

AUGUST, 1898.

There was a large attendance at the monthly meeting of the Royal Society on Monday, August 8th, when the President, His Excellency the Governor (Viscount Gormanston, G.C.M.G.), presided.

Apologies were received from the senior Vice-President (Sir Jas. Agnew, K.C.M.G.) and His Lordship the Bishop of Tasmania.

The SECRETARY (Mr. A. Morton) also read a resolution passed by the medical section of the society, requesting Dr. Sprott to read his paper on Typhoid and the Metropolitan drainage scheme.

NEW MEMBERS.

The following new members were balloted for and elected:—Rev. C. H. Talbot, and Messrs. W. H. Dawson, Oscar E. Hedberg, and W. T. Brown.

TROUT FOR ENGLAND.

His EXCELLENCY called attention to the photographs in the room of some trout from the Great Lake, sent for exhibition to England. He had been allowed to select two of the fish to send to two of the principal sporting papers, in order that the great and grand sport in fishing—for it was such—to be obtained in Tasmania might be made more generally known in the Old Country. Sportsmen at Home might, during the close season there, come to Tasmania and enjoy splendid fishing.

PAPERS.

“NOTES ON A SURGEON OF THE TUDOR PERIOD, AND HIS WORK.” By Arthur H. Clarke, M.R.C.S., etc.

Dr. ARTHUR H. CLARKE read a paper on the surgeon of the Tudor period and his work, which was full of quaint interest to the medical profession. The paper dealt mainly with a part of a book by Wm. Clowes, one of Queen Elizabeth’s “chirurgeons,” surgeon to St. Bartholomew’s Hospital and to Christ’s Hospital, and a prominent Fellow of the company of Barber-surgeons, and who had served as an army surgeon for many years. The description given of amputation of the limb in those days without anæsthetics was of a very striking character.

“CAUSE AND PREVENTION OF TYPHOID FEVER, WITH SPECIAL REFERENCE TO THE PROPOSED METROPOLITAN DRAINAGE SCHEME OF HOBART.” (Diagrams.) By Gregory Sprott, M.D., etc., Health Officer for the City of Hobart.

Dr. SPROTT, who was received with applause, first spoke of the present being an opportune time to lay before the Society certain facts and figures connected with the cause of typhoid fever generally and modes of prevention, with special reference to the proposed metropolitan drainage scheme, as a guide to voting upon it. He traced the history of typhoid (also called enteric fever, and frequently

designated as “low,” “colonial,” “fog,” and “fall” fever) from the days of the early Greeks. It was found to-day in all parts of the world, and was the scourge of the new world. In 1830 Drs. Scott and Milligan reported that an epidemic of it occurred among British troops stationed at Hobart, and which was then described as “colonial fever.” Experiments recently made proved that the vitality and multiplication of the bacillus were increased by the increase of temperature in the soil. It was found in the liver, spleen, and other glands, but very rarely in the blood. It was chiefly found, however, in the abdominal discharges of those afflicted, and, contrary to popular opinion, in the saliva and urine, and therefore great care had to be taken in effectually destroying these. In the soil, if it contained much organic matter, it multiplied to an alarming extent, and was common in every Australasian city in summer time; but in winter it was checked, because the temperature was not favourable. Operations for developing cultures of the bacilli were explained. The bacillus revelled in moist, porous soils, and especially in a filth-laden soil. He regretted to think that there were still citizens who argued that when Hobart had cesspits in use, and consequently soil pollution, there was no typhoid. The instance he had quoted showed there was then typhoid in the city; but if the argument was good, then we ought to revert to a system which had been characterised as one of the greatest blots of the 19th century. We were now suffering from the effects of that very system, which polluted the soil, and from the neglect and shortcomings of our forefathers in that very respect. Pollution of soil in yards and gardens was a very fertile means of increasing the trouble, unless very active vegetation was going on. Household slops, and other refuse thrown about, and surface gutterage led to soil pollution; also dirty interiors of houses of all kinds, which harboured the bacilli. The channels of infection were next explained, the lecturer laying especial emphasis on the dangers of unboiled milk, unboiled drinking water, and eating raw vegetables that had come in contact with the soil, such as tomatoes, lettuces, cress, watercress, etc. The water might be tainted at its source, in its storage, carriage, or distribution. In cities, with surface gutterage and incomplete flushing, with all household and bedroom slops emptying into the same, and probably containing not only the germs of typhoid but of other diseases, it was not to be wondered at that in dry, hot weather, the disease should spread. Flies often

played a part in carrying the germs into houses under such conditions. Ice creams were condemned on account of the danger of conveying germs; also dirty cow sheds, and a tainted milk supply. Cows were often kept in small yards, without regard to cleanliness, and this often applied to country districts as well as to towns. A company was being formed to sell Pasteurised milk in the city, which should be a great public boon. There should be careful selection of building sites, so as not to build on ground made up of all kinds of filthy haulage; there should be good ventilation, with plenty of sunlight in the rooms; subsoil drainage to remove all dampness; paving of yards to prevent exhalations and soakage; active cultivation in gardens to keep the soil pure; removal of all garbage, and the destruction of the same; and a proper system of drainage to carry away all waste products. It was very necessary that all household garbage should be removed, and he trusted ere long to see in Hobart a Destructor in operation for this purpose. He next dwelt upon the necessity for a proper system of drainage to carry away all waste products as quickly as possible. It might be argued that drains and sewer gas were means of spreading typhoid, but that was very doubtful. With a properly constructed system of sewers, well ventilated and trapped, there need be no fear of sewer gas. The prevalence of typhoid fever had diminished in every city or town where underground drainage has been established. When Hobart got an underground system of drainage there was every reason to believe that the prevalence of typhoid would be greatly diminished, though it would be going too far to say that it would be eradicated—at any rate for some time to come. Great care would have to be exercised during the disturbance of the soil, in laying the sewers, to prevent the possibility of the disease increasing. In the end, however, the benefit must indeed be great, and typhoid, it might be reasonably hoped, reduced to an occasional visitor. The necessity for underground drainage was made very evident to those who had to do with the sanitary conditions of the city. He exhibited figures and charts showing the marvellous improvement effected by underground drainage as regards typhoid and the death-rate in numerous cities and towns. By these means typhoid in England had been reduced from 3·9 deaths per 10,000 in 1869 to 1·7 in 1891-1895. There was a reduction of 50 per cent. of typhoid cases in 25 towns after underground drainage was introduced. In Cardiff it was reduced from 17·5 in 1847 to 1854 to 4·0 in 1884-1888; Leicester, 14·5 to 2·2; Bristol, 10·5 to 1·4. Numerous other instances were quoted. In Sydney in 1886 it stood

at 9·9, and in 1895 at 1·9. In Hobart it has been flitting up and down without any tendency to decrease. The death-rate from other causes was also much reduced by drainage. In spite of these figures there were some who continued to argue that underground drainage would not be the means of eradicating typhoid; and, further, that there were cities even within the boundaries of the Australasian Continent which had surface drainage and a pan system, and which enjoyed immunity from typhoid fever. Ballarat had been cited. A member of the House of Assembly during the discussion on the Drainage Bill gave that city as an example of what could be done without a drainage scheme. He (Dr. Sprott) had taken the following figures from the health reports of Victoria. In 1892-3-4 there were reported in the city of Ballarat, with a population of 22,199, 55, 53, and 125 cases of typhoid in those respective years. In 1896, typhoid was so prevalent there that the Ballarat City Council asked Dr. Gresswell to advise as to the best means of preventing the annual recurrence of typhoid in that city. During the first two months of this year there were registered in Ballarat and suburbs, with a population of about 40,000, 13 deaths from typhoid—a higher rate than in Hobart during the same two months. How, then, could anyone quote Ballarat as being free from typhoid? A recent report by the Health Officer of Nottingham reported that there, while other conditions were uniform, there were three classes of houses, namely, (1) those with midden privies, (2) pans, (3) water-closets. The Health Officer took the average number of cases from 1887 to 1896, and reported as follows:—There was one case of typhoid per annum for every 37 houses with midden privies; one in every 120 houses where pans are used; and only one in 558 houses provided with water-closets. Many of the first group were houses of a good character, while the water-closets were by no means confined to superior neighbourhoods. Such a report as that (Dr. Sprott continued), with other facts already given, should convince anyone that the water-carriage system, as far as the prevalence of typhoid fever was concerned, had everything to recommend it. As far as cleanliness and comfort were concerned, no one could doubt the superiority of the one over the other—in fact, people who had been accustomed to the water-carriage system had a horror of being anywhere in the vicinity of a conservancy system. It must be remembered that Melbourne would shortly have what Sydney and Adelaide had already accomplished; and if Hobart refused to follow the

example of those large centres, she would be the only capital city without a proper drainage system for the disposal of organic refuse. There were three objections which had been urged against the metropolitan drainage scheme:—(1) It would cost too much money. (2) If the outlet be at Macquarie Point, the River Derwent would be polluted, and the health and comfort of the residents of Sandy Bay and Lower Queenborough would be interfered with. (3) The water supply was inefficient. As to the first objection he believed the cost would be money well spent. They were assured that it would not involve a higher rating than the present sanitary rate; but if an extra penny had to be paid, he believed the citizens would not grumble. The present system entailed a rating of 5d. in the £1, which gave an annual amount of £4,365. This amount, however, did not represent the actual cost to the ratepayers and owners of property. Owners were continually called upon to provide proper drainage to their houses, and the cost of this, to his knowledge, in many instances had been very great. Unless a comprehensive scheme such as was now proposed was introduced, the present patchwork and expensive system must continue. The present cobble gutters were, in many instances, quite good enough to carry away storm water, but wholly unfit to carry sewage. If, therefore, these gutters had to be taken up, and cement or cube stone substituted, the expense would go a long way towards the drainage scheme. He did not mean to say that the cobble gutters were to be allowed to remain in the centre and more populous parts of the city. It would be desirable to have the side channels in the well-formed and busy streets nicely made, and attractive to the eyes of visitors, even with underground drainage. Labour, in the way of scavenging and street-flushing would be to a great extent lessened, and all this meant money. They were informed that the drainage scheme would cost £75,000—£45,000 for sewers and £30,000 for house connections, the cost of which, with house fittings, were to be capitalised. They were told that the money could be borrowed, under a Government guarantee, at 3 per cent., and a sinking fund of 1 per cent. to be added. Repairs were put down at 1 per cent. Labour, flushing, and administration at £1,000 per annum, so these figures came out thus:—Interest on £75,000, at 3 per cent., £2,250 per annum; sinking fund, at 1 per cent., £750; repairs, at 1 per cent., £750; flushing and administration per annum, £1,000. Total cost per annum, £4,750. The ratable value of all the properties in the area, including Crown property, was at present

£230,000, on which a rate of 5d. in the £1 would amount to £4,790. It was evident, therefore, that the present rate of 5d. was correct, and would give a little more than was necessary. Dr. Sprott then contrasted this with the present cost of typhoid fever, referring to what each case cost in medical assistance, nursing, extras, and loss of earnings, to say nothing of the death of bread-winners and those nearest and dearest. As to the allegations that if the sewage was discharged into the Derwent at Macquarie Point it would cause river pollution and nuisances, he held that it would not be so. Sanitary engineers, including Mr. Napier Bell, had said it would not be a nuisance, and regarded assertions about nuisances being created as exaggerations. A large number of the most pleasant towns in England discharged their sewage into the sea, or into the harbour in front of the town, without any ill-effect. Much of lower Hobart sewage, including a great number of water-closets, already discharged into the harbour. He quoted Mr. Napier Bell's report on this point. Because certain matters, such as apple peelings, stalks of cabbage, driftwood, shavings, etc., could be seen on the shores of Sandy Bay, it did not follow that sewage would be carried in the same way. It would be discharged into deep water, and would at once mix. Should it be found, however, that the river became polluted by the discharge of the sewage, it would be quite competent for the Drainage Board to have the sewage purified before discharging, but he did not think any process of the kind would be necessary. He referred to the rivulet's discharges and the numerous discharges of closets, of slops, etc., into the river now. And not into the current, but into the shallow water at the margin. All that would, with a proper system of drainage, be obviated. It might be well, in taking the vote of the ratepayers, to ask them to also declare whether they were in favour of emptying at Macquarie Point or incurring the extra expense of £40,000 in going to One Tree Point. Perhaps the objection raised with most force had reference to the water supply. The present supply was 63 gal. per head per day. In April, 1896, the Director of Waterworks reported that 200,000 gal. were to be accounted for by leakage or illegal use, which meant 6½ gal. to each person for water-closet flushing. During last summer, the driest time for 25 years, the supply was 50 gal. per head per day. That should be sufficient for all purposes. Sydney had carried on an underground sewerage system for nine years with between 32 and 42 gal. per head. Munich did so with a supply of 33 gal. per head; Brisbane, 33; London, 28; Liverpool, 19; Southampton, 35; Sheffield, 20; Edinburgh, 35; and Paris, 31. Seventy-two

English and Scotch towns averaged 26·7 gal. per head of the population, including factories, for water supply and underground drainage purposes. At Glasgow, the best drained city in the world, and managed on the most modern, up-to-date principles, with an unlimited supply of water if desired, they never exceeded 50 gal. per head per day, and there they had water-closets in every house. In the very driest season Hobart had never a less supply than Sydney. He had been told that in Hobart so much water was used for irrigation. Well, the greater shame that people should so use the water if there was not enough for the health of the city. The Board and the engineer held that the present supply was sufficient for an underground drainage system; so also thought the City Surveyor and Director of Waterworks. In conclusion, he urged that no private or selfish interests should be allowed to interfere with an effort being made to improve the health of the people of the city, the health of a people being the wealth of a nation.

Dr. BRIGHT moved a hearty vote of thanks to Dr. Sprott for his able paper, and that discussion on it be postponed till the next meeting; also a vote of thanks to Dr. Clarke for his interesting paper. In doing so the speaker said Dr. Sprott's paper must have involved a very large amount of labour, research, and study, and was one of the ablest and most valuable he had heard read in that room. He hoped it would be printed by the next meeting. The present drainage system was evidently so bad that it ought to be altered if possible.

Mr. A. G. WEBSTER seconded.

His EXCELLENCY, in putting the motion to the meeting, said he quite agreed with the hint that such a valuable paper should be printed and then fully discussed, and he hoped, if possible, to be present at the discussion of it. As regarded Dr. Clarke's interesting, and in parts amusing, paper, he would not refer to it at that late hour, though he could tell some few things he happened to know appertaining to it.

The motion was then passed.

DESCRIPTION OF A NEW "CORDYCEPS." By L. Rodway.

Mr. L. RODWAY read a paper on a new Cordyceps. He explained that it dealt with a fungus that attacked the caterpillar. It was a fourth species, and was found in Tasmania by Mr. H. Stewart Dove, at Bischoff, and named after him.

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A meeting of the Royal Society of Tasmania was held on Monday, August 22, at the Tasmanian Museum, when a discussion took place on a paper lately read

by Dr. G. Sprott on "The Causes and Prevention of Typhoid Fever." The Hon. C. H. Grant, M.L.C., presided.

Dr. R. S. BRIGHT spoke of Dr. Sprott's paper as an admirable and highly instructive one. We could have the same good results here with respect to typhoid as Dr. Sprott showed had been obtained elsewhere. There was very little that was debatable in the paper. He entirely agreed with all that it contained. He placed contagion amongst the first as a cause of typhoid, though Dr. Sprott did not attach much importance to it. We had had a considerable amount in nurses and other people which could not be explained except by contagion. He was a very firm believer in typhoid being taken by inhalation—of which he had seen examples. He had seen instances of where it was caused by old disused and foul cesspits which had been forgotten. The use of disinfectants ought to be continued for some weeks after the patient became convalescent. The foul odour from the so-called sanitary carts had caused typhoid by inhalation. Another *causis* not generally recognised was the failure to report cases to the Central Board of Health, especially if the ordinary precautions had not been taken. However, there was less carelessness in this respect than there used to be. He agreed with Dr. Sprott as to the contamination of milk and water by sewage being a common cause of typhoid. He was afraid the boiling of milk and water before use was very seldom done. There was a widespread fallacy that drinking water from a running stream was safe. The fact was that such water was often exceedingly dangerous. Dr. Sprott mentioned that typhoid had been caused by eating oysters taken from the mouth of a sewer. Cases of that kind had occurred at Dublin and Brighton. There was another fallacy he should like to contradict—that when there were cesspits in Hobart there was no typhoid. That statement was incorrect; but there was certainly less than there was now under the pan system. There was typhoid in Hobart a great deal longer ago than some people admitted. With respect to the burying of nightsoil, soil was a great purifier, but there was a limit to what it could do. A strong point made by Dr. Sprott was that the germs of typhoid lived 268 days in the ground. Those germs might be brought to the surface by earth worms, as occurred when cattle that died of the Cumberland disease some years ago were buried. With regard to prevention, the early recognition of the disease and the seeking of medical advice at an early stage was of importance. Cases were made more serious by delay. It was appalling the distance some patients were brought when they were

three weeks ill with the fever. Burning was the best plan for the disposal of excreta. Water mains, 25 or 30 years old, should be taken up or cleaned, or looked into. A large amount of impurities must remain in those mains. In other places than Hobart he had seen the mains cleansed with a brush. Dairy inspection in town and country was highly necessary. Many who kept cows did not realise the importance of keeping the dairy and cattle in a cleansed condition. Milk was a highly absorbing substance. The water supply of the cattle should also be inspected. The selection of building sites, drainage, and the pavement of yards were all admirable. He believed thoroughly in underground drainage, and its applicability to Hobart. We were assured there was sufficient water if it were not wasted. It should be seen that the water was not wasted, and the supply might be arranged more advantageously as to area. Personal and domestic cleanliness was of great importance. If people kept themselves, their houses, and back yards clean they would have better health, and be far less liable to disease. The pans were now found to be far worse than the cesspits, and it was time we tried the water-closet system. When it was remembered that a pound of sewage would mix with 4,000 or 5,000 gallons of water in the Derwent there was nothing to be afraid of in connection with that system.

Dr. BENJAFIELD criticised Dr. Sprott's paper adversely at considerable length. He said that if there was more typhoid in the big houses, those were the houses that had water-closets. He expressed himself as opposed to the water-closet and deep sewerage system. It was erroneous to attribute the reduction of typhoid in other cities to drains.

Mr. A. MAULT said he listened to Dr. Sprott's paper with unmixed pleasure, and to Dr. Benjafield's criticisms with unmixed astonishment. The latter's arguments were captious, and he utterly misunderstood Dr. Sprott. Mr. Mault confined his further observations to an explanation of the proposed system of metropolitan drainage.

Alderman G. S. SEABROOK stated that the Corporation obtained from Melbourne the apparatus for cleansing the water mains, but it was found it could not be used here because the pipes were not all of the same size bore. If the water-closet system were introduced he had no fear on the score of water. The question of cost was the one which gave him anxiety.

Mr. R. M. JOHNSTON said that though an improved sanitation would not prevent epidemics it would reduce the death-rate. He believed in deep drainage for a city like this into the deep water of the sea. Let them look at the matter

from a practical and not a narrow point of view. The town should be made pure and sweet apart altogether from the question of typhoid. The strong smells, though the least harmless, were very offensive and prejudiced the people against the city. Let us carry out the first stage of our scheme, and extend or correct it in the future as might be necessary. He would say that too little credit was given in the lowering of the death-rate to increased skill in treatment and nursing.

Dr. SPROTT, in reply, requested Dr. Benjafield to furnish him with the title of the book containing an adverse criticism of the experiments he had quoted by Drs. Martin and Robertson.

Dr. BENJAFIELD: Dr. Vivian Poore's "Rural Hygiene," which I now hold in my hand.

Dr. SPROTT, continuing, said that statement was like many others made by Dr. Benjafield, not in accordance with fact. He knew the book mentioned, which was a good work on Rural Hygiene, but he wished to inform his audience that this book which Dr. Benjafield had said condemned these experiments was published in 1894, while the experiments performed by Drs. Martin and Robertson were not begun till 1896, and not completed till nearly the end of 1897. How then could Dr. Benjafield stand up and say that Dr. Poore's book refused to recognise these experiments as being of any value? He was inclined to believe that Dr. Benjafield had taken upon himself to use Dr. Poore's name to give weight to his own arguments. It was a great pity that the subject had not been dealt with on its merits in the interest of science and truth. If Dr. Benjafield was a believer in returning all sewage to the soil, he had a right to his opinions, but it was not a practical way of dealing with the sewage of large cities like London or Glasgow, and could not even be carried out effectually in Hobart. To tell the citizens of these towns they would have to revert to the earth system would be the signal for a rebellion amongst them. It was simply absurd to talk of every householder burying the excreta in his garden or yard; besides, it has been conclusively proved that the pollution of soil is an important factor in the production of disease. Dr. Benjafield had stated that water closets were the principal cause in the production of typhoid fever, and he instanced the illness of the Prince of Wales as being a case in point. Now Professor Corfield's report shows that he believed the Prince of Wales got typhoid through eating some contaminated food. The W.C. was certainly not at fault. If drainage and sewerage were not the means of reducing the prevalence of typhoid, it was peculiarly interesting to note that in every city there was a marked

reduction of typhoid after drainage had been effected. He did not contend for one moment that typhoid would be eradicated from Hobart if the proposed scheme was carried out, but from the results obtained in other cities he believed this prevalence would be much reduced. Dr. Benjafield had further alleged that sewer air would be admitted into the dwellings, and that typhoid would be produced rather than lessened. There was no likelihood of this if the system was properly constructed. Ventilation would be amply provided for, and with proper trapping no such result was possible. In Bristol there was a system of sewerage without any ventilators at all, and although this was a novel system, judging from the typhoid death-rate Bristol was indeed a sanitary city. He did not believe sewer air was the means of conveying the typhoid bacilli, the weight of evidence was very much against this idea. Koch, Miguel, had both failed to detect the typhoid organism in sewer air, and in a recent report "On the result of investigations on the Micro-organisms of Sewage," by Dr. Andrews and Parry Laws, for the London County Council, it is stated "That the air of sewers themselves should play any part in the conveyance of typhoid fever

appears to us as the result of our investigations in the highest degree unlikely." He did not believe altogether in the theory of aerial infection. From his three years residence in the General Hospital, he had not observed a single case amongst the nurses. He agreed with Dr. Bright that infection was undoubtedly spread by patients convalescent from typhoid. In conclusion, he expressed a hope that the proposed drainage would become an accomplished fact. With such a system Hobart would not only be one of the healthiest cities, but one of the cleanest in the Australasian colonies. He had been in India, America, and other countries, but had never been in a place he liked better than Hobart, which was the finest city in the colonies. It would be a good business speculation to have the city not only healthy as it was, but clean and attractive to visitors.

The CHAIRMAN, who mentioned he had had typhoid fever in an American city, said he thought more noise was made about it than was necessary. He would prefer to see a good water supply to a system of underground drainage.

A vote of thanks to Dr. Sprott terminated the proceedings.