

disease which has up till now baffled the scientific and medical men of the world, and that is cancer. God grant that before long you may be able to find a cure for it, or check its course; and I think that to him who makes the discovery a statue should be erected in all the capitals of the world. In taking leave of you I trust that your stay in London and in England has been an enjoyable one, and that you will one and all carry away pleasant recollections of your visit to my country."

There can be no doubt that the King's desire will be gratified, for, if the foreign delegates have received the some amount of pleasure from the scientific and social work of the Congress as have their British *confrères*, they should go away amply satisfied and with very pleasant recollections indeed. That they were prepared to enjoy everything may be gathered from the fact that they cheerfully, and apparently even willingly, sat through twenty-seven speeches at the final banquet given on Friday night.

The other social features of the Congress were the receptions at the Mansion House by the Lord Mayor, at Apsley House by the Duke and Duchess of Wellington, at the Victoria and Albert Museum by the Earl and Countess of Derby, and at Sion House by the Duke and Duchess of Northumberland; whilst evening parties, private dinners, water parties and the like afforded ample entertainment for all who were able to attend such functions.

Altogether the Congress may be looked upon as one of the most interesting and successful ever held in London, and the results promise to be very far-reaching.

POSITION AND PROSPECTS OF ELECTRO-CHEMICAL INDUSTRIES.

THE presidential address delivered last week by Mr. J. W. Swan, F.R.S., to the Society of Chemical Industry, though it covers the same ground as the one he delivered three years ago as President of the Institution of Electrical Engineers, does so in a much more comprehensive and detailed manner. The paper is very valuable and instructive, though not always pleasant reading for the English electrochemist, who cannot help reflecting that his country is much behindhand in the development of those industries of which Davy and Faraday laid the foundations. It cannot be urged that our backwardness is wholly due to the lack of water power in the British Islands, though doubtless this has contributed in many instances to our failure to keep pace with our competitors. But there are many electrochemical industries in which, though cheap power is by no means essential, other nations have been the pioneers and are likely to reap the reward. Thus, to quote one striking example, there appears to be no English bullion refinery using electrochemical processes, although these are finding extensive employment in America and Germany. The value of the output for 1900 from two out of the three German refineries is given by Mr. Swan as 2,500,000*l.*, the source of power in all three cases being steam.

The fact remains, however, as Mr. Swan points out, that the greater number of electrochemical plants are operated by water power. For fifty European works the figures obtained show that there is 149,000 h.p. available from water, 16,700 h.p. from steam, and 250 h.p. from gas. The great bulk of the horse power generated from water is used in the production of aluminium and calcium carbide, industries in which cheap power is paramount. Is it to be feared, therefore, that the more extended use of electrochemical processes will cause chemical industries to leave this country for others more fortunately supplied with waterfalls? The question is one, as Mr. Swan says, "of national importance, for chemical manufactures occupy, and have always occupied, a leading place among the industries of our country." Something, perhaps much,

is to be hoped for from the reduction in the cost of power generated from coal, in which connection we may quote Mr. Swan's words:—

"Great advances have in recent years been made in the direction of reduction of cost, by improvements in the steam engine, the gas producer and the gas engine. In the best modern steam engines a heat efficiency of 15 per cent. is obtained. There is great reason for hope that help in the more economical generation of power for electrochemical work may come from the further development of the gas engine. Already much has been done, both in the improvement of the gas engine and also in providing it with cheap gas. Our honoured past president, Dr. Mond, has made a valuable contribution in this direction.

"One of the drawbacks to the employment of gas engines for large operations has been that they were not adapted for large units of power, but now engines of 500 h.p. and even 1000 h.p. are manufactured, and work with successful results."

It is to be feared, moreover, that we are not only hampered by unfavourable conditions, but that we do not make the most of the opportunities we possess. The position deserves the most careful consideration of all chemists and electricians, or the former will one day awake to find that his purely chemical manufacturing processes have been superseded in other countries by electrochemical methods, and the latter will find, as he has already found largely in electric traction, that, whilst he was sleeping, a new field of development has been fully exploited by American and continental engineers. We cannot help thinking that the fault is, to a considerable extent, due to our educational system and to the bias of the English manufacturer against college-trained men. Mr. Swan's remarks on this point are worthy of very careful attention:—

"In England and Ireland we are suffering acutely from dire educational neglect and destitution, and that worst kind of poverty, *insensibility to our deficiencies*.

"Our English system of scientific and technical education is not equal to the present needs of the country, seeing how severely we are pressed on every side by the most energetic and intelligent competition. We are giving to the classes at the bottom of the industrial ladder a disjointed smattering of miscellaneous science, of no great value, though probably good so far as it goes, while we are neglecting to educate thoroughly those upon whose shoulders will soon rest the weight of the management of our great manufacturing industries. In the present state of things a competent knowledge of the science of the business a man is engaged in, as well as an active interest in it, whether it be chemical industry or any other, are essential conditions of any large degree of success in meeting the emergencies of a highly competitive and progressive time. A scientific training of university standard, for our manufacturers and for our technical chiefs, is an absolute necessity. Surely public money cannot be better spent than in providing adequate facilities for the educational equipment of the men of the future, with this essential means of national defence. Our country possesses great stores of mineral wealth, a precious heritage that we are lavishly spending. That gift of nature will certainly not avert, and cannot go far to compensate for, the consequences of neglect of the scientific training necessary to turn our fast-diminishing mineral wealth to the best advantage.

"One of the most pressing requirements of the moment, demanded, not only in the interest of chemical industry, but in that of our manufacturing industries generally, is *adequate endowment and encouragement of research*. Original scientific research is the fountainhead of new knowledge, the vital stimulus of industrial growth, the originator of new industries and sustainer of old. Yet, nationally, in the organisation of our educational and industrial system, we give to scientific research no hospitality—we barely pay it the respect of recognition."

These arguments have been advanced again and again by educational enthusiasts, but they have as yet borne but little fruit. Perhaps now that they have been so strongly endorsed by one so well qualified to speak from the manufacturer's point of view as Mr. Swan, they may find their way into the minds of those in whose hands lies the future industrial prosperity of England.