SESSION 1906-1907

Report of Sanitary Congress Meetings

By Mr. CHAS. WILLIAMS (Member)

At the Sanitary Congress recently held in Bristol the Council did me the honour of electing me to be its rperesentative, and at the same time our Hon. Secretary asked me to write a *résumé* of the meetings, or such part as would be of interest to my fellow-members of the Institute of Marine Engineers.

The meetings were certainly well representative of various fields of thought, and although the papers were not quite what we should have discussed at our Institute, I think they may interest us as men and citizens if not as marine engineers, although we must not forget that an engineer to-day is expected to know almost everything, and has often to advise on subjects which are far removed from the ordinary scope of a marine engineer.

Sir Edward Fry, the President, started the meetings with an excellent presidential address, after a reception by the High Sheriff at the Victoria Rooms. He spoke of the advancement in science generally, and of the interest it would give to trace the line of progress of the different sciences, of electrical engineering, and the even more marked advancement in sanitary science. In the good old days the head of a household, in the event of the appearance of scarlet fever or even of smallpox, would call in a doctor, keep the bedroom door shut, and *assume* his drains were in perfect order, except when some sudden outburst of horrible odours called upon him to throw two or three bucketfuls of water down the orifices in his house ; when

he had done these things he assumed he had performed the whole duty of man. Now all is changed: patients are secluded in separate rooms, a sheet wetted with disinfectants hung over the door, and later on drains are tested with the smoke test, and innumerable things demanded by those in authority.

After a most interesting description of the sanitary arrangements in old Rome, he warned all the members present that there was still one disease which was incurable, and they would need to be guarded against it. It was even worse than a large number of diseases they were going to discuss in the coming days, that was "Bacteria on the Brain."

The papers discussed in the Engineering and Architecture Section were principally on subjects of little practical help to the marine and mechanical engineer, but I will just give a small idea of their nature :—

1st. "The Construction of Isolated Homes for the Aged Poor *versus* the Workhouse."

This was an interesting paper, and several very complete plans of isolated homes were shown by the author, Mr. Saxon Snell, B.A. There was rather a warm and interesting discussion on whether we were not trying to make the pauper too comfortable, and so making him feel there was no need for thrift, although I think the majority were in favour of rather adding to the comfort if it did not increase the rates. The author contended that isolated homes would prove a very great saving to our present system of workhouses, as well as being to the moral improvement of the pauper.

2nd. "The Utilization of Old Pits, Quarries and of Cliffs for the reception of Rubbish."

There was a general agreement with the author, Mr. Woodward, F.R.S., that it was both unsightly and a very unsanitary condition of affairs, and a hope was expressed that at no very distant date this should be stopped by all local authorities.

3rd. "The Bacterial Treatment of Sewage," by Stuart H. Davies.

This paper explained the method generally adopted, and led to a rather lively discussion on the various principles, whether filtration through ashes was not equal to bacterial treatment in the septic tank, etc., etc. I have enclosed a proof copy of this paper and of all the other papers, so that the members can read through any paper which may prove of interest to them, because it is impossible, as well as being boredom to

you all, for me to attempt to give a *résumé* of all the papers discussed.

The paper on "Rural Water Supplies" led to an interesting and animated discussion on the robbery of water by the large towns and water companies, leaving the villages absolutely in want.

One of the most instructing items in the whole programme was a lecture by Professor Lloyd Morgan on the "Relation of Heredity to Physical Degeneration." The interesting points of this lecture I will try and give you to the neglect of the other papers. The lecturer commenced by pointing out the patent fact that thousands of our fellow-citizens are born and bred under conditions which preclude normal and healthy development. Anæmic, underfed, and overworked mothers bear to alcohol-tainted husbands children who draw breath in an environment which, partly through ignorance, partly through wilful neglect, is hopelessly insanitary, and who are reared with little regard to hygienic principles.

This lamentable state of matters we must seek to remedy, and it is the functions of this Society to devise practical means for the improvement of the conditions of human development. Heredity is a biological problem. It is true that the life-circumstances of human dwellers in great cities differ from those which form the environment of wild animals; yet the cardinal principles of heredity are the same for man and other mammals.

The professor then went on to say he wished to speak of the relation which the influence on the condition of nurture bears to the hereditary nature of the individual and the race. After a careful explanation of the problem under consideration, the lecturer pointed out that the rate of multiplication among various classes into which the community could be divided was one of the factors affecting deterioration.

He divided all the people or race into three classes.

In the first the race improves.

In the second the race neither improves nor degenerates.

In the third the race degenerates.

All legitimate and decent means should be adopted, largely through the pressure of social opinion, which might lead to an increase of births in that section of the community which contained persons above the level of mediocrity, and a relative decrease in the births in which deteriorations were noticeable, i.e. increase the first and decrease the third. Under proper con-

ditions women increase in height from their mothers in a definite co-relation.

Taking nature again, wild animals usually are born and mature as they ought and were intended to be. Not so in Man—but why ? We have to pay the penalties of a highly evolved civilization. Do we not see thousands of pale peaky boys and girls in the congested part of our great cities, who grow up under conditions which must prevent their attaining the strength and vigour which they would have possessed under more favourable circumstances ? Also note the thousands of office-bound men and women who break down under the strain or monotony of their work through no hereditary defect, who would not break down were their lot less severe. These are the penalties, but mark the implication. The child came into the world the heir to a constitution in virtue of which he may reach a level of physical development, the limits of which could with adequate knowledge be assigned.

The lecturer pointed out that deterioration in the race did not necessarily imply degeneration in the stock. He took the parable of the sower as an illustration. The grain sown on inhospitable stony soil for a dozen generations showed a deterioration of crop but there need not be degeneration, and cultivated under favourable conditions, the seed produced by the twelfth generation might produce a hundredfold.

By deterioration they understood a lowered level of development ; by degeneration a lowered level of the hereditary possibilities of such development, no matter how satisfactory the conditions might be. The latter was a far more serious matter than the former.

Usually physical and mental deterioration as such do not lead to degeneration, or, to put it in another way, deterioration in one generation is not handed on as degeneration in the next ; and conversely, physical and mental improvement does not lead to greater hereditary endowment in succeeding generations. This is not accepted by all, but after a prolonged discourse of the reasons, etc., the lecturer said we might accept as a usual course of events, that acquired characters are not inherited, and consequently the individual deterioration due to unsatisfactory conditions of development is not transmitted to the offspring.

There is little doubt that certain drugs taken into the system contain certain products of the microbes of disease, and certain

by-products of the tissues act as poisons, and not only hinder the development of the body but impair the functional efficiency of its organs; in other words, they lead to deterioration. In the case of alcohol taken to excess it is commonly believed that it gives rise not only to deterioration in the parents who are addicted to drink, but also to a liability to certain nervous and other disorders in their children, who are thus so far degenerate.

The best that can be done is to open people's eyes to the fact that in the matter of heredity we do not live in a haphazard world in which the physically degenerate have just as good a chance of bearing healthy and vigorous children as their more happily constituted neighbours. Granting that the hereditary possibilities are to a large extent beyond our control, we must quicken a realizing sense of responsibility in the parents, and strive to do all possible to diminish deterioration and improve the conditioning environment.

Another interesting paper was given by Mr. Freeman on "Cremation: its bearing on Public Health."

He said the disposal of the dead is one that will shortly form the most paramount question of the day, and one that will demand the serious consideration of all municipal and burial authorities.

The object of placing a dead body beneath the surface of the ground is that the earth may absorb and neutralize the products of gradual decomposition. This result is only very imperfectly accomplished.

We bury over 500,000 bodies each year, and assuming each body to weigh 8 stones, it means we place 4,000,000 stones of putrefying flesh and bone into our land yearly. Can we believe that this great amount of decomposing matter is attended with no evil effects to those living in the immediate neighbourhood? as well as wholesale poisoning of the earth and water springs.

Also with cremation there is less fear of premature burial, because before a body can be cremated, two independent medical certificates must be presented to prove the person or body is dead. In the event of those two opinions being of a mistaken character, that death had not occurred, there can be no return to consciousness, no suffering or pain, for the high temperature (1,800°) would instantly stop the action of the heart, and death would be of a painless character.

He also went on to state that greater care could be enforced if cremation became the general practice, so there need be no fear of a human body being cremated without a certainty of previous death.

In addition to the reading of papers a large number of works were opened to the members and delegates, and I do not think I can do better than give a few particulars of the works of which I am Engineer-in-charge.

About 150 of the members visited the works here, and were afterwards entertained by one of our directors, Lord Winterstoke, to lunch.

YEO PUMPING STATION.—Two Engine Houses, each of which contains :—

Two compound rotative beam engines.
Estimated maximum indicated horse-power, 170.
Speed, 17 revolutions per minute.
Cast-iron beams, length, 28 ft. 5½ in. cr. to cr. of end gudgeons.
H.P. cylinder, 21 in. diameter, 5 ft. 3 in. stroke.
L.P. cylinder, 34 in. diameter, 7 feet stroke.
Surface condensers, measuring tanks for testing, etc.
Main pumps, buckets are ram type, one to each engine, 30 in. diameter × 3 ft. 6 in. stroke.
Delivery, each pump per revolution 107 gal., 2,600,000 gal. per 24 hours, after allowing for slip; both engines working together deliver nearly 5,000,000 per day (24 hours).
Maximum head against pumps, 250 ft.

Boiler House, containing :—

Six Lancashire boilers, 7 ft. 6 in. diameter, 30 ft. long.
Mechanical stokers by Vicars & Co.
Two sets Green's fuel economizers.
Feed pumps in duplicate.
Steam pressure in boiler 100 lb. per square in.

Two Coal Stores :—

Coal delivered by railway wagons to gantries.
Capacity of each coal store up to level of gantry 365 *tons*.
Elevator in each coal store for supply of coal to mechanical stokers of boilers.

YEO RESERVOIR.—Area of watershed draining to reservoir, 5,300 acres.

Area of surface of water when reservoir is full, 450 acres.
Capacity of reservoir, 1,770,000,000 gal.
Maximum depth of water, 37 ft.
Compensation water delivered daily to river below embankment, 1,900,000 gal.

Length of embankment, 530 yd.
Height of embankment, 43 ft.
Puddle trench sunk through the red and variegated marls, and a layer of conglomerate on to a bed of watertight red marl. Maximum depth of trench, 175 ft.
Main valves in tunnel, two sets in tandem, each 4 ft. 9 in. × 1 ft. 9 in.
Length of weir at head of by-wash for passage of floods, 180 ft.

In addition to this there is a system of drainage for villages, farmsteads, etc., within the watershed of the Yeo Reservoir.

The drainage treatment works were by the Septic Tank Syndicate's system, comprising a grit chamber, septic tanks, filter beds, etc.

CHARLES WILLIAMS,

November, 1906. WATER WORKS, BLAGDON.