

alone or photographic rays alone, he photographed the star with short exposures, taking a large number of photographs in quick succession, and from these he subsequently reduced the times of the photographic and visual minima respectively. The results first obtained showed a time-difference of six minutes, on the average, between the two divisions of radiations. But this difference was in the opposite direction to that found by the earlier observers: that is to say, the visual rays were "retarded" more than the optical.

A subsequent revision and refinement of the data confirmed this result qualitatively, but slightly reduced the time-difference (*Mitteilungen der Nikolai-Hauptsternwarte zu Pulkowo*, vol. iii., No. 31, 1910).

ANOMALOUS SCATTERING OF LIGHT.—No. 5, vol. xxxi., of the *Astrophysical Journal* contains an important paper in which Dr. Julius upholds his hypothesis as to the causes which produce the unequal distribution of light over the sun's disc, as shown on spectroheliograms. He states that the results so far obtained are no less favourable to the anomalous-dispersion theory than they are to that hypothesis which ascribes the variable illumination to absorption effects, and proceeds to support his statement by the discussion of the several phenomena.

Dr. Julius also defines his terms more rigorously than in former papers. "Anomalous dispersion" is reserved for the general property of matter, that its refracting power varies rapidly in the neighbourhood of an absorption line. Previously this term was used indiscriminately with "anomalous refraction"; but the latter is now to be used exclusively for the irregular phenomena with which Dr. Julius deals in all his papers; "anomalous scattering" is also introduced, and is shown to be an active agent in modifying various effects.

THE SPIRAL NEBULA M<sub>51</sub> (CANUM VENATICORUM).—As an extract from the *Rivista di Astronomia* (Turin), we have received a paper in which Madame Dorothea Isaac-Roberts discusses in detail the numerous condensations, spires, &c., shown on Dr. Roberts's photograph of the spiral nebula M<sub>51</sub> Canum Venaticorum. Each feature is described, and the position-angles, distances, &c., are given, so that any future worker may determine, with a minimum of labour, whether or not any variation has taken place since the epoch when Dr. Roberts's photograph was taken. Madame Roberts also shows that the present form indicates a process of evolution which has led, and will probably lead, to the partition of this remarkable object into secondary nebulae and condensations.

SUPPLEMENT TO THE "ASTRONOMISCHE NACHRICHTEN."—We have received, as a supplement to the *Astronomische Nachrichten*, No. 17 of the *Astronomische Abhandlungen*, edited by Dr. Kobold. Among its six articles, it contains papers dealing with an experimental research on phase action in regard to heavenly bodies, a new explanation of the origin of comets, and a description by Prof. Lowell of the new canals discovered on Mars. The price of the supplement is 3 marks.

### THE FIRST INTERNATIONAL CONGRESS OF ENTOMOLOGY.

THE first International Congress of Entomology was held at Brussels on August 1-6. The establishment of the congress was in great measure due to the initiative of Dr. Karl Jordan, of Tring, whose tact and energy have throughout contributed largely to the success of the undertaking. Having, in the first place, secured the support of leading entomologists in this country and abroad, Dr. Jordan organised, in the course of last year, a series of preliminary meetings in London, which were attended by Dr. Horn, of Berlin, M. Janet, of Paris, Prof. Poulton, F.R.S., of Oxford, and others, under the chairmanship of Dr. F. A. Dixey, F.R.S., president of the Entomological Society of London. At these meetings it was arranged that the first congress should be held at Brussels in 1910, and local secretaries were appointed to promote the interests of the movement in all countries of the civilised world. So well did these representatives perform their part, that no fewer than 292 entomologists assembled in Brussels for the opening of the congress.

NO. 2129, VOL. 84]

Proceedings began on the evening of July 31 with an informal reception by Prof. Lameere (who, as president of the Entomological Society of Belgium, had been invited to preside over the congress) and the other members of the Belgian society. The gathering was highly enjoyable from the social point of view, and gave acceptable opportunities to entomologists from other parts of the world for making each other's personal acquaintance.

On August 1 the official proceedings were opened by Prof. Lameere in the Salle des Fêtes, a large building within the precincts of the exhibition, the use of which for the general and sectional meetings of the congress had been liberally granted by the authorities. His address of welcome to the delegates and other members of the congress included an eloquent vindication of the claims of entomology to serious attention, both as a science and also as a study having practical bearings of the highest importance. The address, which was well received, was followed by the reading of a report by the secretary of the congress, M. Severin, on whose shoulders the chief labour of organisation had fallen. After the conclusion of the more formal proceedings, the congress turned to the regular business of entomological communications. Some of the most interesting items on the programme bore reference to subjects of economic importance. Prof. Theobald (Wye) had a paper on the artificial distribution of insect pests, and M. Andres (Alexandria) contributed notes on the lepidopterous enemies of the cotton-crop. Dr. R. Stewart MacDougall (Edinburgh) discoursed on the beetle *Galerucella lineola*, so destructive to the Midland osier-beds, and Sir Daniel Morris, formerly director of the Imperial Department of Agriculture in the West Indies, gave a graphic account of the progress of economic entomology in the West Indies and in India, to which progress, it may be noted, Sir Daniel's own efforts have very largely contributed. Among other items of interest were communications from Prof. Kolbe (Berlin) on the comparative anatomy of the Coleoptera, and from MM. Janet (Paris), Speiser (Sierakowitz), and Lyman (Montreal) on various points connected with classification.

The proceedings on August 2 opened with a luminous and admirably delivered discourse by M. Blanchard (Paris) on medical entomology. The eloquence of the lecturer, and the vast importance of the subjects with which he dealt—malaria, yellow fever, and the sleeping sickness, all of which are directly dependent for their spread on the agency of insects—made a great impression on his audience. The day's programme also included an excellent lecture by Father Wasmann on ants and their guests, illustrated by lantern-slides; communications by Prof. Theobald on the distribution of the yellow-fever mosquito, *Stegomyia fasciata*; by Prof. Carpenter (Dublin) on the warble-flies; and others of equal interest.

The business on August 3 was largely taken up with the subject of mimicry and its bearing on evolution. The proceedings began with the delivery of a discourse by Dr. F. A. Dixey, F.R.S. (Oxford), on the general subject of insect mimicry. The lecture, which was plentifully illustrated by lantern-slides, directed especial attention to the ascertained data of mimicry in relation to affinity and to sexual, seasonal, and geographical conditions. Various suggested explanations of the phenomena were discussed in the course of the lecture, and the opinion was advanced that natural selection afforded the only reasonable interpretation of the facts at present within the knowledge of entomologists. Special aspects of the subject were afterwards dealt with by Dr. Karl Jordan (Tring) and Prof. Poulton, F.R.S. (Oxford), the former exhibiting an interesting series of lantern illustrations, and the latter showing a wonderful series of models and mimics captured at the same time and place by Mr. Wiggins in Uganda. A note of scepticism was struck by Mr. Schaus, who, on the strength of many years' observation in the neotropical region, was disposed to deny that mimicry was of any service to the insects exhibiting it. A lucid exposition of Mendelism as applied to the Lepidoptera was given by Prof. Punnett (Cambridge), and an interesting account of his experiments on the influence of temperature on seasonally dimorphic moths was contributed by Mr. F. Merrifield (Brighton).

On August 4 much interest was excited by Mr. Donis-

thorpe's lecture on ants, with their bidden and unbidden guests, and also by Prof. Sjostedt's narrative of the Swedish expedition to Kilimanjaro. Able communications were also received from Dr. Horn (Berlin), M. Bouvier (Paris), M. Honrath (Budapest), and others.

On August 5 Mr. Howlett, of the Agricultural Research Institute at Pusa, India, gave an excellent account, illustrated by numerous photographs, of the work of that most useful institution; and M. Lahille (Buenos Aires) discoursed to an appreciative audience of the progress of economic entomology in the Argentine. The sectional programme also contained, amongst others, contributions from Dr. W. J. Holland (Pittsburg), Mr. H. Skinner (Philadelphia), and Dr. Horn (Berlin); but the chief business of the day consisted in the winding-up address of the president, Prof. Lameere, and the selection of Oxford as the scene of the next International Congress of Entomology, to be held in 1912, with Prof. Poulton, F.R.S., as president.

The evening of August 5 was devoted to a banquet at the *Taverne Royale*, and on August 6 M. Max, Burgomaster of Brussels, entertained the members of the congress at a grand reception in the *Hôtel de Ville*. The exhibition buildings were open to members throughout the whole of the congress, and excursions were organised in the course of the week to the Congo Museum, the Ardennes, the Field of Waterloo, and other places of interest. The Brussels Museum of Natural History was also visited, and its treasures described by members of the staff.

The congress, as a whole, was an undoubted success. Any defect that may have been noticed in the arrangements was probably due to the fact that, this being the first occasion of the kind, there were no precedents to guide those responsible for the administration. Some inconvenience was suffered from the circumstance that the *Salle des Fêtes* was in request for other purposes, which interfered to an appreciable extent with the scientific business of the general and sectional meetings; for this, however, compensation was found in the varied attractions of the exhibition, free access to which, by the liberality of authorities, was allowed to all members of the congress.

It is satisfactory to be able to record that, of the 292 members, 67 were representatives of the United Kingdom, its colonies and dependencies. The contributions made by our countrymen to the scientific work of the congress may fairly be said to have surpassed in extent and value those of any other nation—a fact which is of good augury for the future of entomological research within the borders of the British Empire.

#### THE FIFTH INTERNATIONAL CONGRESS OF PHOTOGRAPHY.

THE International Congresses of Photography, the first of which was held in Paris in 1889, are arranged at irregular intervals as opportunities offer or necessity renders desirable, that representatives of all countries may meet and discuss questions of general importance. It is hoped by this means to avoid, or at least mitigate, the confusion that results from variations in standards, nomenclature, and methods, especially when such variations are due more to accident than intention.

The fifth congress, which has just been held in Brussels, was well supported, most of the European nations, as well as America, being represented. More than eighty communications were included in the programme, and these were classified into three main sections:—(1) Scientific questions; photochemistry; scientific applications of photography. (2) Technique of photography; artistic questions; industrial applications of photography. (3) Photographic documentation and archives; bibliography; legislation. The proceedings of the congress will be published in full in the report that will be issued in due time.

Several of the communications were of the nature of reports setting forth the present state of the section of photographic work dealt with. Captain Th. J. Saconney dealt with aerial photo-surveying. E. Deville gave details concerning photo-surveying in Canada, from which we learn that the extent of the region so surveyed is somewhat greater than the combined areas of Holland and Belgium, the most interesting application of the method

being its application in defining the frontier between Alaska and Canada, a district of lofty mountains. A commission was given three years to report concerning a frontier of one thousand kilometres in length, and as only the short summer season of each year was available, on account of the climatic conditions, other than a photographic method would have been impossible. A satisfactory map was prepared from the three thousand photographs made. The photographic method of surveying employed in Canada is eminently practical, not excluding other methods, so that it should be understood merely that photography plays the most important part in it.

Prof. Wilder D. Bancroft contributed a long report on the photographic emulsion, and from the facts that he has set in due order concludes that the silver bromide grain is a complex of silver bromide, gelatine, and water, and that "the process of ripening consists in changing the composition of the silver bromide grain towards an unknown, optimum concentration." He concludes, too, that it seems theoretically possible to make an almost infinitely fast plate having a very fine grain. Dr. R. Luther set forth the various arguments concerning the nature of the developable image, and J. Desalme reported on present notions concerning the theory of development. The latter considers that the electrolytic hypothesis affords a much better explanation of development than that based on a reduction by a purely chemical process, that is, that a developing solution contains an electrolyte and a depolariser suitable to the positive ions produced. This explains the non-equivalence of the alkalis if substituted in the proportion of their combining weights.

The difficulties of measuring the true opacity or obstructive power of photographic plates were described by F. F. Renwick, who stated that the apparent opacity of a negative under any given conditions is the algebraic sum of several variable properties. These he classifies as the simple obstructing power, the diffracting power of small particles and of the slightly rough surface of the film, the increase in transmitted light when the incident light falls obliquely on the surface, and the increase when the plate being measured is placed close to a reflecting surface if the difference between the readings with the negative so placed, and when the negative is removed, is taken as the opacity. He also criticised adversely the use of acetylene flames as light standards unless many stringent precautions are taken. The principles involved in attempting to measure the diffuse reflecting power of photographic plates were enumerated by A. Callier and R. von Camvenbergh, but they gave no practical details. Drs. Mees and Sheppard described various improvements in acetylene burners when used as secondary light standards, to meet objections that have been urged against earlier forms, and referred shortly to other standards. Dr. E. Goldberg described an apparatus that he has devised (made by Schmidt and Haensch, of Berlin) by means of which the characteristic curve of a plate can be obtained without the more or less tedious plotting generally done. From the group of papers dealing with these branches of the subject, it is clear that the measurement of the densities of photographic plates is a process still set about with difficulties and confusions, and that much work remains to be done in this direction.

Coming to the more technical branches of the subject, we find that a great many widely different matters were treated of. Prof. R. W. Wood described how to take photographs with infra-red and ultra-violet lights. For the infra-red he uses, as a screen, a very dense cobalt glass with either a saturated solution of potassium bichromate or a suitable red aniline dye, and, of course, a suitably red-sensitised plate. Under such conditions grass and trees in full sunshine appear snowy white and the sky as black as midnight. All shadows are very black, as there is practically no light from the sky to illuminate them. For the ultra-violet photographs, quartz lens were used coated with metallic silver to such an extent that a brilliantly lighted window was barely visible through them, and appeared of a deep violet colour. The light transmitted was of wave-lengths from 3100 to 3250. When photographed under these conditions, certain white flowers (as phlox) and Chinese white (zinc oxide) appear as if absolutely black, but ordinary landscapes do not