

The British Empire Exhibition.

ON Wednesday, April 23, the greatest exhibition contrived by human hands in historic time was formally declared open. The King, who was accompanied by the Queen, drove in state to the Stadium at Wembley, where he was received by the Prince of Wales, the president of the Exhibition, and from the throne erected on the Royal dais, spoke the words which inaugurated the British Empire Exhibition.

The nature and purpose of the Exhibition were admirably summed up by the Prince of Wales in his introductory speech, in the course of which he said, addressing the King:

"The Dominions, India, the Colonies, the Protectorates and Mandated Territories under your care have joined together in the great task of presenting this picture of our Commonwealth of Nations. The Exhibition is thus the work of the whole Empire, and it shows the craftsmanship, the agricultural skill, the trading and transport organisations of all our peoples and all our territories. It gives also a living picture of the history of the Empire and of its present structure. It will suggest to the world, I truly believe, that the most powerful agency of civilisation has its heart set upon peaceful aims and the good of mankind."

The deeper note referring to the international importance of the undertaking was taken up again and emphasised in the Prince's concluding words, when he expressed the hope that the result of the Exhibition would be to impress vividly upon all the peoples of the Empire

"that they should be fully awake to their responsibilities as the heirs of so glorious a heritage; that they should be in no wise slothful stewards, but that they should work unitedly and energetically to develop the resources of the Empire for the benefit of the British race, for the benefit of those other races which have accepted our guardianship over their destinies, and for the benefit of mankind generally."

The King's speech was a stirring appeal for the success of the Exhibition, in the interests of the British commonwealth of nations and of the whole world. In notable words, he stressed the importance of discovery, exploration, and research:

"The Exhibition may be said to reveal to us the whole Empire in little, containing within its 220 acres of ground a vivid model of the architecture, art, and industry of all the races which come under the British flag. It represents to the world a graphic illustration of that spirit of free and tolerant co-operation which has inspired peoples of different races, creeds, institutions, and ways of thought, to unite in a single commonwealth and to contribute their varying national gifts to one great end.

"This Exhibition will enable us to take stock of the resources, actual and potential, of the Empire as a whole; to consider where these exist and how they can best be developed and utilised; to take counsel together how the peoples can co-operate to supply one another's needs, and to promote national well-being. It stands for a co-ordination of our scientific knowledge and a common effort to overcome disease, and to better the difficult conditions which still surround life in many parts of the Empire. Think, for example, of the scientific work accomplished in recent years for the prevention and treatment of tropical diseases. And it is easy to imagine how greatly the

Exhibition can contribute towards the progress of our tropical territories and the development of the yet unexplored capacities of the Empire.

"And we hope, further, that the success of the Exhibition may bring lasting benefits, not to the Empire only, but to mankind in general. No nation, or group of nations, can isolate itself from the main stream of modern commerce; and if this Exhibition leads to a greater development of the material resources of the Empire and to an expansion of its trade, it will, at the same time, be raising the economic life of the world from the disorganisation caused by the War."

The proceedings were the occasion of a remarkable telegraphic feat. The King's message declaring the Exhibition open was telegraphed round the world in 80 seconds, which is only one-thirtieth of the time in which Puck declared that he could put "a girdle round about the earth." A day or two previously, anxiety was felt, as a fault appeared to be developing on one of the submarine cables forming the chain, but luckily this was cleared in time. When the telegram was despatched, all the lines were being kept in readiness and the telegraphists were at their posts. From the Stadium, it was sent over the Imperial Cable to Halifax, being relayed at Fayal on the way. It then crossed Canada by the land lines to Bamfield, where it entered the Pacific, passing through Fanning Island, Suva, Auckland, and Sydney. At Sydney, it was given to the Eastern Telegraph Co. It went through Adelaide, Perth, Cocos Isle, Rodriguez, Durban, Cape Town, St. Helena, Ascension, St. Vincent and Madeira, and thence back to London. In order that it should go through as many towns as possible, it was also sent from Adelaide to Port Darwin and thence to Singapore via Java. From Singapore it was sent to Penang, Madras, Bombay, Aden, Port Sudan, Suez, Alexandria, Malta, Gibraltar, and from thence to London. From Cocos it was also sent to Batavia, Singapore, Penang, Colombo, Aden, and then by the route described above to London. From Durban it was despatched to Mozambique, Zanzibar, Aden, and again by the route described above to London. Aden received the message simultaneously by all three routes.

The Eastern Telegraph Co. employed automatic working over its portion of the route, and as the message was received on one side of a station it was automatically transmitted on the other. At Electra House, Moorgate, the message arrived simultaneously on four cables and was immediately telegraphed to the Exhibition. We congratulate the engineers of the General Post Office, of the Eastern Associated Telegraph Companies, and of the other Companies owning part of the route, on the great success of their experiment.

The Western Electric Co. is also to be congratulated on their arrangements for distributing the speeches delivered at the opening of the Exhibition over the large area covered by the Stadium and the Amusements Park. The voices of the King, the Prince of Wales, and the Bishop of London were picked up by the microphone, amplified, and then distributed to seven projectors on the pavilion roof and to groups of projectors erected in the Amusements Park. Each amplifier is provided with facilities for microphone

switching, volume indication and control. Special arrangements are also made for adjusting the volume distributed to each projector, and if necessary the operator can bring reserve apparatus into operation. At the opening ceremony, the control engineer watched the royal platform, the operating engineer stood by the amplifier panels, and all the observers were at their posts. When the control engineer gave the signal, the loud spoken signals were heard with the greatest ease by an audience of 120,000. The observers were all kept busy telephoning to the control station messages to increase or diminish the sound volume so as to give the most satisfactory results in each area. All the equipment was duplicated so as to obviate the risk of a breakdown.

The speeches were also carried by cable to the London Broadcasting Station, where they were broadcasted over the British stations by the British Broadcasting Company and the Marconi Company. The ceremony was heard excellently in receiving sets all over the British Isles, and in several distant towns it was made plainly audible to large crowds by means of loud speakers many of which were provided by some of the daily

newspapers. They were also heard at many stations abroad. The apparatus employed and the great care and forethought exercised by the engineers made both the "public address system" and the broadcasting methods a great success. There is plenty of scope, however, for inventors to increase the efficiency and diminish the cost of the former, and there are many acoustical problems in connexion with the latter that have still to be solved.

The Exhibition was inaugurated in the presence of a great gathering in the Stadium at Wembley; the proceedings were followed with enthusiasm and interest by a vastly greater body of the general public through the medium of the broadcasting services; the news of the opening was telegraphed round the world. It now remains for the Exhibition to justify its magnificent send-off and to make a name for itself as a landmark in the history of the world. It will be impossible for us to attempt to mention more than a few of the exhibits relating to science and technology, but we hope that the articles to be published in our columns will present some of the chief aspects of the Exhibition of interest to scientific readers.

Obituary.

PROF. GRENVILLE A. J. COLE, F.R.S.

ON April 20, after several years of acute suffering, most patiently and cheerfully borne, died Grenville Arthur James Cole, professor of geology since 1890 in the Royal College of Science, Dublin, and since 1905 Director of the Geological Survey of Ireland. He was the son of J. J. Cole, architect to the London Stock Exchange and a pioneer in geological photography, was born in 1859, and educated at the City of London School under Abbott, and at the Royal School of Mines. He was trained in geology by Prof. Judd, and in 1880 was appointed to a demonstratorship created for him in the Geological Division of the Royal School of Mines, where he served until his appointment as professor in Dublin in 1890. In him, Prof. Judd found an active and able lieutenant in shaping and developing the practical laboratory course, the first established in Great Britain, which was made, and has since been maintained, as the characteristic feature of geological training at the conjoined School of Mines and College of Science. To such a course his most valuable contribution was perhaps his "Aids in Practical Geology," first published in 1890, and afterwards improved and kept up-to-date.

Cole's earliest published work was in conjunction with Prof. Judd, and related to the glassy basic rocks, tachylytes and the like, collected by one or other of the authors in the Western Isles. The interest of this study was maintained by subsequent work on the devitrification of glassy rocks, and the spherulitic, lithophysal, and other structures which they possess or acquire. This work was of value to him later when he came to study the rhyolites of Antrim. For this and other purposes he visited Hungary, Switzerland, and other European localities, and the result was the publication of such papers as that on the Rhyolites of the Vosges, that with Prof. J. W. Gregory on the variolitic rocks of Mont Genève, and that with G. W. Butler on the lithophysal of the Rocche Rosse. In

connexion with this work he was also attracted by the alteration of the basic glasses, and described examples of variolites from Anglesey and County Down. At this period he took an interest in the igneous rocks associated with the Lower Palæozoic sediments, visiting Cader Idris with V. Jennings, and Rhobell Fawr with Sir T. H. Holland, the rocks of these areas being determined as earlier than the Ordovician volcanic rocks of Arenig and elsewhere. He also wrote on the remarkable suite of acid and basic rocks between Kington and New Radnor, but without being able to determine their age, a problem yet unsolved.

Both at this time and later, Cole devoted much time to mineralogy, devising or elaborating new methods of recognition, correcting erroneous determinations, and describing new-found varieties. His paper on the Riebeckite of Mynydd Mawr is notable in that he clearly discriminated between the rock forming this mountain and the boulders of a rock of similar composition and also containing riebeckite, now known to have come from Ailsa Craig but at that date of unknown source, found on the neighbouring mountain of Moel Tryfaen.

On taking up his residence in Dublin, Cole at once threw himself into the scientific life of the country, took an interest in its politics, made studies of many of its districts, took an active part in the meetings of scientific societies and the Academy, and trained many students who have since done excellent work at home and abroad. In connexion with visits of the British Association and the Geologists' Association, he led excursions to places of geological interest, and published accounts of the geology of the districts of Dublin and Belfast, in which he included his own discoveries and conclusions. He paid much attention to Irish minerals and building stones, and contributed a descriptive account of the country and its mineral resources to "Ireland, Industrial and Agricultural." His interest in fossil organisms was perhaps greater than might