

requirements and the structural arrangements of the ships. Provision is now generally made for three operators, namely, the rangetaker, who also controls the rangefinder in elevation; the trainer, who is provided with a special sighting periscope; and the scale reader, who transmits the ranges to the fire control station.

The advent of aerial craft has necessitated the use of special combined range and height finders which automatically determine the height of the target from its range and elevation. In the case of naval anti-aircraft instruments, the vertical from which the elevation is reckoned is defined by means of a damped pendulum device. Anti-aircraft height finders for land purposes have the advantage of a steady platform, and in some respects the problem is simpler, as the horizontal can then be determined with sufficient accuracy by means of a good spirit level provided upon the mounting.

Whereas the range of an approaching aeroplane changes so rapidly as to make the operation of maintaining the coincidence of the partial images in the field of view of a rangefinder a matter of some difficulty, the height of the aeroplane remains comparatively constant for considerable periods. It is generally more convenient, therefore, to measure the height, from which the setting of the gun can be readily adjusted in relation to a suitably engraved gunsight scale. As the range is a function of the elevation when the height is constant, an arrangement has been devised whereby the partial images of the moving aerial target are kept in coincidence by the simple operation of following the target. For this purpose, the elevating gear is arranged to act upon the deflecting prism of the rangefinder through the intermediary of conical spiral gears, which are equivalent to cams of the requisite form. If the height alters, the partial images can be brought again into coincidence by independent direct operation of the working head. Both heights and ranges are indicated by the instrument, the latter being better suited to gunnery purposes when the aircraft appears at a long distance over the horizon.

The problem of hitting enemy aircraft at long ranges is greatly complicated by the necessity of taking account not only of the interval that must elapse between the finding of the range (or height) and the setting of this upon the gun-sights and the laying of the guns, but also of the greater interval between the time of firing of the gun and the arrival of the shot at its destination. The gun has to be sighted and laid, not for the ascertained position of the target, but for the position that it may be expected to occupy after an interval, it may be of thirty seconds or more, during which time the target may have travelled 1000 or even 2000 yards from the position that had been determined. The new and difficult problems thereby involved have already been solved, more or less completely, by the invention of predicting instruments closely associated with the range and height finders.

JAMES WEIR FRENCH.

NO. 2595, VOL. 103]

#### THE BOURNEMOUTH MEETING OF THE BRITISH ASSOCIATION.

THE eighty-seventh meeting of the British Association for the Advancement of Science will this year be held at Bournemouth, under the presidency of the Hon. Sir Charles A. Parsons, K.C.B., F.R.S., on September 9-13. The last meeting was held at Newcastle-upon-Tyne in 1916, the 1917 and 1918 assemblies having been abandoned owing to obstacles brought about by the war. This was the first break in the annual meetings of the Association since its inception in 1831. With the return of peace and happier conditions, it is anticipated that the Bournemouth meeting will be a successful and memorable one.

A strong local executive committee, with the Mayor as chairman, has been energetically at work for some months. The preliminary arrangements are well advanced, and every effort is being made to ensure the complete success of the meeting. So far as organisation is concerned, nothing is likely to be lacking, and it only remains for those interested or engaged in scientific work to take full advantage of the opportunities offered to them. Already the number of applications for election as annual members and associates is considerable, and doubtless as the date of the meeting approaches it will increase rapidly.

The Association will find a home in the Municipal College, a fine building, centrally situated, which was erected shortly before the war. Practically the whole of the college rooms will be placed at the disposal of the Association for the week, and will afford ample and conveniently centralised accommodation for its many and varied activities. Only the large public assemblies—the inaugural general meeting, at which the president's address is delivered; the discourses by Sir Arthur Evans, F.R.S., and Mr. Sidney G. Brown, F.R.S.; and the usual *conversazione*—will be held elsewhere. The Winter Gardens Pavilion, which is capable of seating an audience of upwards of 1200, will be the scene of these functions.

The programme of work is very full, and the week will be one of great activity. For the serious worker there will, as always, be many interesting papers and discussions, while the rumour that hitherto carefully guarded secrets of the work of men of science in the war will be made known for the first time is sufficient to appeal to the imagination of the general public and to focus attention upon the meeting.

Social functions will not form a marked feature of this meeting. The only official entertainment on a large scale will be the *conversazione* at the Winter Gardens on September 10. But Bournemouth is widely famous for its manifold attractions, and members and associates will have no difficulty in finding numberless opportunities for relaxation and amusement in their leisure hours.

In a popular seaside resort in September the pressure on the available accommodation will probably be great. Those attending the meeting



are therefore advised to make their hotel or lodging arrangements without delay. The local executive committee is doing everything in its power to help them in this direction, and inquiries addressed to the Local Secretaries, Municipal Buildings, Bournemouth, will bring prompt and full information on the subject.

#### NOTES.

THE visit of the King and Queen to the British Scientific Products Exhibition at the Central Hall, Westminster, on Tuesday, is a mark of Royal approval which will be highly appreciated, not only by the British Science Guild, which is responsible for the enterprise, but also by all who are working for the advancement of science and the extension of its industrial applications. Their Majesties, who were accompanied by Princess Mary and Prince Henry, were received by the Marquess of Crewe, president of the exhibition, and several members of the organising committee. They remained in the exhibition for about an hour and a half, and took the keenest interest in numerous machines, instruments, and products displayed, particularly in the exhibits of optical and laboratory glass and instruments, dyes and fine chemicals, radium, high-speed telegraphic printing, magnetos, Hadfield steels, potash salts from blast-furnace dust, seed-testing, and fruit and vegetable preserving. Both the King and Queen expressed much satisfaction that so many objects in the exhibition represented things formerly obtained chiefly or entirely from abroad, and congratulated the organisers of the exhibition upon the educational and practical value of this display of British productions. Their visit was a most encouraging sign of Royal concern for national activities which receive little official or public attention, though they are of prime importance; and it will doubtless induce many people to see for themselves what is really a stimulating display of scientific and industrial achievement.

A FUND is being raised in the medical profession to present Sir Clifford Allbutt with his portrait. Sir Clifford Allbutt has been, above all things, a great clinical teacher, first in Leeds and, after his appointment to be Regius professor of physic in 1892, in Cambridge. He was one of the first to show the value of the ophthalmoscope in the diagnosis of diseases of the nervous system, the kidney, and certain other general disorders; his volume on this subject was published in 1871. During the years 1896-99 he edited a great "System of Medicine," which had a success so immediate that a second edition was almost at once demanded. In the preparation of this, which appeared at intervals from 1905 to 1910, he was associated with Sir Humphry Rolleston. Sir Clifford Allbutt was elected president of the British Medical Association in July, 1914, and has retained that position throughout the war. The council of the British Medical Association, therefore, has taken the lead in asking for subscriptions to the fund to present Sir Clifford Allbutt with his portrait, to be painted by an eminent artist. From the portrait it is intended to commission a mezzotint engraving, which subscribers to the fund will be able to purchase for their own collections. Subscriptions, which are limited to one guinea, should be made payable to the "Sir Clifford Allbutt Presentation Fund," crossed London County, Westminster, and Parr's Bank, and addressed to the Treasurer of the British Medical Association, 429

Strand, London, W.C.2. A large number of subscriptions have already been received, and it is proposed to close the fund at the end of this month.

THE council of the British Association recently instructed a deputation, consisting of Prof. Arthur Keith, Sir Edward Brabrook, and Prof. A. W. Kirkaldy, to wait upon the Ministry of Pensions in order to urge the utilisation of anthropometric and kindred data collected by the disbanded Ministry of National Service. The deputation was received on behalf of the Minister of Pensions by Col. Arthur L. A. Webb, Director-General of Medical Services, Ministry of Pensions, who explained that the medical statistical department of the Ministry of National Service, of which Dr. H. W. Kaye was in charge, and the data collected by that department, had been taken over by the Ministry of Pensions. Under the Ministry of Pensions Dr. Kaye had not only to direct the compilation of medical recruiting statistics, but also to organise a special branch to deal with medical data connected with the Ministry of Pensions. It was thus impossible for Dr. Kaye's department to give its undivided attention to the preparation of returns relating to the physique of recruits in the various areas and trades of the country. At the present time all the data relating to Grade IV. men were being examined and compiled. Col. Webb also explained that Dr. Kaye's department was endeavouring to obtain data for comparison from Canada, New Zealand, and the United States. The deputation, before withdrawing, thanked Col. Webb, and urged the early publication of results, which are now needed by all who are studying problems connected with the present physical condition of our population.

THE council of the Institution of Electrical Engineers has issued a pamphlet on the Electricity (Supply) Bill, 1919, now before a Committee of the House of Commons. It is pointed out that great injury to the national interest has resulted from ill-considered electrical legislation in the past, and naturally electricians are anxious about the future. The appointment of Electricity Commissioners is welcomed provided that these Commissioners give whole-time service and appoint an Advisory Council, membership of which is restricted to persons possessing expert qualifications. The proposal that the Commissioners undertake and promote research also is approved. There is opposition to the proposed terms for the purchase of generating stations. Parliament is urged not to break faith with those who have invested their capital on the strength of the powers conveyed by earlier legislation. Having regard to the fact that practically every industry in the country is concerned directly or indirectly with electricity supply, it is more fitting that the Electricity Commissioners should be responsible to Parliament through the President of the Board of Trade, and should not be under the Ministry of Ways and Communications. This point is strongly emphasised.

THE death is announced, at sixty-seven years of age, of Prof. Emil Fischer, professor of chemistry in the University of Berlin, foreign member of the Royal Society, and Nobel laureate in chemistry in 1902.

THE death is announced, in his seventy-fourth year, of Dr. Elwyn Waller, who from 1885 to 1893 was professor of analytical chemistry at the School of Mines, Columbia University. From 1872 to 1885 Dr. Waller was chemist to the New York Health Department. He was the author of several text-books on chemistry.