Original Articles.

SOME SANITARY PROBLEMS OF MASSACHUSETTS.¹

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GEORGE ELIOT, in her novel of *Middlemarch*, has represented her young philosopher-physician, Dr. Lydgate, as "a man who believed that masses are influenced and moved only as individuals are affected and convinced." Probably no man more fully appreciates and subscribes to this truth than the intelligent physician in every community. With him the every-day observation bears witness to the effect the individual has had in the moulding of family and neighborhood, in casting the lines of society and the body politic. To him more than to most it is given not only to observe, but to himself mould the moulder, to give stimulus and direction to much of the vital thought and movement of men and communities.

The day has happily dawned when the physician has come to be thought of as somewhat more than the vender of pills and powders, more than the alleviator of pain.

In the language of Goethe, "he has stamped his value on himself, the price he has *challenged* for himself has been given him," and both the citizen and the State have come to think of him as holding the keys of a wider knowledge than that of physic, and now call him in counsel upon the problems that lie at the foundations of human happiness, and of the prosperity of the Commonwealth.

The physician's unselfish, ardent promotion of sanitary knowledge, notwithstanding its sure effect upon the practice from which comes his livelihood, furnishes a rare spectacle in this self-seeking world, and establishes alike his claim to philanthropy, and to the right to advise upon measures for the public good.

It is because I am myself sure of this unselfish philanthropy, and of the physician's influence upon the individual and so upon society; because I realize his opportunity of dropping "here a little and there a good deal" of the seed of truth into the ears of the masses, and because his voice is now heard, as never before, in the halls of legislation, and in the council chamber, that I venture to-night to ask attention to a few of the sanitary problems of Massachusetts as they present themselves to my mind, although in crude form, and to bespeak for them earnest consideration, and such action as their importance invites.

Just as a man's life is the measure and test of his belief, so the health of a State becomes sooner or later the measure and test of its prosperity. For in the physical power of its inhabitants to labor and earn lies all its power of accumulation, and from these spring its facilities for mental and moral growth and enjoyment.

The considerable increase of numbers means always war upon those pristine conditions of purity which exist in the elements before man's interference upsets the regulating and well-balanced alchemy of nature.

A State that, in an area like that of Massachusetts, has gathered a population of more than a million and a half, who daily contribute to its atmosphere, land, and waters, the great pollutions of their economies and

of the manufactures by which they live, must inevitably contemplate the certain and steady advance of diseases, that, whatever the media of their propagation may be, surely attend the cumulative pollutions of air, water, and soil.

Cities and towns of constantly increasing population and manufactures have occupied the valleys of our streams, and skirt the borders of large lakes and ponds. The waters of river and lake, once pure, and even now the sources of domestic supply, are being rapidly contaminated, and in not a few instances the same stream is both the source of water supply and the receptacle of sewage.

Nor is this all. By the rule of "first come first served," which has become the law of the State, the great sources of water supply have been given to the first applicant, often a city or town of small present or prospective needs, while the larger contiguous city, whose rights in the water supply granted were as inalienable as its needs were greater, has found itself, when its necessities called, left out in the cold. The prime sources of water supply held under eminent domain by the State have nearly all been granted; but a few—and these the lesser—remain to be ceded. Their assignment has been made almost wholly on the basis of the contiguity of the city or town applying therefor, as was natural, and without other regard to the fitness of things. Small places now control great and invaluable sources, of capacity far beyond their remotest possible needs, while great and growing cities and towns have been narrowed to the assignment of small, ill-situated supplies, and are exhausting every device for more, while the superabundance of their neighbors sparkles in their view as tantalizingly as to the eyes of the Ancient Mariner, there was,—

"Water, water everywhere, and not a drop to drink."

Soil pollution will always exist to greater or less extent, and will, of course, be cumulative as numbers and trades multiply. Even when sewers exist to convey away the worst and greatest contaminations, the soil in the neighborhood of man's abodes can never be pure. A pure water supply cannot come from an impure soil, and an impure water supply contains the maximum of baleful power. If the source of the domestic water supply be pure a considerable pollution of soil and air is tolerated, and though not with impunity, at least with less danger.

It is evident that the first general sanitary need of a community is an abundant supply of pure water.

I have stated that in Massachusetts two facts unfriendly to the universal possession of this pure and abundant supply exist.

First. The rapid and increasing pollution of the great sources of supply, and second, the unequal assignment by the legislature of these sources.

That the necessity of remedy is all important is only too apparent.

Does the power of remedy exist? To a great degree I believe it does.

What, and where is it?

While I believe there is a tendency with us to too much dependence upon government, in some things it becomes necessary to invoke the far-reaching and powerful arm of law, and in no other way can the willful or negligent pollutions of water courses be reached.

I say willful and negligent, as opposed to natural and inalienable rights of drainage which must be met

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not by mandate alone, but by other adequate provisions, and it is both a fact and an argument that the great contaminations of lake and stream come to-day from the natural drainage of areas settled by communities long before the adjacent waters were thought of for the domestic needs of the remote cities now using them.

It may as well be said here as later, that just as we have come to recognize that heating and ventilation cannot be considered apart, so neither can water supply and drainage, at least so far as the Commonwealth is concerned.

The eastern part of Massachusetts is to-day very generally underlaid by the reticulated systems of water-pipes of closely adjacent towns and cities. A comparatively small expense would connect these several pipe systems or join certain of them in groups so that the supply of each might be common to all. Thus the utter inadequacy of supply of some could be reënforced at pleasure from the superabundance of others, and the serious disabilities now so often imposed on city or town by the necessity of repairs or cleansing, low water, breakage of reservoirs, mains, or machinery, special accidents or pollutions, would no longer occur.

To stop the willful or negligent pollution of sources of water supply stringent legislation is necessary. To divert the natural and prescriptive drainage of areas from their original flow into streams and lakes now used as sources of water supply, comprehensive legal authority must exist. To control, connect, and group the water supplies and pipe systems of numerous towns and cities, new and great powers must be vested; new organizations constituted, — and the legislature alone can do this.

It is evident, therefore, that it is to the same power that we must look for remedy that has, in part at least, built up the errors we seek to remove.

So much as affecting the question of water supply.

Water, once put to the uses of man, and hence more or less impure, must find removal more or less direct to its great *omnium gatherum* — the sea.

In short, when water has become sewage its disposal is only second in importance to its original acquirement.

The sewerage of Massachusetts as it exists to-day is hardly worthy of the name. Grown like the communities which have built it, little by little, incongruously, upon no perfected plan, it barely serves to temporarily pass from sight, and the immediate neighborhood of men's abodes, the foul flow it contains. It is only within the last few years that, in a few of the large cities, definite and comprehensive plans have been considered and in part constructed.

Wholly inadequate to the population and the volume to be provided for, the inevitable results have been and are, first, that the soil is being steadily saturated with pollution, doing a sure and certain work in the generation of disease, and second, that streams needed at their best as water supplies are forced to do duty, like the Charles, the Sudbury, and the Mystic, both as water sources and sewers. Both the great water dependencies of the city of Boston, — likely to double its population in the next two decades, — are to-day so endangered by this double service of their flow that an efficient and speedy remedy is demanded.

The water courses to the sea, even in a fairly watered country, are not numerous, and, as has been said, their

prime value is as purveyors of *pure* and not as *carriers* only of *impure* water. Few of them are conditioned, located, or meet the ocean favorably, for the latter service alone. Nothing, however, seems more probable than that some of the streams of Eastern Massachusetts — like the lower Sudbury — must be set apart as sewage carriers only. The sea-coast is yearly assuming new value as it is occupied for summer resorts, at large expense, as at Nantasket and Point of Pines, while every harbor is now guarded with a most watchful and jealous eye by the Harbor Commission. The stream condemned as a water carrier will have to run the gauntlet of acrimonious criticism from its point of beginning as a conduit to its commingling with the deep tidal waters off the coast.

Each city and town has built its meagre sewerage according to its own topography, circumstances, and misconceptions — largely upon the latter. The sewage of each must go *somewhere*. If to the neighboring stream, it may be only to be set back by the next tide, to close proximity to the inlet pipe of the water works of its neighboring town; if into the lake, upon the sloping borders of which the town was years since built, then the reservoir of the great city that owns it must be poisoned; if into the sea at the nearest point, then summer resort, Harbor Commissioner, and Board of Health complain. Like the "ugly duck," it is wanted nowhere.

Reluctantly, but pretty definitely, sanitarians have come to believe that any attempt, in the light of present knowledge, to secure profit from the utilization of sewage is hopeless, except in rare instances, and on a small scale. Of the methods available for its utilization, its return to the land by intermittent downward filtration or irrigation alone promises satisfactory results, and this for the sewage of small or inland towns, will, undoubtedly, in the future, be more and more employed. But to remove the willful pollutions that in the consideration of water supply we found contaminating our present sources; to take out of our rivers and lakes the natural drainage contaminations; to keep from the soil about us, or the streams that are water sources, the sewage of our thickly settled towns and cities; to relieve our harbors and our beaches, new, ample, and far-reaching channels must be had, providing in place of the water-courses now contaminated special conduits for their harmless flow to proper outfalls in the deep tidal waters. Just as has been indicated, the apparent necessity of purifying and connecting or grouping the water supplies of the State in commonalty, so, but even more clearly, is indicated the need of purifying the soil and gathering together in new channels the sewage of the net-work of cities and towns of Eastern Massachusetts, and its removal in commonalty beyond power for harm.

That I have roughly sketched — as a boy might draw a picture on a slate — the outline of a gigantic undertaking, I am well aware. That I have contemplated no less than the comprehensive water supply and drainage of the most densely populated part of the most densely populated State of the Union, I also know, but great as the undertaking and expense must be, radical, almost, as the movements must be that it contemplates, I still ask any of you, looking the facts as we all know them full in the face, must not some remedy be found for these fast-growing and incalculable evils? And is there any other road out of them? This much any intelligent man may ask. Master

minds must recast the outline and fill in detail. Whether the cordon of rivers and lakes that encircle the municipalities of Eastern Massachusetts, if purified and connected, so that the resources of each group may be available to all its members, would then furnish adequate supply for the coming years of portentous growth is a further question. Whether it may not be that, leaving to manufacturers and to lesser domestic demands the present supplies, the chain of cities and large towns stretching northward from Boston, in two States, may not find it necessary to join the metropolis in bringing the great lake of New Hampshire to our doors, remains as a further problem. Water in abundance, *pure* water must be had. It is *life*, and all that a man hath will he give for his life.

What streams shall be freed from the befoulments of man and of manufactures, and what relegated to Stygian blackness in their service as sewers, men qualified to determine and clothed with power to decree must say. What valleys shall be drained, what routes the great sewer conduits shall follow, what irrigation fields be established, what outfalls reached, and a thousand questions of hardly less import must be settled.

More than all, municipalities to whom rights have been given must be divested of those rights and dispossessed of their property, must be compelled to relinquish for the common good that which they have enjoyed for their own, and be made to bear a part in burdens that benefit others beside themselves. It goes without saying that for such mighty enterprises and such grand schemes there must exist great powers, and that they must be vested in a central and competent authority.

Sooner or later, perhaps by a devious road, and as the ultimate joining of several previous commissions and their labors, I believe we shall have a conservancy board of water supply and drainage for the Commonwealth. That it will be the legitimate and worthy successor of the several water and drainage commissions that may precede it is most probable, but that it must come I entertain no doubt. It took a hundred years of the sanitary woes of London after attention was turned to them, to produce the Metropolitan Board of Works and the Thames embankment. It may take fifty in our advanced state of knowledge to secure our own conservancy board, and the legal foundation for it to stand upon, but sooner or later I believe it will come, because *it must*.

Already a long stride has been taken in the creation of the Metropolitan Drainage Commission of last year, charged with the draughting of a plan for the drainage of the Charles and Mystic River Valleys and the immediate vicinity of Boston. Among the apparent facts developed by its inquiry were, not only the entire feasibility of the drainage of the area named, but that it could be accomplished in such manner as to very generally take on without special pumping the existing systems of most of the cities and towns of the area; that the great water basins of Boston would be almost wholly freed from contamination; that the flow of Pegan Brook, so long a source of annoyance to Boston, could be provided for; that the needs of the outlying city of Lynn could be included; that towns lying off the shed of the valleys named could be included at small expense; that irrigation plans would meet the needs of certain small towns; that the total expense when divided upon the property of the municipalities benefited would not be burdensome; that a

direct tax would remove all difficulties of apportionment; and that the rivers of the district would, with a single exception, be made wholly available for water supply while the vested rights of sewerage therein would be provided for.

That a commission, given but six months time in which to work and an appropriation of but three thousand dollars, albeit aided by previous inquiries, should have been able to reach conclusions covering so much and so important ground is the most hopeful augury for the work of a future commission with ampler time, means, and scope.

The extensive litigations attending the construction of the water basins of the Sudbury, the discharge of Pegan Brook, the pollution of the Mystic and the Blackstone, and the water supply of Wakefield, with others, are additional arguments for speedy and comprehensive reference of these matters to central and competent authority, able to administer in the interests of all.

I commend to that careful consideration, which the members of this Society are wont to give matters of such importance, these allied matters of general water supply and drainage, so nearly affecting every one of us.

A SUMMARY OF OBSTETRIC CASES.

REPORTED BY MEMBERS OF THE MIDDLESEX EAST DISTRICT MEDICAL SOCIETY, AND COMPILED BY DR. SAMUEL W. ABBOTT.

DURING the thirty years or more of its existence as an organization the Middlesex East District Medical Society has striven to cultivate and encourage among its members habits of systematic observation, for the purpose of individual and mutual improvement, and also for the general advancement of medical science.

Individual observation forms the basis of a large portion of all statistics in medical science, and it is a part of the duty of every medical man who draws something from the general fund of medical knowledge to contribute his share in return. In view of this fact committees on Therapeutics, Systematic Observation, and Obstetrics have been appointed who have collected the experience of this Society in these departments, so far as possible, from the voluntary contributions of members, and rendered occasional reports, many of which have been published in past years.

The work of collecting the Records of Obstetric Experience was begun as early as January, 1855, and intrusted to the secretary of the Society, Dr. William Ingalls, who faithfully performed his duty of compilation from that time till 1861. These reports were published in the Boston Medical and Surgical Journal in 1857, 1858, *et seq.*, and comprise a summary of 2256 cases.

The sudden outburst of the rebellion called away the secretary, Dr. Ingalls, and other active members of the Society to service in which obstetric reports were out of the question. Hence their discontinuance for a season. In 1875 these reports were renewed, and have been continued to the present time.

About twenty-five physicians have contributed to the earlier and the later series of reports. The number of reporters has not been more than thirteen in any one year, and an average of ten annual reports has been received.

The blanks used in the later series contained the following items:—