

and courses of work put forward by various examining authorities, and methods of teaching were discussed.

The principal resolutions passed by the conference dealt with the educational proposals of the Government, and the London University Commission Report. The conference urged the "necessity for improved provision for technical education and the organisation of technical education on a national basis." In addition, attention was directed "to the urgent necessity for increased grants from the State in aid of technical education," higher salaries for teachers to be a first charge upon these increased grants. With regard to the London University Commission report, a resolution was passed unanimously opposing any limitation of the existing facilities for obtaining external degrees, and the proposed exclusion of external students from the examinations in the faculty of technology, including engineering. This resolution also stated that many of the criticisms made in the report concerning London polytechnics and technical institutions are obviously founded on an incomplete knowledge of the work done in these institutions. The association strongly deprecated any weakening of the connection between these institutions and the University in view of the excellent results which have followed in the past as a result of the present relationships between the polytechnics and the University. The higher work in these institutions, whether day or evening, should form an integral part of the organisation of the faculties of science and technology.

A public meeting was held in connection with the conference in the large hall of the Bradford Technical College, the principal speaker being the Right Hon. J. A. Pease, M.P., the President of the Board of Education. During the course of his speech, Mr. Pease emphasised the importance of technical education, especially in the day-time if possible, and the necessity of "gradually bringing into the educational net nearly the whole of the population which left school between the ages of twelve and fourteen." New regulations would shortly be issued which, by means of larger grants and more elastic conditions, would favour the development of junior technical schools, "which would be linked up with the colleges and classes of a superior character." Mr. Pease criticised external examinations "as a waste of money and effort, and resulting in very little good." In concluding, he suggested that the key of the educational situation is to give more power, coupled with greater financial aid from the State, to the local authorities.

J. WILSON.

#### THE NATIONAL PHYSICAL LABORATORY.

THE annual meeting of the general board of the National Physical Laboratory was held recently at the rooms of the Royal Society, when the report and accounts for the year 1912 and the statement of work for 1913 were presented and approved for transmission to the president and council of the Royal Society.

In former years this meeting has usually been held at Teddington during the month of March, and has been combined with an inspection of the laboratory by the members of the board. In consequence of a change in the financial year, the annual inspection will in future be held at a later date. This year it is to take place on Thursday, June 26, when the Right Hon. A. J. Balfour will open the new buildings recently erected.

These buildings complete a scheme initiated in 1909 to provide laboratories for metallurgy and optics, with administrative offices, at an estimated cost of 30,000*l.*, exclusive of equipment; of this sum the Treasury

undertook to provide 15,000*l.*, provided the remainder were forthcoming from other sources.

In 1910 the late Sir Julius Wernher generously provided 10,000*l.* for the erection of the metallurgy laboratory, and on learning lately that the actual cost had exceeded the sum available by 936*l.*, Lady Wernher most kindly defrayed the deficit.

To secure the further sum necessary for the completion of the scheme, and to obtain funds for the equipment of the buildings, an "Additional Funds Committee," of which the late Sir William White was chairman, was appointed during 1912. In its report this committee states that the Royal Commissioners for the Exhibition of 1851 had generously given a donation of 5000*l.* to the building fund, thus completing, with the gift from Sir Julius Wernher, the 15,000*l.* required to meet the Treasury grant.

Generous help towards the equipment has been received from many sources, including a number of the City companies. The committee, however, points out that considerable sums are still necessary to provide adequately the equipment which is essential for the proper development of the work.

The block of buildings for optics and administration is now nearly complete, and it is to open these that Mr. Balfour has promised to be present on June 26.

#### ATMOSPHERIC REFRACTION IRREGULARITIES.

THE anomalies of atmospheric refraction are numerous, and at various times irregularities extending over periods of one minute, one day, and one year have been discussed, that of the order of one second being generally known and causing "unsteady seeing." The variation of the order of one minute was discovered by Nussl and Fric experimentally in 1908, and they concluded that this irregularity had an amplitude of nearly a second of arc. The existence of such a large amplitude and its importance in meridional work suggested to Prof. Frank Schlesinger a re-determination by a perfectly independent method, and this he has done and described in a recent number of the Publications of the Allegheny Observatory (vol. iii., No. 1). He has based his measures on photographs of ordinary star trails made with the help of stationary long-focus instruments, and these he has had secured for him, according to a programme, by Prof. Slocum with the 40-in. Yerkes refractor, and Prof. Seares with the Mount Wilson 60-in. reflector, the star trails being those of the Pleiades group. The result deduced from the Yerkes plates, as is illustrated by curves in the publication, is to show the presence of this slow fluctuation, every one of the seven trails remaining at times above or below its mean position for a considerable fraction of a minute.

The same series of photographs was used to determine whether neighbouring stars showed the same fluctuations and whether the minor fluctuations were real. The curves plotted from these photographs thoroughly endorsed both these views, one figure showing the fluctuations of Merope and Alcyone as absolutely identical. To decide whether such one-minute fluctuations were common to mountain sites as well as low-lying situations, the Mount Wilson photographic trails were employed, and handled in the same way. The conclusion drawn was that the irregularities were of the same character, the amplitude being of the same order and the extreme range about one second of arc. Prof. Schlesinger thus directs attention to the fact that these results set a limit of accuracy to meridian work and show that photographic determinations of the distance between