

Alberta for the production of helium on a large scale, the problem of supply would be solved, for the amount of the gas which would be required for low-temperature research would probably not be more than 20,000 or 30,000 cubic feet a year. In default of a production-works on a large scale being established, it would be necessary to install a small plant at Calgary for the specific purpose of supplying the cryogenic laboratory with helium. This could easily be done at the present time, as the experimental plant is still *in situ*. It would require from 3000*l.* to 4000*l.* to make the changes in the plant which experience has shown are necessary, and to provide the additional auxiliary machinery, tools, etc., required.

If this plant were run for three or four months each year, an adequate supply of helium could be obtained. The expense of running the plant under these conditions would be high, and it would probably be found that it would require from 2000*l.* to 3000*l.* to operate it for a period of three or four months each year. This amount would, of course, have to cover charges for salary of staff, compensation to the owners of the natural gas, light, power, miscellaneous supplies, freight charges on cylinders, etc.

From the above it will be seen that a scheme such as that outlined would require in the aggregate a capital expenditure of about 30,000*l.* for buildings and plant, and the interest on an endow-

ment of about 125,000*l.* for operating and maintaining the cryogenic laboratory, together with the supply station.

If a cryogenic laboratory, with its auxiliary supply station, were established along the lines indicated, it would probably be found to be more economical to run the supply station continuously for a number of years, and to store for future use the helium accumulated. In this connection it should be stated that the experimental plant as it exists would probably not produce more than 100,000 cubic feet of helium per year. The plant could, however, be easily manifolded, and the Governments of Great Britain and Canada might, from the point of view of national safety, legitimately be asked to assume responsibility for operating it.

Much of our knowledge acquired in the field of low-temperature research we owe to the brilliant work of such distinguished men as Andrews, Davy, Faraday, and Dewar. The discovery of the rare gases, helium, neon, argon, krypton, and xenon, we owe to Lockyer, Rayleigh, Ramsay, and Dewar. How could we more fittingly perpetuate the work of these great men than by establishing on a permanent basis a cryogenic laboratory for the purpose of making still further progress in the field of low-temperature research—a field in which British men of science have made such brilliant and notable advances?

The Cardiff Meeting of the British Association.

IT is twenty-nine years since the Association met in Cardiff. It is safe to say that any members who may have been present on that occasion will not now be able to recognise the city, for there can scarcely be any other town in the country which has not merely grown, but also altered, so much in that period. In 1891 there was on the north side of what is now one of the main streets a large tract of finely timbered ground called Cathays Park, adjacent to Cardiff Castle and its park, and also the property of the Marquess of Bute. In Cathays Park now stand a number of large and handsome public buildings, including the City Hall, Law Courts, University College, Technical College, and the National Museum of Wales. These are the buildings in which the meetings of the Association will take place, and not one of them was in existence at the time of the former meeting.

As usual, it is difficult to estimate the probable success of the meeting from the point of view of numbers, but locally every effort is being made to ensure it, and a good average meeting is expected. It is certain that the Association can never have been better provided in the matter of meeting rooms and lecture halls. The local arrangements are now almost complete. The housing shortage, particularly serious in Cardiff, and the fact that this is the holiday season have made the task of the rooms and hospitality committees

rather trying, but it has been accomplished, and ample accommodation will be available.

The reception room, general offices, post office, and luncheon and tea room are situated in the City Hall; Sections A, F, H, and L meet in the University College; Section G has the use of the South Wales Institute of Engineers close by; and all the other sections are accommodated in the Technical College. In the Technical College also there is an assembly hall for special meetings. The inaugural general meeting, evening discourses, and citizens' lectures take place in the Park Hall, which is near one corner of Cathays Park.

Regarding the programmes of the individual sections, little can be added to the account of them published in NATURE of July 15. The journal of sectional and other proceedings will be ready on the first day of the meeting, but has lost its right to the name, for it will not be published daily as hitherto. Members should therefore retain their copies throughout the meeting. Any alterations in the sectional programmes will be shown from day to day on the notice board in the reception room.

The inaugural general meeting will take place on Tuesday, August 24, in the Park Hall, at 8 p.m., when the president, Prof. W. A. Herdman, will deliver his address. On Wednesday there will be a reception by the Lord Mayor of

Cardiff at the University College at 8 p.m. The evening discourses by Sir R. T. Glazebrook and Sir Daniel Hall will be delivered in the Park Hall at 8 p.m. on Thursday and Friday respectively. The conference of delegates of corresponding societies will be held at 2 p.m. on Wednesday and on Friday in the assembly hall of the Technical College.

Three citizens' lectures will be delivered in the Park Hall at 8 p.m. on Monday, Wednesday, and Saturday, the lecturers being respectively Prof. J. Lloyd Williams ("Light and Life"), Prof. A. W. Kirkaldy ("Present Industrial Conditions"), and Dr. Vaughan Cornish ("The Geographical Position of the British Empire"). Members of the Association as such are not admitted to these lectures. The distribution of tickets, which are free, is in the hands of the Workers' Educational Association, and they may be obtained at the reception office during the meeting.

The programme of excursions is a varied one. The geologists are visiting Cefn On and Caerphilly on Tuesday, Penylan on Wednesday, the Barry Coast on Thursday, and Lavernock on Friday. Section E (Geography) will explore the Vale of Glamorgan on Wednesday, and the Taff and Rhondda Valleys on Thursday. The engineers will be shown over the Bute Docks on Tuesday, the Melingriffith Tinplate Works on Wednesday, the Dowlais Steelworks on Thursday, and the Great Western Colliery on Friday. Section H (Anthropology) will investigate the Roman remains at Caerwent (between Newport and Chepstow) on Wednesday. A botanical expedition to Wenvoe

takes place on Thursday. The Section of Education will inspect the summer school at Barry on Friday. One or two demonstrations have also been arranged. On Wednesday Section I will be shown the new physiological laboratories of the University College, where a new electrokymograph will be demonstrated. On Thursday afternoon members of the Association, particularly those of Sections B, A, and I, are invited to the chemical laboratories of the Cardiff City Mental Hospital, where demonstrations will be given of some new chemical and physiological methods, and also of a modern high-powered X-ray installation equipped with auto-transformer and Coolidge tube. All these sectional excursions and demonstrations take place in the afternoons.

On Saturday, August 28, two general excursions of the Association will be made. One party will drive through the Wye Valley, taking lunch at Tintern and calling at Llanover, near Abergavenny, at the invitation of Lord Treowen, to take tea on the return journey. The other party will cross the Bristol Channel and visit the famous Cheddar caves, Wells Cathedral, and Glastonbury Abbey. The numbers in these excursions (and also in many of the sectional expeditions already mentioned) are limited. Members are requested to signify their intention of taking part in any of them as soon as possible after the beginning of the meeting. By so doing they will not only ensure their own participation, but also lighten the work of those responsible for organising the excursions, for in the present local conditions the difficulties of arranging transport are considerable.

Obituary.

Sir Norman Lockyer, K.C.B., F.R.S.

THE death of Sir Norman Lockyer on Monday last deprives the world of a great astronomer, and the nation of a force which it can ill afford to lose. Though it had been known for several months that Sir Norman was in a feeble state of health, his many friends cherished the hope that the vigour which was characteristic of him would revive, and that the devoted attention of his wife and daughter would preserve him to us for a few more years; but this was not to be. The alert mind and acute understanding which influenced so many men and advanced so much scientific work over a period of sixty years or so are now at rest, yet there remains to us a recollection which will not soon be effaced, and there stands in the archives of science a record of his achievement which will command admiration so long as the pursuit of knowledge is regarded as worthy human endeavour.

In the jubilee issue of NATURE in November last Dr. Deslandres, Sir Archibald Geikie, Sir Ray Lankester, and other distinguished men of science paid tribute to the work and influence of the founder of this journal, the volumes of which form an enduring monument to his memory.

Sir Norman was not only a pioneer worker in the fields of science, but also an advocate of the claims of science to recognition in modern polity, and this rare combination was used to further scientific interests as well as to secure the progress of knowledge. He was the embodiment of mental activity, and never relinquished a task to which he had put his hand. Until a short time ago he was as eager to learn of developments and discoveries in astronomical work, and as ready to suggest new lines of research, as a man in the prime of life, and it is difficult to realise that this fund of energy is now no longer available to those of us who derived benefit from it. When Goethe wrote: "The quickening power of science only he can know from whose soul it gushes free," he must have had in mind a researcher of the type of him whose loss we now mourn.

Sir Norman Lockyer was born at Rugby on May 17, 1836. He was educated at various private schools, and in 1857 received an appointment at the War Office. His work there was so much appreciated that in 1865 he was entrusted with the editorship of the Army Regulations. In 1870 he was appointed secretary of the Duke of Devonshire's Royal Commission on scientific