of the conjunctiva of the eye and other mucous membranes with liquids not strong enough to injure the living cells of the skin. The best method of antiseptic treatment of the intestine, merely relative as its efficacy might be, was now recognised in the use of drugs which produced frequent and abundant evacuation.

How were we to square the conviction that so many of the microbes usually found in the body were injurious with the argument, drawn from the work of Darwin, that if our microbes are so dangerous they ought long ago to have been eliminated simply by the operation of natural selection? One observed constantly that not merely natural characteristics unfavourable to their possessor's life, but even organs which had merely ceased to be useful to him, disappeared more or less completely. To bring out more clearly this paradoxical aspect of the survival of our microbes, most of which were not merely useless but unquestionably injurious, he would draw attention to the fact that the very organs of the body which sustained this flora were themselves for the most part either useless or injurious to health and life. They would remember that the ducts of the capillary follicles in the skin were the seat of a microbian vegetation often composed largely of microbes capable of producing more or less serious disease. Well, those follicles were useless organs, and represented merely what was left of the hair that covered the skin of animals who were our ancestors. In the digestive apparatus of man, the part of the body richest in microbes, there were also to be found parts which, to say the least of them, were now useless. The vermiform appendix, for instance, was the remains of an organ which was more fully developed in our animal forefathers; in the anthropoid apes it was already found in the process of reduction. Even the stomach, that organ which might seem so indispensable for digestion and the normal existence of man, was in reality nothing but a large reservoir for food, a reservoir which could without serious inconvenience be dispensed with. There were at that moment four persons living without stomachs, and thus furnishing a strong argument against the utility of that organ.

Of all the parts of our digestive system it was certainly the small intestine alone that was indispensable to the continuance of life. And yet in man, who could support himself on food easily digestible, the small intestine was disproportionately fully developed. Instead of having it between 18 and 21 feet long, man might do with one-third of that length. Kukula reported a case in which he had removed almost two-thirds of the small intestine with the greatest advantage to the patient. In one case Körte had removed, together with part of the small intestine, the greater part of the large intestine, leaving only the terminal section. As a result of this operation the patient had been completely cured. He could cite other cases of successful surgical operations to prove the uselessness of the large intestine to human beings. In one case the whole of the large intestine had atrophied of itself, without operation, in consequence of a fistula, without interfering with the active life of the subject. The sum of all this was that we possessed a voluminous and highly developed organ, the large intestine, which fulfilled no useful function and bred a very copious and varied mass of microbes, capable of injuring us through their poisons.

In face of thisf act it remained to ask what the large intestine was, what its origin and the reason of its existence. The history of the capillary follicles was comparatively simple, for they were the surviving traces of hair which had protected from the cold the animals from which man was descended. The large intestine, on the contrary, was no mere relic, but an organ highly developed. It was, as a rule, found only in the mammiferous animals, and not in birds, reptiles, or others of the lower vertebrates. Dr. Metchnikoff went on to trace in some detail the development of the large intestine to the prevalence of certain special conditions in the life of herbivorous vertebrate animals capable of running at great speed, conditions no longer present in the life of their descendants, and no longer calling for the peculiar organisation developed to meet them. The slow tendency of evolution to bring about the atrophy of such organs or characteristics might, however, be assisted by medicine and surgery, medicine coping more effectually with the noxious microbes and their effects, while the progress of surgery had already brought it within its power to remove by operation organs or parts of organs propitious to the growth of the "flora."

Dr. Schunck proposed, and Prof. Hickson seconded, a vote of thanks to the lecturer, and the resolution was carried by acclamation.

MODERN METHODS OF GAS MANUFACTURE.

A PAPER on modern practice in the manufacture and distribution of illuminating gas was read by Mr. Harry E. Jones at the meeting of the Institution of Civil Engineers on April 16, and some of the points dealt with are here summarised.

The author remarked that improved returns from residuals at gasworks have been obtained by giving greater attention to the saving of fuel by the use of generator furnaces; by manufacturing the ammonia at the gas-works; by the preparation of cyanogen; and by the more extensive application of the antiseptics which are largely and cheaply produced from the tar.

The enrichment of gas, by reducing the return from residuals, has adversely affected the progress of gas-supply. The materials needed are all costly, and yield no return. Moreover, with incandescent burners, the cost of enrichment is wasted. Of the means of enrichment available, carburetted water-gas is preferred for cheapness and permanency. The advantages of this method are: facility for rapid and considerable addition to the output of gas, and for suspension of such additional supply without consequent expense; complete control of illuminating power over a wide range; avoidance of excessive accumulation of coke in winter; prevention of the deposit of naphthalene in the distributing mains and services, which formerly caused great loss and inconvenience; and reduction of space required by the plant, and for storage of materials. It was pointed out, however, that it is chiefly for mid-winter use, to relieve the strain on the coal-gas plant and the drain on the collieries, and to meet fogs and sudden climatic changes, that the system is profitable, as the price of oil advances with the price of coal, and to a figure that, having regard to value of residuals, cannot be paid without loss. During the winter of 1900-1901 the price of oil was practically prohibitive of its use, except for necessary enrichment or emergency use. Should it, however, be possible to supply unenriched water-gas, which, with the Welsbach burner, gives equal illuminating power, then the use of oil could be dispensed with and the combined coal- and water-gas processes could be carried on with a large saving and would enable the price of gas to be lowered by between 1*s.* 2*d.* and 1*s.* 8*d.* per 1000 cubic feet.

In purifying-plant the author recommended the abandonment of the old hydraulic seal, which is unstable, costly and very perishable. In his practice the entire cover is removable, being very light and held down by small bolts at the margin, and by bolts passing through both cover and floor and spaced at equal distances. The vessels are 8 feet deep and are arranged in groups of five worked in ordinary sequence, having both lime and oxide of iron in each. This system fulfils without nuisance all the requirements of the sulphur-purification demanded by the London Gas Referees without the cost, risk and space of the system of three separate groups previously necessary, in order, for carbonic acid, carbon bisulphide and sulphuretted hydrogen. For condensers the author prefers horizontal tubes, in which the tar and gas are cooled together, which have been found to remove naphthalene. Coke scrubbers are simplest and cheapest, and in practice more than secure the degree of purification from ammonia exacted by the London Gas Referees, and, by the ammonia retained, purifies the gas also from carbonic acid and sulphur. The residuals of gas are useful in purification, and a cycle of reactions was traced in the processes of manufacturing sulphate of ammonia by sulphuric acid made partly from the sulphur in the ammoniacal liquor and partly from that in the residual spent oxide of iron from purifiers.

The pressure for distribution of gas is usually 3 inches to 4 inches head of water, but Mr. C. C. Carpenter has for some time been delivering by means of Sturtevant fans, at pressures between 12 inches and 18 inches. In America distribution has been accomplished over long distances by employment of pressures of several pounds per square inch. Service pipes are now laid in steam-tubing 30 per cent. thicker than gas-tubing; they are coated with pitch before filling the ground in, and their life has thus been extended from 12 years or 14 years to more than 20 years. Meters of the "dry" form are now invariably employed, which, if examined periodically, at intervals of 6 or 8 years, can be maintained fairly accurate; by improvements in manufacture their life has been increased from 12 years to nearly 20 years.