such fields year by year grows gradually less, until plowing and sowing become useless, for nothing grows. Gradually, also, the ground will master the filth if man ceases further to pollute it, just as it will dispose of the corpses if there is no more burying. The ground has the capacity to purify itself and remain so, and, if only so much filth is

put into the soil as it can dispose of and no more, there is no danger. In a clean or purified soil the ground or subsoil water may rise and fall at will, for the dampness which it occasions does not produce such consequences as are produced in an impure soil. And if the cess-pools of Munich are not yet all absolutely water-tight, at any rate very much less finds its way from them than formerly. The conviction grew daily stronger in Munich that it was impossible to have proper sanitary arrangements for the city and the houses, without a rational drain or sewer system. This was made more certain from the marked consequences that followed similar sanitary measures in many English towns, and also in some German towns, as Frankfort-on-the-Main, under Dr. Varrentrapp's urging; Danzig, under the direction of its intelligent and energetic chief burgomaster, von Winter. Munich has had the good fortune to have had Dr. von Erhardt as first burgomaster, a man of unusually clear judgment in sanitary matters, and under him at length the sewerage of the city was determined upon. As early as 1858 good sewers, after plans by Oberbaurath (chief building councilor) Zaretti, had been begun in the suburbs, called the Ludwig and Max suburbs, and in 1878 twenty-six kilometers had been finished. For some years then the building of sewers was interrupted, because the city authorities resolved to have plans prepared by J. Gordon, an English engineer, for the systematic drainage of the whole city.

After these plans had been prepared the work was taken up again, and from 1881 to 1887 forty-eight kilometers were completed, and also in that time quite a large number of cess-pools for waste water from houses have disappeared. The canalization or sewerage of the city has gradually become popular, so that now many who at first opposed the scheme and denounced me heartily approve of it, and we may confidently expect that this great sanitary work will be completed in the course of a few years.

Another work of great sanitary importance in addition to the drainage or sewerage must not be passed over in silence, viz, the new abattoir, cattle-yards, and market in the Thalkirchner street, erected according to the admirable plans of Arnold Zenetti. This new abattoir was opened on the 1st of September, 1878, and at one blow eight hundred separate slaughter-houses, which were distributed throughout the entire city, disappeared; these belonged to butchers, sausage-makers, publicans, restaurant keepers, and others, and all had manure heaps and pits and cess-pools connected with them. Only those who have seen the filth and the condition of these back buildings and yards, who have breathed the air and smelled the stench therein, can possibly appreciate how much less the soil of Munich is contaminated since the opening of the new cattle-yard and abattoir. The sudden rapid decline in the prevalence of typhoid tells the story in no uncertain tones. The frequency of typhoid fever, it is true, had been gradually diminishing since 1860, but the marked difference between 1879 and 1881, as seen at a glance from the diagram, has something so astonishing in it, that every person skilled in sanitary matters will at once recognize the evident influence of the new abattoir. The connection between the decline of typhoid fever in Munich and the purification of the soil and keeping it clean has been shown by Sayka in a paper, in which he contrasts the prevalence of typhoid fever in Munich in drained and undrained districts, or before and after draining. He arrives at the following conclusion: "Concerning the decrease in abdominal typhoid

in Munich there are so many peculiar modifications of this decrease, all so intimately and closely following, both as to place and time—modifications of the drainage—that the probabilities of the beneficial effect proceeding from sewerage become very great, and the observations made regarding the same have almost the value of an experiment.”

In speaking thus of the chances that drainage is so efficacious, Sayka expresses himself in an exceedingly scientific, exact, and cautious manner when he uses the word probability; the conditions being really such that unless there is a desire to fold the hands and do nothing, we would, in ordinary practical life, take it for proved to a certainty. According to exact scientific principles the observations made in Munich have not the value absolutely of experiments made in a laboratory, but they have been in fact practical experiments upon a large scale for the sanitation of a pestilential city, and the experiment has succeeded here as it has in other places.

A particularly instructive experiment is the sanitary improvement of a quarter of Munich known as the “*Grube*,” or den of Haidbosen, to which I directed attention in my book called “The Present State of the Cholera Question,” page 722, which is also illustrated with the necessary cuts. This “*Grube*,” or pit, was inhabited by about five hundred people, and was formerly the worst hot-bed for typhoid and cholera in the city. Since the removal of all the old porous sewers and cess-pools, and its drainage by means of a proper sewer, with nothing else changed, it has become free entirely from these diseases, although the people use identically the same drinking water as formerly, while the people in the neighboring quarter of the city, who had the best of drinking water, but the old cess-pools and sewers, were still afflicted with typhoid. Sayka, in his capacity as a practical health officer, is now advising the town authorities of Prague to make the same experiment with sewerage and house drainage as has been done in Munich, and leave for the future the study of the exact scientific reasons for their necessity.

It is true, speaking scientifically, that many points are still obscure, as, for instance, how good drainage and sewerage, cleansing and keeping clean the soil, are connected with the specific germs of typhoid and cholera; how places thus treated not only lose their predisposition to such diseases, but become absolutely free from them. But facts often outrun science. Long before the discovery of America the Indians had found out that Peruvian bark cured the ague. Only after the lapse of centuries has science (chemistry) discovered that the efficacy of the bark comes from its containing an alkaloid which can be crystallized, which we call quinine, but why it is that quinine cures the ague we know as little to-day as we know why places with good sanitation become indisposed to, or entirely exempt from, typhoid and cholera. The further developments of experimental hygiene, especially as now assisted by bacteriology, will explain much that is now unexplained; but hygiene has not only a theoretical but also a practical side, and, viewed practically, action can not be postponed until all learned men agree. Here facts must be dealt with that have a practical value apart and aside from all theories. One such fact is, that a pestilential soil, as it was first called by Naegeli, can be made healthy by certain technical treatment, and that this is what has been done in Munich, so far as typhoid fever and cholera is concerned.

THE PREVENTION OF TUBERCULOSIS.

[Translation from the *Hamburgischer Correspondent*, September 19, 1889.]

The German Society for Public Hygiene in Strasburg had in its session for the second transaction, "The Prevention of Tuberculosis." Prof. Dr. Heller-Kiel spoke; he first described the significance of tuberculosis, which is indeed so great as to justify extraordinary measures of antagonism. On the one side tuberculosis is, in fact, the most important disease, having the highest rate among the causes of death. It is the most important disease in an economic respect, inasmuch as those suffering therefrom die after a long sickness with diminished or abolished power of activity. Finally, it is dangerous on account of its contagious power. He designates the inheritance of the disease as indeed possible, but at all events practically as unimportant; the frequent appearance of tuberculosis in single families is explained far more simply by the circumstances which favor the contagion in such cases. The most essential, really the sole essential thing, is the transmission from other tuberculous human beings and animals, from the latter especially, by the parts serving as nourishment, milk being first. The speaker designated, first, efficient school hygiene as an effective measure for fighting against the destructive disease. The spittoon should also be introduced into schools. Every child that coughs ought to be made to use the spittoon, so that the expectoration, the main source of transmission, be made innocuous, and thereby the advantage will also be gained that many germs of diphtheria will be destroyed. In consideration of the frequent appearance of consumption among teachers, the teacher himself must practice the corresponding precaution. Regular wet-cleaning and frequent disinfection of school-rooms must be added. Nurses and persons occupied in the preparation and sale of food must constantly be taken notice of relative to their health, those that cough must be excluded entirely from the latter occupation. With respect to the transmission of tuberculosis from animals, a severe compulsory inspection of meat, condemnation of all animals found to be tuberculous, veterinary watching over of stalls suspected of tuberculosis, destruction of tuberculous animals, and close surveillance of the milk traffic would be appropriate for attaining the desirable effects.

MORTALITY TABLE, FOREIGN CITIES.

Cities.	Week ended.	Estimated population.	Total deaths from all causes.	Deaths from—								
				Cholera.	Yellow fever.	Small-pox.	Typhus fever.	Enteric fever.	Scarlet fever.	Diphtheria.	Measles.	Whooping-cough.
London.....	Oct. 5....	5,642,015	1,739					19	25	52	11	
Paris.....	Oct. 5....	2,260,945	1,012			3		31		27	16	14
Glasgow.....	Oct. 5....	545,678	208					6		3	3	
Warsaw.....	Sept. 21...	445,770	261			30				4	15	
Warsaw.....	Sept. 28...	445,770	249			33				9	11	
Calcutta.....	Aug. 31....	433,219	199	6		1						1
Calcutta.....	Sept. 7....	433,219	219	6		1					1	
Calcutta.....	Sept. 14....	433,219	230	11		1						
Rome.....	Aug. 3....	407,935	169			3		4			4	
Rome.....	Aug. 10....	407,935	155					5				
Rome.....	Aug. 17....	407,935	160			1		3			3	
Rome.....	Aug. 24....	407,935				2		3			2	
Copenhagen.....	Sept. 28...	307,000	132					5			11	
Belfast.....	Oct. 5....	229,622	97						2		2	
Genoa.....	Oct. 5....	180,329	78									
Stuttgart.....	Oct. 5....	125,510	34								1	
Havre.....	Oct. 5....	112,074	57				1					
Catania.....	Oct. 7....	108,000	30					1	1	1	1	
Leghorn.....	Oct. 6....	103,287	35								1	
Cadiz.....	Sept. 28...	57,197	41			1						
Cienfuegos.....	Sept. 23...	40,655	13		1							
Cienfuegos.....	Sept. 30...	40,655	17									
Cienfuegos.....	Oct. 7....	40,655	14		1			1				
Vera Cruz.....	Oct. 10....	23,800	30									
Gibraltar.....	Sept. 29...	23,681	15									
Gibraltar.....	Oct. 6....	23,681	18								3	
Laguayra.....	Sept. 28...	7,428	7									

JOHN B. HAMILTON,

Supervising Surgeon-General, Marine-Hospital Service.