

body of the catalogue. The nine sections include mechanical engineering, electricity, civil engineering, agriculture, horticulture and arboriculture, food products, mining and metallurgy, textile industries, and chemical industries. A plan at the end shows the positions of the stands of the various exhibitors.

THE *Physikalische Zeitschrift* for August 1 contains a review of the present state of our knowledge of the properties of the α particles sent out by radio-active substances, by Dr. H. Geiger, of Manchester. The velocity of the homogeneous rays sent out by radium C appears to be 2.05×10^9 centimetres per second, and the quotient of the electric charge by the mass 5.07×10^3 electromagnetic units. The mean number of α particles sent out by a gram of radium per second is 3.1×10^{10} , and each carries a charge 9.3 to 9.6×10^{-10} electrostatic units, and appears to be a helium atom. The progress of each is checked by the molecules of a gas, and in air the path described does not exceed a few centimetres in length. During the description of this path each is capable of producing 1.72×10^5 ions by collision. The results of the recent measurements of the diminution of the velocity of the particles as they pass through solids, their scattering, and their ultimate absorption are all discussed in a clear and thorough manner.

A LETTER from Sir William Ramsay, in the *Chemical News* of August 5, directs attention to a new fact in the history of the development of the Leblanc process for the manufacture of soda. It has generally been believed that Leblanc perfected a process devised by De La Métherie in 1789. A letter to Dr. Black, written by a Mr. Geo. Golder, of Edinburgh, and dated March 19, 1782, shows, however, that the black ash process had already been devised and patented by an English inventor named Collinson. A specimen of black ash prepared by Collinson's process was submitted to Dr. Black, who reported that it contained "more alkali than the best Alicant Barilla in the proportion of 68 to 44, and more than the best kelp in the ratio 68 to 10." "It is an excellent ash for the soap-boilers . . . and there is no need to use lime in drawing the leys from it, as it is already in a caustic state." "After this," the writer adds, "there appears little doubt who invented the black-ash furnace."

MANY examples of smoky chimneys are no doubt owing to carelessness and lack of knowledge in those concerned with the work, but we also find many architects and builders of repute being occasionally nonplussed by the problem. Some important points in chimney design are given in the *Builder* for August 13. The grate should be provided with a blower to induce a good draught at the start. The flue should be expanded laterally to a width of about 2 feet a short distance above the grate, and then brought in again, forming what is usually termed a "bottle." Above this, one or two bends of about 150 degrees should be made. The top should be slightly contracted, and the chimney-cap sloped up sharply all round the aperture or pot; outside chimneys should be avoided; stacks should come as near the highest part of the roof as practicable; a number of flues should not be packed too closely together in a large stack, but kept as distinct as possible; the outer walls of stacks should be 9 inches thick.

In an article on the International Road Congress, which opened in Brussels on August 1, *Engineering* for August 12 gives the altered form of a rejected resolution, which in its original form condemned macadam. The resolution

finally adopted is as follows:—"Macadam, carried out by the methods of Tresaguet and Macadam, causes dust and mud, is expensive to maintain, and is suitable in large cities only for streets where the traffic is not very great or heavy. The experimental work carried out in recent years with macadam, improved by using a bituminous or tarry coating or binder, ought to be continued to determine the best method of utilising this kind of construction under varying conditions, and the results considered at the next congress." Our contemporary directs attention to a point which requires scientific investigation, viz. the exact behaviour of a sand foundation under stone pavement. On the Continent, a bed of sand from 3 inches to 6 inches deep is almost invariably used, and the setts are bedded directly on and in the sand. The sand is spoken of as a "cushion," and is said to be elastic. Another view is that it absorbs the shock on the pavement, saves the stones from damage, and reduces the noise of traffic. It would be easy to settle the points in doubt by experiments in an engineering laboratory.

OUR ASTRONOMICAL COLUMN.

A NEW COMET.—A telegram from the Kiel Centralstelle announces the discovery of a new comet by the Rev. J. H. Metcalf at Taunton, Mass., on August 9. The position, at 9h. 15.2m. (Taunton M.T.), is given as R.A.=16h. 10m., dec.=15° 20' N., and the comet was said to be moving in a south-westerly direction; at the time of discovery the brightness of the comet was about equal to that of an eleventh-magnitude star.

A later telegram gives the position of the comet as observed by Mr. Burton at Boston on August 10; at 12h. 28.8m. (Boston M.T.) R.A.=16h. 10m. 29.3s., and dec.=14° 56' 41". The comet is on the meridian at about 6h. 30m. p.m.

OBSERVATIONS OF COMETS.—Dr. Max Wolf records an observation of comet 1910a, on July 15, in No. 4429 of the *Astronomische Nachrichten* (p. 210). The comet was then a little to the south-east of ν Cygni, and its photographic magnitude was 16.5.

In No. 4430 of the same journal he states that on plates taken on April 11 he has found images of comet 1909e (Daniel); the comet was then fainter than Halley's at the time of discovery, and was not shown at all on a plate which had a longer exposure on May 12. In compliance with a request from Herr Jan Krassowski for unpublished observations of comet 1909e, Dr. Rambaut also publishes some positions of this comet, secured at the Radcliffe Observatory during December, 1909, and January, 1910.

OBSERVATIONS OF MERCURY.—During July and September, 1909, observations of Mercury were made at the Revard (Aix-les-Bains) and the Masegros (Lozère) observatories by MM. G. and V. Fournier, and the drawings are now reproduced and discussed by M. Jarry-Desloges in the August number of the *Bulletin de la Société astronomique de France*. Those made at Masegros, with a refractor of 29 cm. (11.5 inches) aperture at an altitude of 900 m., show that there are definite markings on the surface of the planet which can be seen and delineated by different observers at different times with striking agreement, although the observing difficulties are very great. A dark patch on the southern horn is shown on all the drawings, and in some even obliterates the actual cusp. Other markings agree on different drawings, and can also be identified with some observed by Schiaparelli and Lowell. The observations confirm the statements that the rotation period of Mercury is probably equal in length to the planet's revolution period.

DISPERSION OF LIGHT IN INTERSTELLAR SPACE.—Recognising the importance of the results obtained by MM. Nordmann and Tikhoff regarding the differential velocities of light of different wave-lengths through interstellar space, Herr Beljawsky made a number of observations of the Algol variable RZ Cassiopeiae during the autumn of 1909. Using filters which transmitted either visual rays

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 M₅₁ (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 M₅₁ 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.

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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-