

## DISEASE IN THE MILK-CAN.

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It is fairly well established that diphtheria is excited by some forms of bacteria yet to be individualized. However this may be, its contagiousness is undoubted, and equally certain it is, that its contagious material may be communicated directly by the patient or be transmitted to a distance in various material ways. The more usual channels for the spread of this disease are believed to be drainage and a polluted water-supply; and, equally certain, if less often determined, it may be from infected milk of healthy or diseased cows. The results of very many investigations in England, France and Germany, establish beyond cavil the fact that diphtheria does occur among domesticated animals, and especially the cow, from which its transmission has been traced again and again. How frequently it is spread from the milk of healthy cows, through contamination outside the cow, either by the water-supply to the milk, or from infected vessels, or from absorption of atmospheric contagium, is of vital consequence to all.

When we reflect upon the fact that milk is so sensitive to meteoric conditions and has such absorbent qualities, or affinity, so to speak, for atmospheric poisons, it seems strange that so much stress is put upon the responsibility of the animal, and so little attention or research is given to other possibilities. Whenever it is established, as it frequently and undoubtedly is, that scarlet fever, typhoid and diphtheria gain entrance to the family through the milk-can, it is hardly just or wise to condemn offhand, the friend of all and the foster-mother of many, the cow. In many of the towns in the vicinity of Boston, the local vendor of milk nominally furnished his patrons from the limited product of a few cows, which he ostentatiously parades, while his chief supply is from a general dealer, who on his part collects it of the small producer, more remote, from a house-to-house visitation. Thus it will be readily seen that the chances of infection are multiplied in the ratio of the greater number of original sources from whence the supply is derived.

If one of these many small tributaries that feed the general stream should be the habitation of some infectious disease, it will be seen that with a little carelessness, or with the ordinary care that is exercised in the handling of milk in the average home, it would be extremely liable to pollution. For, while the large producer of milk has separate and special apartments for the treatment of the same, the one-to-three-cow producer *safely* cares for his under his own living-roof, where it may be exposed to deleterious and unhealthy influences at all times. Some facts of interest bearing upon the propagation of diphtheria which prevailed epidemically in Melrose and Malden, during June, July and August of last year, and which was the direct and immediate outcome of an infected milk-supply, I will recite: Of the several cases occurring in my own practice, I failed to discover any of the classical grounds, or *loci causæ* obtaining, but incidental inquiry elicited the fact that each had a common milk-supply, and further investigation found it also true in the cases of other physicians. In Melrose, twenty-three cases occurred in twelve families. In one of these families the contagium was from immediate contact with contiguous neighbors, who were down with the disease.

We have, therefore, eleven distinct foci of infection widely separate, (two only being within the same square) being generally near a line from North to South, of two miles in extent, at intervals of one-eighth of a mile. At these eleven foci of infection, or original cases, a certain local vendor served seven with milk, another two, another one, and a fourth one, while these four obtained milk from two wholesale dealers, who, on their part collected it in a neighboring town and district where diphtheria was then prevailing, and *from families in which diphtheria then existed*. If these were coincident phenomena they attain to the marvelous, when we consider that, of probably thirty distributors of milk, this disease only followed in the trail of a certain supply and failed to appear on the routes of twenty or more who drew their supply elsewhere and none of whom peddled this particular milk.

In the interest of truth and to satisfy an awakened curiosity as to the extent of the mischief wrought by this milk-supply, I pursued it in its effects still further. Being furnished with a list of cases in Malden, for the same period, I continued my investigations with the following results: Number of cases reported, twenty-seven; number of families in which they occurred, eighteen; of these one was not to be found, and one claims to have contracted the disease from a neighbor in whom it existed and with whom they intermingled freely. Now, of the sixteen foci of infection to be accounted for, thirteen received the infected milk. Of the remaining three, who were served by two vendors who received their main supply from the cars, no history is obtainable, but it is quite possible that it came from this very infected locality. It is also more that possible that these vendors supplemented a deficiency occasionally, as they are wont, from a brother vendor, or, what is quite as possible, they procured it direct from the wagon of one of these distributors of the infected milk, who daily passed their doors to a market several miles beyond. Social relations may and do have influence in the spread of zymotic diseases; poverty, uncleanness and the effluvia of animal putrefaction establish a general condition favorable to the genesis of miasmatic contagious diseases. At least, under such conditions their development is encouraged and extended and their virulence intensified—but how much more? Wherever diphtheria occurs we enthusiastically search for filthy surroundings, or defective drainage, as the primitive cause, and with our willing senses these can be had to our satisfaction; yet it is very doubtful if it is ever caused by sewer-gas, or that it is ever endemic in the sense that *ague* is. True, certain endemic conditions of a sanitary and atmospheric nature do supply in many instances the predisposing cause as applied to the individual and his surroundings.

This may be equally said of typhoid, yet who with our limited knowledge can assert, that the sole condition of parentage, the noxious agent, the real element-producing disease, are these essentially? Experience, observation and discoveries are reducing some heretofore probabilities to present possibilities.

Let us turn from the speculations of fancy to the logical teachings of absolute facts, as set forth. We have an epidemic of diphtheria extending over four miles in length, including fifty subjects of this disease in thirty families, or, twenty-eight distinct foci of infection. No facts can be had in one instance, thus leaving twenty-seven to be dealt with. Of these

twenty-seven foci of the disease twenty-four were supplied with milk coming direct from families in which the disease was known to exist, leaving three only wherein we fail to make out a case that would warrant a verdict for conviction. Of the fourteen deaths resulting from this epidemic, thirteen were in families using the milk known to be infected, and one in the family in which no history is had. We emphatically assert that thirteen deaths were the immediate result of an infection conveyed by milk-supply, *the mischief of preventable cause.*

We have local ordinances, Board of Health rules and statute laws, for the isolation of the sick, the non-intercourse of family members, the destruction and disinfection of clothing and habitations, wherein exist typhoid, scarlet fever, small-pox and diphtheria, but nothing to restrain what may be the most pernicious factor in the spread of these — milk.

NOTE.— The facts and data of the above, in the completest detail, are in possession of the State Board of Health.

## RECENT PROGRESS IN OPHTHALMOLOGY.<sup>1</sup>

BY MYLES STANDISH, M.D.

### PATHOLOGY OF OPTIC NEURITIS AND CHOKED DISC.

DEUTSCHMANN<sup>4</sup> writes that the so-called choked disc (*stauungspapille*) is from the beginning an inflammatory condition, a true neuro-retinitis. There is no evidence in favor of the supposition that it is caused by compression of the ocular end of the nerve; the anatomical facts are opposed to this assumption. Schultén, on the ground of original experiments on animals, has lately come forward as an advocate of the compression theory of Schmidt and Manz. He raises the intra-cranial pressure by means of injections of salt solution into the sub-dural and sub-arachnoid spaces. He produced thereby a narrowing of the arteries, and an overfilling of the veins in the retina; he assumed that these vascular changes were caused by compression of the nerve by fluid in its sheath, and that they truly represented the first stage of the condition known clinically as choked disc. In other experiments, Schultén raises the brain pressure by injections of oil, wax, or gelatine, and by the introduction of small india-rubber bags between the dura-mater and the skull. In this way, also, he obtained the vascular changes in the disc above described.

Deutschmann, accepting the above observations as accurate, denies that they support the compression theory of choked disc. The vascular changes produced were not proved to be the beginning of the morbid process in question, or to be produced by the compression of the ocular end of the nerve by an excess of fluid in its sheath. To settle the matter more positively, he determines to solve, by means of further experiment, the two following questions:

(1) What degree of hydrops of the optic nerve in animals is required to produce changes in the disc similar to those of choked disc in man?

(2) Are there any conditions under which a moderate and even transient hydrops of the nerve, such as is often found post-mortem in man, is associated with the occurrence of choked disc?

For the determination of the first question he in-

jected directly into the nerve sheath. Dividing the superior rectus he laid bare and cut through the optic nerve in front of the optic foramen; then drawing forward the distal end, and taking especial care not to rupture the central vessels at their entrance into the nerve-trunk, he injected warm sterilized agar-agar solution, the advantage of which is, that, at the body temperature it remains of a soft semi-fluid consistence, and is only very slowly absorbed. A ligature being then applied to the nerve, the divided muscle was sutured and the wound closed; the whole with anti-septic precautions. Healing follows almost without trace of the operation. By filling the nerve-sheath very forcibly, he obtained ophthalmoscopic evidence of a total arrest of circulation in the retina, and a few hours later a swelling and turbidity of the papilla, much resembling the choked disc in man. Microscopic sections showed a well marked compression of the nerve close to the globe, a swelling and œdema of the papilla, but no trace of a true neuritis. When the injection was made less forcibly, however, though still sufficient to produce a more marked hydrops than is usually found in man, he obtained only a temporary diminution of the arteries, and an overfilling of the veins, and the microscopic examination, several days later, showed no trace of pathological change, either in the nerve or papilla. Deutschmann concludes that in animals a choking of the disc comparable with that which occurs in man, can only be produced by a pressure sufficient in amount to arrest the circulation. No one, he points out, has found a degree of hydrops in the human optic nerve approaching to this required amount; and, moreover, the frequent retention of good vision in such cases refutes the idea of an arrested circulation. In the next place, Deutschmann made injections of agar-agar into the cranial cavity in order to fill the nerve-sheath by means of pressure within the skull. By repeating the injection from time to time in the same animal, he established not merely a transient excess of pressure in the skull, but one which was renewed from time to time, and by the antiseptics he obtained the effects of pressure without the inflammatory complication. A well marked injection of the optic nerve-sheaths, are equal in degree to that which is found in the human subject under conditions of morbid pressure in the cranium, and lasting for several weeks, was produced. Dissection showed that the sheath was forcibly distended, but that papilla, the nerve-trunk, and its sheath, were absolutely free from any trace of inflammation. From these experiments Deutschmann concludes that an excess of intra-cranial pressure, with distention of the optic nerve-sheath, does not of itself suffice to produce the choked disc. Deutschmann therefore adopts the theory of Leber, that hydrops of the optic nerve is concerned in the production of choked disc in a manner other than that assumed in the compression theory, namely, that the products of new formations, (tuberculosis and intra-cranial tumors), mixed with inflammatory exudation and with cerebro-spinal fluid, are carried into the intervaginal space of the nerve, and at its bulbar extremity excite inflammation of its tissues. To test this view, he repeated his injection experiments, but used an infecting instead of an aseptic material. A few drops of tubercular pus were injected with anti-septic precautions into the sub-dural space. No reaction followed. Three weeks later the papilla began to redden, and the veins to become tortuous; swelling

<sup>1</sup> Concluded from page 79.

<sup>4</sup> Monograph, Jena, 1887, *Ophthal. Review*, April, 1887.