

It does not detract from the practical merits of this admirable collection to say that it represents much that is antiquated, obsolete, curious and unused in medicine at the present time. The therapist studying medicaments can hardly be expected to know all about ichthyology, because cod-liver oil is obtained from the *galdus morrhue*, nor is the surgeon to be up in metallurgy, or be a master of cutlery, because his instruments are made of steel.

In this time of improved medical education, when laboratory, clinical and dead-house teachings, with improved hygienes, tend daily to make the administration of drugs the opprobrium of medicine, and much of the study of our own profession a mere meditation upon death. The mellowing influence of time only impresses us anew with the remark of the late Dr. LOOMIS, of New York, who was accustomed to say to his classes in his native and unaffected way: "You young men prescribe the drugs, but we old fellows don't believe in them."

SUBSTANTIAL GAINS FROM THE TWENTY YEARS' SANITATION OF BERLIN.

It is said of the city of Berlin that, in 1875, there were only fifty-seven houses connected with sewers, and the general mortality of Berlin was equal to 32.9 per 1,000 of the population. Ten years later the drainage of the town had been pushed forward with considerable energy. The teachings of Professor VIRCHOW had taken root in the minds of the people. The labor party gave energetic support, and as their voting power was daily increasing the sanitary regeneration of Berlin soon became an accomplished fact. In 1885 no less than 15,895 houses were connected with the sewers, and the death rate was down to 24.4 per 1,000, inhabitants. Finally, in 1895 the work of connecting houses with sewers and abolishing the ancient cesspools and pails had been pretty well completed. There were then over 22,000 houses connected with the sewers, and the death rate was only 19.4 (even lower than that of London for the same year, viz., 19.8 per 1,000). Thus in twenty years the death rate has been reduced by considerably more than one-third. Of course this is not due exclusively to the improved drainage, but it is quite safe to say that it is the principal cause of the great progress achieved. There are now but very few houses in and about Berlin not connected with the drainage system. Perhaps there may still be some houses in this condition, but they are rapidly disappearing, and it is calculated that soon they will have ceased to exist, and that about 23,000 houses will then drain directly into the sewers.

Berlin is situated upon a sandy plain, affording a deficient fall to the sewers. These are, therefore, not self-cleansing and imperfectly ventilated; in some districts they at times become water-logged so that

there is great risk of the sewer gas escaping into dwelling houses, particularly as the closets are often placed away from the outer wall, and that effective trapping is not very scrupulously and strictly controlled. Nor is proper care taken that the number of closets shall be in proportion to the number of inhabitants. This grievance becomes especially flagrant when, as is so often the case in large centers, what was formally a private dwelling-house is converted into a factory or workshop. Under the presidency of Dr. CZADICK the Berlin workmen organized a Sanitary Commission. It was formed almost exclusively of workmen and had no official power whatsoever, but the reports resulting from the inspections made by this Commission show how much there is still to be done to improve the domestic hygiene of Berlin. As many as 200 people have been found working in a house where there are only two closets. To this must be added all those grave defects that are to be found in all large towns where poverty leads to overcrowding and where vice and drunkenness engender carelessness, dirty habits and general recklessness. Though Berlin suffers from all this, it must be recognized that very little of it is to be seen on the surface.

Next to the complete system of drainage the greatest sanitary advantage is the new broad streets which almost exclusively compose the great town. Considering the important position Berlin occupies in the politics of Europe, it is difficult to realize how modern a town it is. In ancient times Berlin was a very insignificant place, and even so recently as the Thirty Years' War its population, which had comprised 12,000 inhabitants, was reduced to 6,000. Under FREDERICK the Great (1740-86), the population rose to 145,000. After the peace of 1815 the population was a little over 200,000. With the development of railways the population naturally increased, and amounted to 496,000 in 1860. Then came the great historic period which resulted in the creation of the German Empire with Berlin for its capital. The population of the capital increased in due ratio to the increased power, first of Prussia then of all Germany. After the Austrian war there were 702,000 and after the French war more than a million inhabitants. Now there are a million and a half persons living in Berlin, so that the population has more than doubled in twenty years. Of course this gives to Berlin an enormous advantage over other towns. The great difficulty is always with ancient property—property which has acquired considerable vested interests, but which was constructed long before the laws of public health were known or enacted. Berlin, on the contrary, was built after the principal laws of health had been demonstrated and proved. It was therefore possible to prevent the repetition of the errors of the past, and this in some measure has been done. On all sides there are broad straight streets. The fronts

of the houses are swept by the passing winds and are bathed in direct rays of sunshine. This in itself suffices to mitigate a number of minor shortcomings. Then, so that the fullest possible advantage should be derived from these broad streets, they are kept marvelously clean. The army of scavengers is set to work with the method and the spirit of discipline and organization which make the strength of the German people. The general aspect of Berlin is therefore very impressive. As an English writer observes, "there is poverty always with them, but it does not show itself in public. In large English towns we see adult men and women going about in filthy, torn rags, looking very pictures of misery and degradation, who nevertheless probably obtain in the course of the year and in one way or the other, more money than the trim, well-brushed and well-clothed poor of Berlin. The German woman is a much better housewife than the British workman's wife, and she knows how to mend and patch clothes, so that, however old and poor the material, it always looks neat and clean. The man, thanks to his severe military training, brushes himself carefully and has always a trim look about him. The clean people in the clean broad streets give at once a healthy appearance to the town. At the same time there is a reverse side to the question. The Germans, if clean and neat in their clothes, are not so clean and neat in their persons. Even among the upper classes and in the best houses the English visitor is surprised to find that a bath room is quite an exceptional luxury."

Berlin being, as already stated, situated in the midst of a sandy plain, it has been easy to find, in the immediate neighborhood, soil suitable for the creation of sewage farms. More than this, sewer farms could be established not in one or two directions, but all around the town. Thus there are a series of farms both north and south of Berlin which receive the sewage water of the town. Corresponding with these farms there are nine pumping-stations, so placed that the difficulties due to the want of fall are reduced to a minimum. In the year 1892-93 at these pumping stations a total of 61,207,240 cubic meters of sewage, coming from 22,107 houses, was raised and sent on to the farms. This was equal to an average of 7.59 cubic meters per day per house. The total population served by this system of drainage was 1,550,038 persons, which is equal to 0.108 cubic meters each day per head. The cost of pumping was 655,481.06 marks, or 0.423 mark per head. The sewage arrives by gravitation to a very large well at the station, from which it is pumped up into the closed mains and sent on to the sewage farms. The highest point on the sewage farms is 24 meters above the pumping station, and the surface of the sewage in the well at the station is $3\frac{1}{2}$ meters below the engine-room. The farthest point of the system of sewers that converge

to this pumping station is at a distance of 5,300 meters and it is calculated that the sewage does not take more than two hours to reach the pumps from this the furthest distance. In some cases the sewers are made of German hardware pipes; in other instances they are of cemented masonry, and large enough to admit a man to clean. In both instances the sewers are not self-cleansing. This is but natural, as the fall is in the majority of cases absolutely insufficient.

There are, under the ground, drains to carry away the water after it has been purified by filtering through the soil. This water goes to the neighboring water courses. At first there was an outcry raised that the rivers would be polluted and the fish killed. To meet this the authorities dug out a big pond, let the purified sewage water fill this pond, and stocked it with fish. Gold fish, carp and even trout lived and prospered here. This convinced the population of Berlin that there was nothing to fear from the purified sewage. So great was the success of the experiment that other ponds were constructed and now the municipality has added pisciculture to its many other productive enterprises. Near Weissensee there are several large ponds where fish are bred for stocking streams and for sale. The week previous to the writer's visit no less than 7,000 carp were taken from these waters and sold; some of them weighed nine pounds.

The question as to how far these farms are a nuisance and a danger to public health is still the subject of much controversy. Though there were but few cases of cholera in Berlin, itself, there were 22 suspicious cases on the sewage farms to the south of Berlin during the summer and autumn. Twenty of the patients were adults, and the disease was described as cholera nostras. A physician who lives on the spot, has written various reports in which he maintains that workers on the sewage farms drink the water from the drains and suffer from typhoid fever. Careful investigations have been made, and a full official report gives the very definite impression that there is no sufficient evidence to justify the assertion that the patients suffered from drinking the water from the drains in the sewer farms. Both in the north and south districts numerous bacteriologic examinations have been made. Not only was the water in the drains, that is, the purified water, free from the bacteria of typhoid fever, but so also was the raw sewage, when examined at its arrival at the farms. Nevertheless, it is recognized that the condition of the wells is far from good, and orders have been given to protect them more carefully from contamination by surface water. Orders have also been given to the workers on the farms not to drink the water from the drains. Apart from the question of contaminated water, it must be confessed that there are numerous pungent and very unpleasant odors. Of course, when raw sewage is thrown on the soil and comes

out of the pipe with great force, there is a general stirring up of its foul contents, which naturally causes very unpleasant odors.

Nevertheless, and though it is easy to criticise details, and though undoubtedly many defects exist, the broad fact remains that Berlin is drained throughout. There is a method of disposing of all the sewage. The death rate on the sewage farms is low in spite of occasional accidents, such as cases of typhoid fever and cholera nostras; but, above and before all, there is the great, grand result already mentioned, and which can not be repeated too often, that concurrently with the draining of Berlin the death rate has fallen from 32.9 to 19.4 per 1,000 of the population, a rate that indicates that Berlin of all the million-souled cities of the civilized world, in 1895 touched low-water mark in respect of a sanitarily depleted mortality. (London in 1894, however, touched an even lower point, namely 17.4 per 1,000.) Roughly computed this same low rate implies a gain in life-saving of between eight and nine thousand lives; or, in other words, had the rate of twenty years ago prevailed in 1895 a sacrifice of not less than 8,500 lives would have resulted, over and above the actual death-toll. Or, again, if a human life be appraised as worth to the state the average sum of \$700, as the computation of some authorities is, Berlin was the gainer by not far from six millions of dollars in the year 1895. A handsome return that is, in part at least, to be claimed as flowing from the great public works carried out in the cause of sanitation and by sanitarians.

Continuing this train of illustration a step further, let us, à la PETTENKOFER, assume that there is a loss of 36 cents for each day's sickness, for medicines, nursing, etc. We will still further assume that each registered death means thirty-four cases of illness, averaging twenty days, *i.e.*, 680 sickness-days, whose cost will be \$245, for each death. Applying this valuation to the deaths that did not occur, in 1895, as above computed at 8,500, there were 289,000 of Berlin's citizens spared from illness, and a saving in money-worth amounting to \$2,082,500.

MUSIC AS A THERAPEUTIC RESOURCE.

"Sweet Music! Sacred tongue of God."

CHAS. G. LELAND—"The Music Lesson of Confucius."

One of the daily papers of Chicago gave an account in its issue of last Sunday of the trial on a large scale of music at the Eastern Illinois Hospital, to witness the effect if any on the insane.

The paper with a childlike simplicity says that to the musical director and the superintendent "belong the honor of making the first scientific experiment of this character in the history of medicine and music."

It is indeed quite probable that the experiment on so large a scale has not before been tried, as there were about 2,000 present according to the account, but the utility of music as a therapeutic measure has been

known ever since DAVID played the harp to soothe the madness of SAUL, and ASCLEPIADES of Bithynia, at the height of his Roman popularity recommended declamation, laughter, chants and music in the treatment of disease in that early day—

"When music, heavenly maid was young
While yet in early Greece she sung."

The first systematic writer on legal medicine, PAUL ZACCHIAS (1620), recommended music in the management of insane, believing with CONGREVE that

"Music hath charms to soothe the savage breast,
To soften rocks, or bend a knotted oak."

NICOLAI, of the University of Halle, a disciple of HOFFMANN and of the iatro-mathematical school, sought to prove that the vibratory movements of the tympanum produced oscillatory movements of the nerves, which thus soothed the fiery brain.

HENRY WARD BEECHER, who, if not a physician, was yet learned in psychology, said that "music cleanses the understanding, inspires it and lifts it into a realm which it would not reach if left to itself." If we turn to that most wonderful of all collections on the subject of insanity, BURTON'S "Anatomy of Melancholy," we shall find that music is recognized as one of the potent means at the command of the alienist. "RHASIS, ALTOMARUS, ÆLIANUS, MONTALTUS, FICINUS FAVENTINUS," says BURTON, "are almost immoderate in the commendation of it; 'a most forcible medicine,' JACCHINUS calls it; JASON PRATENSIS, 'a most admirable thing and worthy of consideration that can so mollify the mind, and stay those tempestuous affections of it.' *Musica est mentis medicina mæsta*, a roaring-meg against melancholy, to rear and revive the languishing soul; 'affecting not only the ears, but the very arteries, the vital and animal spirits, it erects the mind and makes it nimble, (Lemnius). This it will effect in the most dull, severe and sorrowful souls, 'expel grief with mirth, and if there be any clouds, dust, or dregs of cares yet lurking in our thoughts, most powerfully it wipes them all away.'" Numerous quotations with the quaint commentaries of BURTON follow, and he says, "besides that excellent power it hath to expel many other diseases, it is a sovereign remedy against despair and melancholy and will drive away the devil himself."

The writer of this article twenty-four years ago¹ reported a case of cerebro-spinal fever where the restlessness of the patient, who finally recovered, was controlled by the playing of a violin, and the patient slept sweetly under its power, soothed by the influence of music which

"Waves eternal wands
Enchantress of the soul of mortals."

The voice of antiquity while thus commending it, seems insensibly to have yielded much to the general power of music in making these concessions, but some of the ancients counseled caution; PLUTARCH affirms

¹ New York Medical Journal, "Cerebro-spinal Fever," by J. B. Hamilton, XXI, 1875, pp. 113-126.