

increased comfort and convenience. He congratulated the Institute of Physics in being formed to aid intellectual development.

Mr. A. J. Balfour, who as Lord President of the Council is concerned with the Department of Scientific and Industrial Research, was then called upon to extend a welcome to the institute. He expressed his deep gratification at being present. He represented the outside public who ought to have a deep interest in what was being done in the development of pure science and in industry. He was profoundly surprised that there was not hitherto an Institute of Physics. Physics is one of the most fundamental of all the sciences. That lacuna is now filled, and he rejoiced that it had begun under such favourable auspices. Reference had been made to the Department of Scientific and Industrial Research. The public knew little about its work—the public very seldom does know about the things which most deeply concern it. He confessed that when he saw great industrial disputes going on about the distribution of the results of industry he could not help thinking, "Why do not you devote half the energy and half the amount of money involved to increasing the power of man over Nature, which would increase the share and increase the total result to be divided among the members of the community, instead of devoting your energies to saying how the relatively insignificant amount we now produce is to be divided among the producers?" Mr. Balfour's memory went back to his Cambridge days and to the great Cambridge physicists who all in their several ways had made advances in physics which have changed our conception of the structure of the universe and increased our power of turning it to practical account. Mr. Balfour did not believe that mere expenditure of money, the mere growth of laboratories, or the mere multiplicity of students was going to produce a larger crop of men of genius. Genius comes of itself; no system of education yet discovered has been able to turn it out. The spirit bloweth where it listeth, and no organisation will increase the number of men at the very summit of the profession. He did not for a moment wish it to be thought that this remark settled the whole question. A large amount of work which does not in itself bring to maturity a great discovery is required if great discoveries are to be made, and this work can be increased by organisa-

tion and by the expenditure of money. The work that the Advisory Council has done in providing opportunities for research deserved all the praise which Sir J. J. Thomson had given to it. Unfortunately, the present impoverished state of the country has compelled a reluctant Treasury to cut down the sum at their disposal. No money gives, not only a greater spiritual return, but also a greater pecuniary return than the money devoted to research. It is impossible to carry on without more assistance than an impoverished State can afford or wealthy men seem inclined to contribute. Apparently these men do not realise what they might do.

Mr. Balfour said he was often surprised that the imagination of our great magnates was not stimulated by the idea that they could add to the wealth of the whole world by encouraging industrial research. There was nothing narrow about the results of an increase in physical knowledge. What is discovered in Cambridge or Paris or Japan is a gift to mankind. When he reflected, as he thought political economists were slow to reflect, on the prodigious changes which are made by discovery in the lot of mankind he was surprised at the lack of the spirit of liberality, at the imperfect realisation of the actual facts of the case, and at the fatal desire to see an immediate return. Discovery, however, lurks undeveloped for a generation; but the life of nations is a long life, and anything that adds to a knowledge of the physical world must, either sooner or later, in our own time or in that of our remote descendants, do something material for the life of mankind. The hope he had for the world was that by the growth of science and invention, instead of discomfort, comfort and leisure would be given to the community—at least, if the people learn how to use their leisure. That was the idea based upon the work of men who were engaged, as those present were engaged, in probing the secrets of Nature. If, as he believed, the institute they were inaugurating was going to assist in that great work, they might regard the day of this meeting as a red-letter day in the history of British science.

Votes of thanks were proposed by Sir W. H. Bragg, Sir Robert Hadfield, and Prof. C. H. Lees.

All information concerning the institute can be obtained from the Secretaries, 10 Essex Street, Strand, W.C.2.

The British Science Guild.

SCIENTIFIC DEVELOPMENT AND WORLD-WELFARE.

GR^{EAT} success attended the annual dinner of the British Science Guild, which was held at the Hotel Cecil on Tuesday, May 3, Lord Montagu of Beaulieu, president of the Guild, being in the chair. There was eloquent acknowledgment of the great part science has played in the country's progress, and keen insistence on the imperative need of its wider application to the stupendous problems of the future. The president, unfortunately, was suffering from the effects of a severe attack of laryngitis, and, although this affected the wonted vigour of his utterance, it is scarcely necessary to add that it did not lessen the value of his weighty observations.

After the loyal toasts had been duly honoured, the president, in proposing "Science and the Empire," said he thought it was quite clear that in whatever direction we looked, science, moderation, and balance of mind were wanted all over the world to-day more

than ever before. We had appeals to reason unheeded by great masses of people, we had attempts in other directions to set scientific laws and economic laws at defiance; and when there was an organisation like the British Science Guild, which could, at any rate, attempt to sum up the balance one side and the other, it seemed to him they would do less than their duty if they did not attempt to bring their case and their teachings before the public. Their thoughts were naturally centred on the great struggle that was going on in reference to one of the vital necessities of life—coal. They could not help realising that all these struggles meant an immense waste of power and wealth to the nation. Of course, if we used coal as we should, as every scientific man in that room knew, we should never burn it, for instance, in that most cheerful thing, the open grate. We knew that the smuts which covered our clothes and our buildings in

London were the result of waste in coal-burning. On many grounds they would like to see the time come when all the bituminous coal of the country was passed through a process of coking, and we used the liquid fuel on one side for all kinds of transport and other purposes, and burnt only smokeless fuel in our grates. They would welcome anything that would improve the lot of the miner underground and help him to raise a greater quantity of coal at less exertion to himself and make his occupation more healthy. As economists they knew that unless we could in the future raise coal at a reasonable price the coal of great countries like America would beat us in the markets of the world. Lord Montagu, quoting the example of Joseph in Egypt in preparing for the lean years, suggested that the Government should store certain articles like coal and certain kinds of food which the community might be deprived of during the progress of industrial disputes. That idea might be misinterpreted by some as an attack on the power of the trade unions, but it was nothing of the kind. We did not wish any portion of the community to starve or suffer hardship; moreover, the community must defend itself when attacked. He thought we must gradually look forward to a time when we must not be dependent upon one kind of fuel only. We must cultivate so far as we could the use of alternatives to coal.

Lord Montagu went on to insist that the need of science in every department of the country was greater to-day than it had ever been. He hoped that some of our leading statesmen would not think of science only as a means of destroying our fellow-men because during the war, no doubt, science, especially towards the end of the conflict, was called upon to invent new means of dealing out death to our adversaries, and the whole ingenuity of large numbers of men of science was concentrated on what, after all, was the horrible business of destroying each other. He was sure Field-Marshal Sir William Robertson would agree with him that they should try to develop all these great energies of science to the benefit of the human race. What they really desired to do was to lead a campaign against ignorance, and he could not help thinking of one of the members of their council, a most energetic and valuable member, Mr. J. J. Robinson, who had done wonderfully good work already in establishing provincial centres and in endeavouring to cultivate the scientific spirit in our great provincial towns. He would like to see that side of their work greatly increased.

Field-Marshal Sir William Robertson, replying to the toast, spoke of the great work of men of science in the war, particularly referring to the development, with astonishing success and rapidity, of submarine warfare, both offensive and defensive, and of sound-ranging and signalling. There was also the tank, which was produced in the face of considerable obstacles—some people said obstructions. We had very little glass for making optical instruments, but during the war men of science came forward and produced sufficient quantities of this glass well up to pre-war standard. The credit due to science was all the greater, because in the pre-war preparations science had been too frequently disregarded, with the result that everything had to be done almost from the very beginning. It was to be hoped that the lessons of the war would not be forgotten by the fighting Services, for we might be sure that science would play an even greater part in the next war than it had in the recent war, more especially when we thought of the air

and under the water. In view of the present position of affairs we must not altogether forget about preparations for war. He suggested that what we required was that every State Department and every public service should have with it, and in it, the best scientific advice and assistance that could be furnished. Men who aspired to exercise Ministerial control over the destinies of the country, or in other ways to wield large administrative powers, should attach much greater importance to the value of science as an educative force than they had done in the past. If they neglected to do this they could not hope efficiently to discharge their duties in peace, or usefully assist in guiding their country through the terrible ordeal of war.

Col. Sir Konald Ross proposed "Science and Literature," and the toast was acknowledged by Dean Inge.

Lord Rayleigh submitted the toast of "The British Science Guild," and made a graceful allusion to the distinguished man to whom the origin of the Guild was primarily due—Sir Norman Lockyer. Sir Norman combined, he thought, in a peculiar sense, the qualities necessary for those who would push and advance the scientific cause in this country. It was no use merely to hold scientific views; they had metaphorically to take people by the throat and shake them before they would realise the national importance of scientific principles in progressive practice.

Lord Biedisloe, in acknowledging the toast, said a question those of them who were not yet sufficiently familiar with the Guild might well ask was: "What is the British Science Guild?" The answer had been suggested to him by a very interesting book which had lately been published, Westaway's "Science and Theology," in which he found the following statement:—"The training in scientific method has brought into being a thinking fraternity whose bond of loyalty is respect for the truth." Now, surely, if there was one body more than another in this country that would answer to that description it was the British Science Guild. He thought there was a great poet who said in substance:—"He is a free man whom the truth makes free, and all are slaves besides." Well, we boasted that our country was the land of the free. He thought it was extremely doubtful whether, at any rate under existing conditions, this was an apt description, but if we were not yet conscious of that extent of freedom which ultra-democracy should bring to us, surely we could best remedy the defect by applying science to all the activities of our human life in the future to a much greater extent than we had done in the past. Perhaps the most important work upon which the Guild was at the moment employed was to endeavour to arrange a conference between representatives of science on one hand, and representatives of organised Labour on the other. They felt there was an opening now for an *entente cordiale* between the great enlightened leaders of Labour and the chief exponents of science with the object of rendering the task of Labour lighter, more effective, more comfortable and happy, and in the long run to obtain a very much larger output from the industries of the country. They had every reason to know that the leaders of Labour were quite in sympathy with their endeavours to bring the conference about. Referring to agriculture, his Lordship said that at the present time—largely as a result of the alarming experiences of the war—there was a livelier interest on the part of the organised farmers of this country in scientific methods than ever there had been during the last generation.