Activities of Provincial Sanitary Engineers

Along What Lines Should the Work of State and Provincial Boards of Health Be Extended ?—Review of Six Main Functions—Should the State Design Structures ?—Address to the American Society for Municipal Improvements

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S TATE supervision of municipal sanitation is a matter calling for wise consideration. At best it should guide or supplement municipal activities, without destroying local initiative; at worst it may be onerous enough to destroy all spirit of .co-operation, and signally fail through lack of support. The present paper is written with a desire to illuminate the activities of the engineering services of state and provincial boards of health, especially those connected with the control or supervision of water works, water purification works, sewerage, sewage disposal and the design and location of incinerators and abattoirs.

War time revelations suggested the many advantages of a great forward movement in state sanitation under the direction of specially qualified servants. A beginning was made a few years ago, and it was most interesting to note public men and engineers continuing the discussion as to the qualifications of medical officers of health at the last meeting of the American Public Health Association.

The employment of full-time sanitary engineers at salaries ranging from \$2,000 to \$5,000 in the following thirty-three states is a promising sign that the movement is in the right direction:—

California, North Carolina, Connecticut, Indiana, Kentucky, Maine, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New York, Ohio, Pennsylvania, Vermont, Washington, Wisconsin, Alabama, Arizona, Arkansas, North Dakota, Delaware, Florida, Illinois, Iowa, Kansas, Louisiana, Nebraska, New Mexico, Oklahama, Texas, Virginia and West Virginia.

In a few notable instances the state boards are now guided by the experience gained in the operation of small, state, sewage and water experimental or testing stations, supplemented by the observations of municipally controlled testing stations.

TABLE 1. Contr	-SH OL T	OWII YPH(NG H	EFFEC BY PF	T OF	SYS	ONTA	TIC] UBLI	EFFO C W	RTS ATER	то
	~	1	mes,	INU	VINCI	or or	Unin	1			
	Ty	phoid	deatl	1 rate	per	100,00	0 popu	ilation	1		1000
Dunal	1918	1917	1916	1915	1914	1913	1912*	1911	1910	1909	1908
Cities Towns (5,000	5.09 9.6	6.58 7.50	8.1 12.1	9.45 9.43	10.0 12.4	$13.3 \\ 17.3$	10.9 27.7	16.1 35.8	22.0 51.5	$\begin{array}{c} 25.1\\ 34.3\end{array}$	20.5 37.8
to 10,000) Total deaths from ty-	17,2	31.4	52.2	38.0	47.4	- 46.0	47.0	62.3	56.4	67.7	107.1
phoid	208	222	995	208	258	446	483	637	706	669	662
Average rate Rate in U.S.	7.52	8.4	12.5	10.7	13.5	15.7	18.7	25.3	31.5	29.9	29.7
A. ø		1	13.3	12.4	15.4	17.9	16.5	21.0	23.5	21.1	24.3
*Chlorination adopted for the major foci in 1912 and 1913. Protec- tion insisted upon for the points of potential danger, 1913 to date, as sanitary surveys progress.											

The activities of the state boards of health to-day are handicapped (and this is becoming more and more evident) not so much by lack of power or legislative authority, as by lack of direction and inadequate appropriations. It is because of this latter restraint, which is slow of adjustment, that I suggest consideration of the activities of their engineering departments as to whether there are not certain functions of the office of paramount national importance, the exercise of which should draw to the state board the needed financial support so that its operations may expand into one or more of its other logical branches.

The first duty of the state board, or its engineering subdivision, is the location for the state or province of the major fòci of water or filth-borne diseases. Returns of deaths and deaths from specific causes are obtainable. These must be examined and reduced to a common denominator; for instance, death rates are usually compared on the basis of deaths per 1,000 of population living, and typhoid fever is commonly compared on the basis of deaths per 100,000 of population living. Divergencies above the state or continental averages almost invariably indicate foci of disease transmission. Divergencies not only indicate the infective centres or foci, but in addition frequently suggest the occasion of endemic conditions and the extent to which improvement can be immediately carried. A persistent high winter rate for typhoid fever in our northern states almost invariably is due to sewage-polluted water supplies.

TABLE 2—DIARRHOEA AND ENTERITIS IN ONTARIO, 1902-1914 (Under 2 years)

	M	Ye ax.	arly o M	leaths lin.	per	hundred	live	births Group of the	Group of the
Class of	Indi-	Aver.	Indi-	Aver.				lowest	highest
Municipality. *County (rural)	year.	1302- 14. 5.1	year.	1902-14.	Max.	Min.	Aver.	aver- ages.	aver- ages.
Towns (5,000-		-	1º			0.01	1.00	0.00	2.10
10,000) Cities (10.000-	12.9	7.8	0	1.6	7.1	1.27	3.59	2.30	4.86
500,000)	11.5	6.9	0	1.7	5.9	1.44	3.37	2.20	5.36
*For one of the exceptional y was 11%.	the s year ra	maller n as	r mun high a	nicipal as 22.9	ities)%, a	included nd the a	in th iverag	he coun e for 19	ty rate,)02-1914

Fortunately a great many investigations have already been made and comparative statistics and illuminative suggestions with reference to vital statistics are available for portions of almost all the civilized countries of the globe. The work of an engineering division consists largely, therefore, in assembling existing data and calculating averages for purposes of comparison. But even without the aid of outside data the divergencies encountered within the statistical divisions of the state or province are sufficient in themselves to locate major foci and suggest the course to pursue.

The second duty of the state is to ameliorate or safeguard all major foci and in addition to stop-gap all potential danger as is made apparent by sanitary surveys.

This portion of the program appears simple enough but in actual practise it is far from that. It presupposes the existence of reasonably complete and accurate mortality and morbidity statistics. Unfortunately for the engineer, these are not always available. Of the states having appointed sanitary engineers, 41% were not in the registration area of the United States in 1916, including Alabama, Arizona, Arkansas, North Dakota, Delaware, Florida, Illinois, Iowa, Louisiana, Nebraska, New Mexico, Oklahama, Texas and West Virginia,—an open avowel of the incomplete character and unreliability of their mortality statistics.

Your foci have been located, the zero hour is given and then the real struggle begins. Organization counts for much at this stage of the proceeding. On the one side you have some unadorned statistical facts and the information that a certain number of unnecessary deaths occur annually in this and that town, and many cases and deaths distributed all over the state and continent; on the other side is represented an unwelcome capital expenditure for water purification works, an already high tax rate and a municipal council uncertain of re-election.