

course of physical education. The exceptions are temporary and due to conceit growing out of distinctions earned by superior accomplishments in contests. As a rule this condition does not last.

Systematic physical exercise is impossible without personal cleanliness. Children who are brought up familiar with the gymnasium and track are clean and regular in their habits. Together with a weak body there is nearly always associated a high degree of backwardness due to false modesty, and also considerable lack of confidence. Now these are almost invariably lost after one or two years of gymnasium and out door athletic work. That this is a valuable change for those who in later years must fight the world's great battle cannot be gainsaid.

As physicians we all know the objections to the customary drinking of intoxicants and the use of tobacco. Their employment conflicts most positively with good athletic work of any kind. An early physical training of children compels them, or at least urges them, to dispense with intoxicating drinks or any form of tobacco. This alone would be reason enough to justify a demand for the early physical training of our children if there were no others. No athlete can get along without fresh and wholesome food. Therefore greater care in the acquirement of both of them would inevitably result from proper physical exercise.

The Physical Education Society of Pennsylvania has so far directed its main efforts towards introducing into the public schools of the State a system of compulsory physical education. It now exists in some parts of the country, notably in Milwaukee where the German Turners are doing so much good to the rising generation. It is confidently hoped that in less than another year Pennsylvania will be enrolled among those few States that have made a systematic attempt at the physical as well as the mental education of their children.

I can think of no better conclusion to this paper than a quotation from a former contribution of mine on this subject:

"1. The object of physical culture is to develop the material body, and with it, of necessity, the mind and morals.

"2. Like most potent agencies, it is much abused and far too little understood.

"3. It absolutely forbids smoking.

"4. It absolutely forbids the drinking of alcoholic or malt beverages.

"5. It insists upon the necessity of regularity in living, especially as regards time of sleeping, eating, exercise, and recreation.

"6. It enforces a good substantial dietary that will never be forgotten.

"7. It discountenances all kinds of vice.

"8. It is rigid in discipline without seeming so to those disciplined, and develops implicit and willing obedience to advisors.

"9. It has a marked effect upon the growth of the body and mind.

"10. It develops to a high degree the valuable qualities of hope, confidence, courage, deference, obedience where proper, independence, perseverance, ambition, temperance, and determination.

"11. It is, in short, the most valuable preparation of the young for the cares and trials of adult life, and aids young and old alike to ward off disease and mitigate its effects."

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## THE CONTROL OF EPIDEMIC DISEASES.

*Read before the Section of State Medicine, at the Fortieth Annual Meeting of the American Medical Association, June, 1889.*

BY G. T. SWARTS, M.D.,  
OF PROVIDENCE, R. I.

By epidemic diseases we usually consider diseases which are contagious or infectious. I wish to include within this group all other diseases which may attack an unusual number of persons within a short space of time, as trichinæ "poisoning," disease resulting from the ingestion of diseased meats and other foods, poisoning from canned goods, diarrhoeal disease resulting from the ingestion of contaminated milk, tuberculosis as disseminated by man or infected milk or flesh of animals so diseased—in fact any sudden onset of a number of cases in which often the physician is at a loss to make a diagnosis, but which by eliminative investigation proves to be due to some common cause, as contamination of milk, water supply, or air. Any control which may be of practical and most valuable service in such sudden outbreaks must be prompt.

It has been customary for several years in most cities to keep a record of the deaths resulting from the zymotic diseases. Later, from interest or curiosity, or later still, from practical use, it was made compulsory that the physician should report all such cases as might come under his care to the health authorities. In many cities, from the known contagiousness of these diseases, an immediate control of the cases is made by placing the case and the family, and those immediately exposed thereto, under quarantine. This is made more or less strict, and hence more or less of a success, as the advanced knowledge of the health officer may order, or in proportion as the health officer may have been able to affect public opinion. The family is warned not to receive visitors, the house is placarded, the premises inspected for unsanitary conditions which might have been a provoking or assisting cause in the production of the disease, and remedied as soon as possible for assistance in the recovery of the patient.

But without constant supervision and having ready the agents whereby an eliminative exami-

nation can be made, much valuable time may be lost, and what with a few cases could be easily fixed upon as a cause, becomes later, by the result of man's natural desire to protect himself and from fear, a mixed question. The physician, hearing of the prevalence of a certain line of symptoms, most naturally sees an almost similar line in the next case that he meets, and reports the case as the same as the one prevailing; and yet, under no stress of an epidemic, such a line of symptoms would find its way into a natural category.

In order that a control should be kept up it is necessary that some organized authority, such as a board of health or sanitation, should be established, whose legal powers and executive ability should have wide scope and cover considerable area. Where such authority borders upon other provinces a systematic exchange of suspicious conditions of cause or of result should be kept up, that each might serve the other.

In all epidemics of a serious character the experience has been that the disease has gained a wide spread before any organized movement for its study can be made. In order to control this a few cases should suffice to give the suspicion to an authority already established. In order that such authority may be able to take advantage of such ready action, it must be equipped with an assistance which is constantly in operation, and which should include within its working staff not only a chief officer, but also a medical inspector conversant by daily practice with inspecting and collecting for information every minute detail about the condition and associations of each individual case, whether the case be a typical one, or merely a suspect. The chief officer should have for assistance a chemist, a bacteriologist and a competent veterinarian, that with as little delay as possible any suspected contamination of the ingesta of the cases may be investigated.

There can be but three ways in which an epidemic disease (omitting those of nervous contagion, as hysteria, etc.) may originate, viz: either by inhalation of contaminated air, or by ingestion of fluids or solids. If a comprehensive control can be kept upon these three things by such a corps of assistants as has been cited, the chances of spread of disease can be reduced to a minimum.

Such a chief officer should be kept informed of the state of the various water supplies of his district, knowing the sources thereof and the many points where contamination might take place. This should include not only river, pond or well supply, but should extend to a control of all mineral waters, whether local or imported, and also its condition during storage or filtration. The source of every quart of milk received in his province should be known, as also the water supply of the cattle supplying the milk, and the physical condition of each individual animal in the herd should be known.

This seems at first thought as a vast undertaking, from our not having already such a control; but this was carried out in France as soon as the convention on tuberculosis made its report. Considering that milk is so common a food, and its defects in the way of tuberculous contaminating influences from disease on the animals, producing gastric and eruptive disturbances, especially in children, its chances of contamination by dilution and lack of cleanliness in handling, it is well worth all the attention which can be given to it, if a perfect control is desired. A control of the filthy methods in use for the collection of milk would alone do much towards assisting infants and children to tide over the heated term, and assist the typhoid patient with this as his only food to a chance of recovery.

A control upon the contamination of air is attempted in most cities by destroying all refuse matter by removal of decaying animal or vegetable matter to an unfrequented place, either for burial or cremation; also by checking the influx of foul air from cesspools and drains by the introduction of a trap and tight connections of waste and drains. A constant examination of the air in suspicious localities should be kept up, especially in places of public assembly, as in schools. As illustrating the method I would recommend in epidemic control I will cite two recent epidemics within this State.

The first occurred in the town of Bristol. Over one hundred people were attacked within the space of a few weeks with symptoms which resembled typhoid fever. The town had no working force for investigation, and the State Board of Health was in a similar condition of inefficiency. The writer was requested by the Council of the town to investigate the disease prevailing. The cases had been very generally reported by the physicians in attendance. A visit was made to the premises of each case, and every influence to which they had been exposed was given attention. This included, besides the examination of the sanitary condition of the premises, the source of milk and water supplies, the occupation, whether recently away from home, the ice supply; also the different ponds and tracts where the ice was gathered, and the water shed supplying the same, the vicinity of the pumping station and the bank of the river giving the water supply for some distance up the stream, and the storage tank or reservoir. The meteorological observations of the previous months, the subsoil and strata in and about the town were all examined. The direction of previous epidemics was also noted. By recording the results of all the examinations together, and by such a method only, can an eliminative selection of cause be found.

In addition to this a chemical examination of the water supply was made, a bacteriological ex-

amination of the water and milk supplies, and also of the stools from the patients, but no typhoid bacilli were found. Eliminative evidence showed without doubt that a particular source of milk was a factor in the production of the disease.

This source of milk being shut off the epidemic ceased. The next point to be determined was whether the cows supplying this milk were diseased or whether they were ingesting material which might influence the character of the milk, and yet prove innocuous to the animals, and if such material were present, to determine whether it was air, water or food. To determine this a bacteriological examination of the air was made, samples being taken from in and about the barn before and after sweeping of the floor, which operation was performed just before the milking time and which created much dust. Nothing of note developed in the cultures, except the organisms usually found in air, the sarcinæ and one colony of the bacillus prodigiosus. Examinations of the milk were then made, taking specimens first from the cows direct, next from the pails, then from the strainer, and from the cans, directly after being filled, after they had stood in the ice box, and later after it had been delivered in town. Neither specimen developed in the cultures anything which would answer the test of Gaffky's typhoid bacillus, but each contained numerous colonies of a bacillus which resembled the wurzel or root-like bacillus. Gaffky's. This bacillus is found commonly in stagnant water, ditch or bog water or superficial garden soil. This discovery led to a suspicion of the drinking supply of the animals, and which had already been condemned, for the animals themselves were apparently healthy except one or two of the eight had glandular enlargements under the jaw which might or might not have been tubercular deposits.

The source of water supply for the animals had already been found to be a low marshy, boggy district, the pond being formed from the accumulation of surface water, being not over 6 or 7 inches deep and stagnant. The cows were in the habit of standing and walking about in this water, making it very muddy and drinking as their needs might demand. This pond also received the drainage from the farm-yard, which had not been cleaned of cow refuse for several years.

The wurzel bacillus has been shown to have no influence upon animals, and is non-pathogenic as far as man is concerned. The query might be presented, whether or not the organism, under the favorable conditions of warmth and food as found in the udder, or possibly in the cans after standing, might not have produced a ptomaine which, in its action upon the human intestine and other systems, was capable of producing a disease resembling typhoid fever. The cows were removed from this feeding ground and taken to another farm ten miles away. The milk from these cows

continued to be sold in the town, and yet there appeared no more cases of the disease. Such an examination should be made at once, and by a corps whose special lines would be working at once that the epidemic character of the disease may be checked. One of the difficulties presented by delay in commencing the investigation was shown here. The customers of this particular milkman had become suspicious of the milk on account of there being several cases in his family and up to that time one death. As a result they refused to be supplied longer by him and obtained their supply from other milkmen. Naturally the other milkmen had not a sufficient supply to meet this sudden demand, the suspected milkman had more to sell on account of his losing customers, so he naturally supplied the other milkmen who were short, so that when the writer began the investigation he had more to unravel than if it was taken at the beginning. The above transactions actually took place, and the suspected dealer often was sold out before the other dealers.

The second epidemic<sup>1</sup> to which I wish to refer is a "short, sharp and decisive" one which occurred in Providence during the past fall. The disease was typical typhoid fever. The control was as follows:

The writer, as Medical Inspector, received the reports of all cases from the physicians attending. The premises of the cases were inspected, the sanitary conditions were at once improved when necessary, printed regulations as to disinfection were distributed, and cleanliness of the hands and cooking utensils urged upon the nurses and attendants. The sources of the water, ice, milk, etc., were noted. Within a week it was evident that an unusual number of cases were occurring. The Superintendent of Health immediately increased the force of medical inspectors in order that all cases reported in a morning's mail might be inspected before the following day.

No three milk supplies were from the same source. The sanitary conditions of the premises were comparatively good. The water supply was, however, common to all, namely, the city river supply. The Superintendent of Health at once suspected the river, and found that the river had been polluted with typhoid excrement about eighteen days previous during a heavy rainfall, the stools from typhoid patients having been thrown on the banks of the river for two or three months.

Fæces from the typhoid cases were examined and the typhoid bacillus found. Cultures taken from the spleen of the only autopsy made developed all cultures of the same bacillus, and the lesions of the intestines were typical of the disease.

Advantage was taken of the knowledge that

<sup>1</sup> The epidemic lasted about three weeks and between 200 and 300 cases occurred. The epidemic increased suddenly and as suddenly declined. See Report Supt. of Health, Providence, 1889.

small domestic filters are collectors of filth, and with this filth organisms of various sorts accumulate and increase with great rapidity in numbers.<sup>2</sup> Several of these small filters were taken from the faucets supplying water in houses where the disease existed, and were submitted to bacteriological examination by three bacteriologists independent of each other. Two of the three found the typhoid bacilli within the water of the filters, and from one developed great quantities of organisms found commonly in fæces.

All this was done at the commencement of the epidemic, as the Health Department had at its disposal the means and willingness to make a study of associations and, being in working order, was at an early date cognizant of the presence of the disease and of all the conditions by the daily reports of the Medical Inspector. As the only precautionary measure possible, the public were at once advised to boil all drinking-water in order to destroy any specific organisms which might have found their way to the tap, and to remove all filters from the faucets. The epidemic rapidly subsided, whether from cessation of the contamination or from the destruction of the bacilli in boiling the water it is impossible to say; probably much from both.

### CHRONIC CYSTITIS IN THE FEMALE.

*Read in the Section of Obstetrics and Diseases of Women at the Fortieth Annual Meeting of the American Medical Association, June, 1889.*

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Of the various diseases the gynecologist is called upon to treat but few have oftener proved more vexatious or intractable than chronic cystitis. After a careful study of the pathology and histology of this peculiar condition several factors appear to comprise, to a greater or lesser extent, either singly, variously or remotely, its etiology. The lesions or morbid processes giving rise to cystitis, whether in the acute or chronic stage, are numerous. Each case should be considered according to its own history and peculiar indications. In the consideration of the subject of cystitis it is well to keep in mind the structure and anatomical relations of the mucous membrane of the bladder. Reference to the character and arrangement of the epithelial cells shows that there are several layers. The deeper layers are composed of cells that are conical or cylindrical in appearance. The superficial layer of the mucous membrane is provided with a squamous epithelium. The same arrangement is continuous with the structure of the urethra. This epithelial structure of the mucous membrane extends to the urethra, where numerous racemose mucous glands, the glands of Littre, have ducts

opening on its surface. Littre's glands vary in size. They often exceed 1 millimetre in diameter and attain from 3 to 6 millimetres in length. Their office is to secrete mucus which protects the subjacent structure from immediate contact with the urine and from ferments or poisons which so frequently gain access into the urethra and bladder. The submucous coat is also provided with an extensive plexus of veins and loose areolar or connective tissue. The muscular coat of the urethra is formed of two layers, and is continuous with that of the bladder. This arrangement of parts gives the urethra and ostium vesicæ not only a remarkable power of distensibility but also a wonderful immunity against ordinary accidents and conditions that occur to the viscus itself.

In reading some of the published articles and discussions on cystitis a person unacquainted with the subject might be led to suppose that the formation of the structure of the female urethra and bladder is of such a nature as to be totally devoid of any important resisting power against the open or insidious attacks of the elements within or without, and that on the event of the urine becoming concentrated or a bacterium termo gaining admission into its folds the most disastrous consequences may be expected to follow. It should not be forgotten that the urine which is pale and of low specific gravity, voided by the nervous or hysterical female, often causes quite as much irritation or pain as is experienced in cases in which there is an abundance of sediment. In the treatment of cystitis the point should be emphasized that the symptoms present are often but a mere expression of the organ that there has occurred a lesion or a morbid process, and possibly at a distance from the part seemingly affected. In every case the true factors should be sought for and considered.

The following cases are appended to show the importance of some of the factors entering into the causation of the affection.

*Case 1.*—Mrs. R., æt. 21 years, married three years, miscarried in January, 1888. She recovered and remained in good health until January, 1889, when she began to suffer from severe cystitis. The patient consulted a female physician who prescribed vaginal irrigation of water at the temperature of 100° F., as well as the hot pack. This treatment was continued for some weeks without any marked beneficial effects. At the time I was called, April 17, I found the patient was four months advanced in pregnancy. She was suffering from a marked anteflexion. The suffering caused by the cystitis was unusually severe; there was also nausea and morning sickness. The patient was kept in bed; the uterus was restored and maintained in the proper position, at first by vaginal tampons, later by a properly fitting pessary and an abdominal belt. After two weeks of treatment nearly all vesical

<sup>2</sup> See Proceedings of Rhode Island Medical Society, 1888.