

one of the enantiomorphously related configurations; all the albumins are lævo-rotatory, all the starches and sugars are derived from dextro-glucose. Since Fischer's work teaches us that none of the sugars derived from lævo-glucose are fermentable by yeast, it would seem to follow as a legitimate conclusion that, whilst *d*-glucose is a valuable food-stuff, we should be incapable of digesting its enantiomorphously related isomeride, *l*-glucose. Humanity is therefore composed of dextro-men and dextro-women. And just as we ourselves would probably starve if provided with nothing but food enantiomorphously related to that to which we are accustomed, so, if our enantiomorphously related isomerides, the lævo-men, were to come among us now, at a time when we have not yet succeeded in preparing synthetically the more important food-stuffs, we should be unable to provide them with the food necessary to keep them alive.

CHLORINE SMELTING, WITH ELECTROLYSIS.

A PAPER on chlorine smelting with electrolysis was read by Mr. Swinburne at the first meeting of the Faraday Society; as the process described in the paper is of considerable interest, and may one day be of great importance, we give a brief abstract of the paper below.

The process is one for the treatment of complex sulphide ores, such, for example, as the Broken Hill slimes, and is divided into three stages as follows:—(1) the treatment of the ores with hot chlorine, whereby the metals are all obtained as chlorides; (2) the treatment of the mixed chlorides by substitution until finally all the chlorine is combined with zinc; and (3) the electrolysis of the zinc chloride to extract the zinc and recover the chlorine. The first stage of the process is carried out by blowing hot chlorine into the crushed ore in a "transformer"; the essential feature is to avoid the formation of chloride of sulphur.

This involves a careful regulation of temperature and of the rate of feed of the ore; the temperature can be easily regulated by the rate of feed of the ore and chlorine as the reaction evolves a great deal of heat, and the transformer is entirely self-heating. Advantage can be taken of the composition of the ore, as some of the metals have a greater heat of reaction than others; if necessary, a mixture of ores of different compositions can be made so as to give a satisfactory working material. The sulphur is set free and condensed. At the end of a charge the ore feed is stopped, and the excess of sulphides converted to chlorides, after which the fused chlorides are drawn off and dissolved; the gangue having been separated by filtration, the second part of the process begins. This naturally depends on the composition of the ore; lead, silver, and gold are separated with the gangue, and after drying are fused first with lead, which extracts the silver and gold, and then with zinc, which gives lead and zinc chloride, the former practically pure. The filtrate is treated with spongy copper to separate lead and silver, and then with zinc to take out the copper. Iron, manganese, and zinc chlorides are left; the iron is chlorinated up to the ferric state, and precipitated as ferric hydrate by zinc oxide, and further chlorination in presence of the zinc oxide throws down the manganese as peroxide. There is thus left only zinc chloride in solution, and this is evaporated down and fused. To it is added the fused chloride from the lead substitution, and the whole is electrolysed in vats made of iron lined with fire-brick. The heating is internal; the current and the chloride soaking into and solidifying in the fire-brick gives really a vat with zinc chloride walls. Vats taking 3000 amperes have been in use, but these are small, and 10,000 ampere vats are to be tried; the pressure required is less than four volts. The result of the process is pure zinc and chlorine ready for chlorination of fresh ore.

It will be seen that the chief merits of the process are its comprehensiveness, its cyclical nature, and the fact that it turns out pure metals. Obviously it is suited, with only slight modifications, for the treatment of a great variety of ores. The chlorine simply goes round and round; apart from leakage, which, as Mr. Swinburne says, if it would show on the balance sheet would make the works uninhabit-

able, chlorine can only be lost as chloride of sulphur (a source of loss the inventors claim to have overcome), and as oxychlorides formed in the iron separation and in evaporation of the zinc chloride, neither of great importance if care be taken. The works therefore simply take in ore and electrical energy and turn out metals, sulphur, and gangue. Mr. Swinburne enters at some length into the question of cost, but space does not permit of our following him here; we have said enough to indicate the interesting character of the paper, to which those more specially interested may be referred for further details.

M. S.

THE ROYAL INSTITUTE OF PUBLIC HEALTH.

THE annual congress of the Royal Institute of Public Health was held at Liverpool, July 15-21, under the presidency of the Earl of Derby. The sections met in the various departments of the University College, and were thus closely associated and readily accessible. The proceedings were opened by an interesting address from the Earl of Derby, in which he directed attention to the considerable progress in sanitation that had been made by many ancient civilisations. The Harben medals for 1901 and 1902 were then presented to Sir Charles Cameron and Prof. W. R. Smith.

A combined conference of the preventive medicine and municipal hygiene sections discussed the subject of tuberculosis, and Dr. Nathan Raw read a paper upon "The Prevention of Consumption in Large Cities," in which he expressed the opinion that consumption is frequently conveyed to children by milk from tuberculous cows, though patients in the advanced stage are the greater source of danger to the community. He suggested as means for controlling the disease (1) the establishment of a central office where consumptives might seek advice; (2) the erection of a municipal sanatorium which, for Liverpool, should contain 100 beds, and be within the reach of any needy citizen; and (3) the foundation of a hospital for the poor for at least 100 incurable cases. Several other papers dealing with tuberculosis were also contributed; one, by Mr. McLauchlan Young, who summarised the experiments performed by Prof. Hamilton and himself upon the communicability of bovine tuberculosis to man, and expressed the opinion that there could be little doubt that human tubercle can be readily inoculated upon bovines; another, by Drs. Dean and Todd, upon the communicability of human tuberculosis to the pig, in which the six animals experimented upon were all infected with the human bacillus. Thus there is already an accumulation of evidence against the view expressed by Koch at the Tuberculosis Congress of 1901, that bovine tuberculosis is probably not communicable to man.

In the section of bacteriology and comparative pathology, the president, Prof. Boyce, F.R.S., in his opening address directed attention to the connection between abstract research and the good of the community, instancing the value of bacteriological research to practical medicine, to the farmer, to the water engineer, and to the oyster merchant. A paper by Dr. Savage upon "A Uniform Method of Procedure for the Bacterioscopic Examination of Water," evoked an interesting discussion. He considered the subject under four headings:—(1) the methods of collection and transmission of the samples; (2) the data which it is desirable to ascertain; (3) the processes and procedures of the examination; and (4) the significance to be attached to the results obtained. It was ultimately resolved to form a committee to consider whether it might not be possible to systematise the methods, &c., to be used for the bacteriological examination of water.

Another important discussion, upon "the nature and significance of the pseudo-diphtheria bacillus," was opened by Dr. Cobbett, who expressed the opinion that this organism has nothing whatever to do with the true diphtheria bacillus. Prof. Hewlett stated that he was not yet convinced that the two organisms had no connection, and directed attention to several points of similarity between the two. Several medical officers of health held that, whether the two organisms had any connection or no, the pseudo-bacillus sometimes produced a diphtheritic condition. It is im-