

## International Illumination Congress.\*

ON Sept. 8 the International Illumination Congress proceeded to Buxton, where, on the evening of arrival, there was a demonstration of railway light signals and railway coach lighting at the Buxton railway station. The following day was occupied by a visit to Sheffield, in the course of which numerous local steel works and other places of interest were seen, and an opportunity was afforded of inspecting the Corporation Public Lighting Department, under the supervision of Mr. J. F. Colquhoun. While most of the factories were of considerable technical interest, members were dismayed at the very unsatisfactory lighting conditions prevailing in some of them.

The following day was devoted to sessions at which series of papers on industrial lighting, architectural lighting, the lighting of railways and mines, farm and horticultural lighting, and light sources were read. In the Industrial Lighting Section, Dr. H. Lux (Germany) presented the recommendations of the German Illuminating Engineering Society on this subject, and Herr N. Goldstein and Herr F. Putnoky discussed the lighting of textile mills. A bulky review of current practice in the lighting of factories by gas was presented by the Society of British Gas Industries. Perhaps the most interesting contribution in this section was that by Dr. M. Luckiesh and Mr. F. K. Moss (United States), who made a plea for 'humanitarian foot-candles', that is, the provision of an intensity of illumination beyond the requirements of safety and in excess of demands from the point of view of production.

The section which aroused most interest was possibly that dealing with architectural lighting, on which seven papers were read. Developments in Great Britain were surveyed by Mr. R. W. Maitland and Mr. W. J. Jones, and decorative lighting in France by MM. H. Maisonneuve and J. Wetzel. A paper on "Illumination and Architecture" by Mr. L. Kaeff (Holland) contained some interesting speculations on the influence of climatic conditions on architectural design, and the effect of varied conditions of natural and artificial lighting on shadows cast by embellishments on buildings. The engineering aspects of architectural lighting were dealt with by Mr. W. J. Jones, and researches of a mathematical character were reported by MM. Dourgnon and P. Waguet. These papers gave rise to an interesting discussion, in the course of which the application of laws relating to the illumination derived from a luminous point, a line, and illuminated surfaces were analysed, and views on the best methods of securing the co-operation of the architectural profession in illuminating engineering considered. Interesting information on procedure in the United States, where courses of instruction for architectural students in illumination and, conversely, lectures on architecture for illuminating engineers have been arranged, was forthcoming.

The other papers covered a wide variety of topics. Mr. A. Cunningham outlined the development of lighting on British railways, and discussed such problems as the lighting of platforms, goods sheds, and goods yards, for which tentative standards were suggested and reference made to the use of floodlighting in connexion with shunting operations. Convenient designs for illuminated station name-plates were illustrated. This paper was supplemented by a similar one by M. J. W. Partridge outlining practice on the French railways: in this, further information on the use of floodlighting for the illumination of large open spaces was furnished. Papers on the lighting

of mines deplored the very low standard of illumination prevailing and advocated the use of miners' lamps of higher candle-power. The possibility of floodlighting the coal face, by the aid of electric light, was considered. In this connexion data illustrating the influence of conditions of illumination on safety and output in certain mines in Silesia were presented by Dr. L. Schneider (Germany). Mr. W. A. Villers was responsible for a paper on cinema studio lighting, in which the use of incandescent lamps for 'talking' films was illustrated. There were several papers reviewing processes in incandescent lamp manufacture, and comparative data on the qualities of sunlight and artificial daylight. Finally, there was a group of papers, "Electric Light on the Farm" (R. Borlase Matthews), "Plant Cultivation with Electric Light in Sweden", and the "Artificial Lighting of Greenhouses in Germany", all of which illustrated the important part that light may play in connexion with horticulture.

At Birmingham, where the Congress next proceeded, there were interesting visits to local works. That to the glass works of Chance Bros., Ltd., at Smethwick, was notable for some pleasing demonstrations, such as methods of tracing the rays from optical equipment by means of chemical smoke. The experimental lighting in the Hagley Road, where sections are lighted alternately by gas and electricity, was of considerable interest. The papers read at Birmingham were less varied than at Buxton, being chiefly concerned with signalling apparatus. Four papers, all from Japan, described signal systems in use on the Japanese railways and experiments on the production of coloured glasses. There was a good paper by Mr. J. P. Bowen, engineer-in-chief to Trinity House, reviewing the development of lighthouses. Informative contributions by A. V. Blake and W. M. Hampton and E. Schuppen discussed the development of traffic control signals in Great Britain and Germany respectively. The former paper showed how requirements in Great Britain chiefly demand the independent control type of signal, and discussed such technical problems as the best form of distribution curve and the elimination of 'phantom indications' of signals. Herr E. Schuppen studied the use of simultaneous and progressive systems of control in Berlin, the length of individual cycles, and the design of automatic controllers. It is stated that since automatic control has been introduced, 20 per cent more traffic is carried by the same streets in Berlin, and with very much less hindrance.

In the Section on Motor-Car Headlights there were communications from France and Great Britain reviewing recent progress in methods and design. Dr. F. Born (Germany) discussed in considerable detail the basis of an international agreement on motor-car lighting, assuming the provision of two kinds of light, a main beam and an anti-dazzle beam; 100 m. has been proposed as a minimum value for range of the main beam and 25 m. for the anti-dazzle (alternative) beam. Provisions for limiting glare are most easily based upon the illumination at the observer's eye. Suggestions for standardising the various constituent parts were also made. A report from the Japanese Committee on Motor Vehicle Headlights described experiments with the R.A.C. disc and suggested some modification in the test with this apparatus. Other papers treating light distribution and heterochromatic photometry were of a somewhat specialised character, either dealing with the details of photometric processes or recording experiments determining

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the order of accuracy attainable in comparing sources of different colour. The final day at Birmingham was devoted to a day-trip to Stratford-on-Avon, after which members proceeded to Cambridge.

The meeting at Cambridge was generally regarded as one of the most successful parts of the Congress, and was well attended. In the course of the visit, there were trips to Ely and Peterborough (the latter an evening visit so that the artificial lighting of the cathedral might be inspected) and an address on "The Light of the Stars" by Sir Arthur Eddington. There was also a comprehensive demonstration of anti-dazzle devices by the Royal Automobile Club, which was instructive in demonstrating recent progress in this field. A considerable amount of work was done, sessions being devoted to such matters as street lighting, daylight illumination, nomenclature, definitions and symbols, photometric test-plates, traffic signals, glare, motor-car headlights, photometric accuracy, aviation lighting, heterochromatic photometry, the lighting of schools and factories, etc.—on most of which reports reviewing progress and, in some cases, leading to definite recommendations were presented.

Amongst the numerous points on which decisions were taken the following may be noted. It was agreed that in visual photometry the most accurate measurements are possible with illuminations between 5 lux and 20 lux, and that in the laboratory a mean error of an order not exceeding 0.25 per cent is possible, whilst in commercial work a limit of 3 per cent may

be attained. In regard to daylight, the 0.2 per cent daylight factor (at present applied in Great Britain legally in connexion with Ancient Lights cases) was regarded as a minimum—which would be definitely inadequate in the case of work involving much visual discrimination. It was further agreed that a committee should be set up to consider the standardisation of artificial daylight. The Section on Lighting Education formulated many recommendations, such as the inclusion of instruction in illumination at post-primary schools and in architectural colleges, and the organisation of at least one full specialised course in illuminating engineering in each country. In connexion with headlights, the distinction between the 'driving beam' and the 'passing beam' was recognised, and steps to limit glare and ensure adequate illumination were proposed. It is interesting to observe a consensus of opinion that coloured beams of light are of no material advantage in fogs.

Other resolutions related to traffic control and street lighting, a desire for fuller data in regard to the influence of traffic signals on road accidents being expressed. In connexion with street lighting, it was recommended that, in order to facilitate international comparisons, contributors should give (a) a description of the fitting, (b) particulars of spacing, and (c) both average and minimum illumination.

An invitation for the next meeting of the International Illumination Congress to take place in Germany was accepted for 1934, when the president will be Dr. A. R. Meyer.

### International Congress for the Testing of Materials.

THE New International Association for Testing Materials held its first congress at Zurich on Sept. 6–11. Although this was the first congress of the New International Association, eleven international congresses on the testing of materials have been held in the past. Ten of these were held by the original International Association which was formed more than thirty years ago under the auspices of Tetmayer and Bauschinger. This Association was broken up during the War, but a new International Association was formed at a congress in Amsterdam which had been arranged in September 1927 by the Dutch Association for Testing Materials. The new Association, although it is continuing the most valuable work of its predecessor, differs from it in many important respects, particularly by being a much simpler organisation, which avoids so far as possible the formation of numerous permanent committees, and also by entirely eliminating all questions of international standard specifications.

The Congress at Zurich was presided over by Prof. A. Mesnager, of the Conservatoire National des Arts et Métiers, Paris, and its work was carried out in four sections, namely: (A) Metals, under the presidency of Dr. W. Rosenhain, London; (B) Inorganic Materials, stone, cement, concrete, etc., under the presidency of Prof. M. Roß, director of the Swiss Federal Testing Laboratory at Zurich; (C) Organic Materials, bitumen, paints, rubber, etc., under the presidency of Prof. Roos of Hjelmsäter, Stockholm; (D) Questions of General Importance, under the presidency of Prof. Goerens, of Messrs. Krupp. Most of these sections held five sessions, each occupying a whole morning or afternoon and each devoted to the discussion of a single selected subject, upon which a number of reports by experts of international standing were first presented in brief abstract, a general discussion following. The reports were of a very high order of interest and importance, and particularly good dis-

cussions took place. The work of the Congress was, throughout, animated by the spirit of international co-operation and friendship, and by the desire of all those taking part to further the common cause of improving our methods of testing and of advancing our knowledge of the properties of materials, upon which satisfactory methods of testing must be founded.

In Section A, the subjects discussed were cast iron, notched-bar impact testing, fatigue, materials at high temperatures, and the progress of metallography. In regard to cast iron, considerable divergence of opinion and practice appears to exist, particularly between the French engineers and those of other countries. As a result of the discussion, however, the president of the Section hopes to issue a brief summary acceptable to all those who took part. Such a summary should serve as a guide to those bodies whose business it is to deal with standardisation, both national and international. The same applies to the notched-bar impact test, where the adoption of a standard test piece affording comparable results in different countries is particularly desirable.

In Section B, the importance of geological factors in the testing of stone was discussed, and new data on the resistance of road-building materials to shock were presented. Cement testing, concrete testing, and the testing of reinforced concrete were also discussed at length, the latter subject presenting a series of particularly important problems.

Section C dealt with the problems of asphalt or bitumen, which has attained so much importance in regard to road construction, and special attention was devoted to the question of nomenclature, upon which international agreement appears to be highly necessary. In regard to the testing of timber, the decisive importance of moisture content on all strength properties was emphasised; it is suggested that consideration of this factor clears up the existing difficulties in the relations between compression, bending, and