

gard to aviation, that public or national bodies have interfered with onerous legislation such as has retarded other budding industries. The movement has received but little encouragement in the way of State-aided experimental work; plenty of private pioneer work has been done—indeed, we were among the first to take seriously to aeronautics—yet we are woefully behind our neighbours. Extremely rapid progress has been made recently in other countries in heavier-than-air machines, and it seems clear that we should actively encourage the development of that branch of the science which appears of the greatest promise. Two methods have been adopted on the other side of the Atlantic which we might do worse than imitate. One is a national competition promoted by the United States War Department; the other is the method adopted by Dr. Graham Bell, who collected around him a number of ardent workers, who banded themselves together with the object of producing several successful machines. These men were all well acquainted with the principles underlying the art, and their collective wisdom has been well proven in the results achieved. Our own few earnest workers worry along independently, until financial stress often directs their attention to other matters. Continuing, our contemporary thinks that the movement of aviation is not in the right hands. Anyone who attends the meetings of the two best known societies connected with aeronautics must know that the discussions are not at all on a high level, and compare very unfavourably with those at, say, the Institution of Civil Engineers or the Institution of Mechanical Engineers. It is admitted that sport is quite a legitimate opening for aviation, as it has been for yachting and motoring; but, as has happened in these latter sports, the flying machines now built merely to win races will probably give place to machines of a more serviceable type when the movement has become leavened with the ideas of engineers and the results of scientific studies.

EVIDENCE of the interest that is taken in the isomeric change of optically active compounds is afforded by two papers by Mr. H. Wren in the October number of the Chemical Society's Journal. The substance selected for examination was *l*-benzoin,  $C_6H_5.CHOH.CO.C_6H_5$ , a compound which contains an asymmetric carbon atom, but would lose its optical activity if converted into the isomeric "enol,"  $C_6H_5.C(OH):C(OH).C_6H_5$ , and might therefore be expected to racemise with great readiness, at least in presence of an alkaline catalyst. The experiments carried out by the author showed that *l*-benzoin retained its activity in the crystalline state during three months, and that its solution in acetone was unchanged at the end of eight days. The addition of a small quantity of sodium ethoxide to its alcoholic solution was, however, sufficient to destroy its optical activity in a single day. The methyl ether,  $C_6H_5.CH(OCH_3).CO.C_6H_5$ , lost its optical activity completely in five minutes when dissolved in alcoholic potash of N/9 strength, and a progressive racemisation by dilute sodium ethoxide was completed in the course of three hours. Complete racemisation took place on attempting to prepare the ethyl ether by means of alcohol and hydrogen chloride, and a partial loss of activity took place when silver oxide and ethyl iodide were used. The oxime  $C_6H_5.CH(OH).C(:NOH).C_6H_5$ , and carbanilide



were found to be optically active, but the former suffered a partial loss of activity on acetylation, and the latter was completely racemised by heating above its melting point during four hours at  $140^\circ$ , contact with the glass being shown to be an important factor in promoting the change.

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A racemic product was also obtained on condensing *l*-benzoin with aniline. The changes here recorded are very similar to those that have been observed amongst the derivatives of camphor, but differ from them in that the inversion of the one asymmetric carbon atom causes a total loss of optical activity

DR. MAXIMILIAN TOCH, of New York City, in his address as chairman of the American Society of Chemical Industry, dealt with the influence of chemistry on civilisation. The address is published in the issue of *Science* for November 19. In the course of his remarks, Dr. Toch said:—Chemistry needs no sponsor, but its effect on civilisation has been more marked than that of any other science. True, it has reached out and taken electricity and physics as aids, but, withal, engineering made but little progress until steel and cement—two chemical products—were cheapened, simplified, and made universal. Medicine has claimed great honours, but the masterful work done in coal-tar chemistry, in the production and discovery of synthetic drugs, the discovery of anaesthetics, the marvellous work done in the metabolism of matter, the excellent analytical schemes for the waste matter of the tissues, are all due to the researches of chemistry, and their civilising influence is greatly felt. The engineer may boast of his skill, but he has done nothing greater than the pyramids, nor finer than the temples of Greece and Egypt. The monuments he has wrought in steel were given to him by the ability of the chemist to control carbon in iron, and the economic principle involved in the production of steel supplies work, puts money into circulation, and keeps the wheels turning. For a science so young its civilising influence is enormous, and there is no doubt that the rapid progress which chemistry made in the nineteenth century will be outstripped in the twentieth, for the control of our foodstuffs, the application of the raw materials in the earth, and the refining of metals, create positions, give progress to a country, and help largely in the establishment of chemistry as a profession.

THE Geological Society has published a catalogue of the geological literature added to the society's library during the year ended December 31, 1908. The catalogue has been compiled by the assistant-librarian and edited by the assistant-secretary, and its price is 2s.

MESSRS. FLATTERS AND GARNETT, LTD., 32 Dover Street, Manchester, have just issued a new classified catalogue of lantern-slides illustrating various subjects of biology, geology, astronomy, physiography, textile fibres, machinery, &c. The slides are from drawings, photographs of specimens, and photomicrographs, and most of them are not to be found in other catalogues. For the illustration of lectures or lessons in biological and other subjects many of the slides should prove very valuable.

#### OUR ASTRONOMICAL COLUMN.

DISCOVERY OF A NEW COMET, 1909e.—A telegram from the Kiel Centralstelle announces the discovery of a comet by Prof. Daniel, at Princeton, on December 6. Its position at 9h. 23.9m. (Princeton M.T.) was

R.A. = 6h. 16m. 32s., dec. =  $33^\circ 50' N.$ ,

and its magnitude was estimated as 11.0. This position lies at about the centre of the triangle formed by  $\theta$  and  $\kappa$  Aurigæ and  $\theta$  Geminorum. The comet is said to be moving slowly in a northerly direction.

HALLEY'S COMET.—According to the ephemeris, Halley's comet is now approaching the sun at a rate of about 1,230,000 miles per day, whilst its distance from the earth

is decreasing daily by some 460,000 miles; its distance from the earth on December 11, at 9 p.m., will be about 128.5 million miles.

Observations made at the Solar Physics Observatory, South Kensington, with the 36-inch reflector, show that the comet is a nebulous object, easily recognisable, and having no visible nucleus; exposures of five to ten minutes give a distinct image, and show how rapidly the object is moving in relation to the surrounding stars.

With a 3-inch Dallmeyer portrait lens, Mr. Longbottom, Chester, succeeded, on November 21, in photographing an excellent image of the comet, on an Ilford plate, in thirty minutes.

**ABSORPTION OF LIGHT IN SPACE.**—In this column for February 25 (vol. lxxix., p. 499) we directed attention to Prof. Kapteyn's researches on the absorption of light during its passage through interstellar space, in which he found a value corresponding to an absorption of 0.016 of a magnitude in a distance of thirty-three light-years.

Another paper dealing with this subject he now publishes in vol. xxx., No. 4, of the *Astrophysical Journal*, and as No. 42 of the "Contributions from the Mount Wilson Solar Observatory." The criterion he adopts is that such absorption would manifest itself, *ceteris paribus*, by the more distant stars being redder than the nearer ones. The subject is too complicated to discuss here, but, by comparing the photographic and visual magnitudes of stars of which the spectral types are known, from Misses Maury's and Cannon's classifications, and for which measures of distance are available, he succeeds in showing that such absorption probably does exist. The results indicate that for the photographic rays the loss per 32.6 light-years is 0.00945, while for the visual rays it is 0.00465, magnitude; the final value for  $d$  (increase in redness per 32.6 light-years) is  $0.0066 \pm 0.0031$  magnitude. Apparently there is no reason for assuming the absorption to be different in galactic and extra-galactic stars.

Incidentally, Prof. Kapteyn finds that for stars of the same spectral class, the ratio between the brightness of the violet radiations and that of the visual rays changes largely with the apparent magnitude. This, however, is probably a photographic, and not a cosmical, phenomenon.

Prof. Kapteyn's result proves abundantly that such large values, for the absorption, as are implied by the results recently brought out by certain investigators must be illusory.

**COPERNICUS ANTICIPATED.**—No. 21 of the *Revue générale des Sciences* (November 15, p. 866) contains an interesting article, by M. Pierre Duhem, giving an account of the life and works of Nicole Oresme, who became Bishop of Lisieux in 1377, and died at that place in 1382. Oresme translated, with commentaries, the four books of Aristotle, but the translation was never printed, although there are several manuscript copies; it is on one of these that M. Duhem bases his note. In this work, Oresme, commenting on Aristotle's contentions for an unmovable, central earth, gives numerous reasons and arguments against such an hypothesis, and clearly shows that, in his opinion, it was entirely wrong. In concluding his note, M. Duhem suggests that, not only was Oresme the precursor of Copernicus, but he may have been, also, the inspirer.

**STAR ALMANAC AND CALENDAR FOR 1910.**—From Messrs. King, Sell and Olding we have received copies of "The Star Almanac for 1910," "The Star Calendar for 1910," and "The Stars from Year to Year." These works, for 1909, were reviewed in our columns for December 3, 1908, and maintain the favourable opinions then expressed concerning them. The prices are 3d., 1s., and 1s., respectively.

#### MAGNETIC EXPEDITIONS.

OF the many successfully conducted land expeditions sent out by the Department of Terrestrial Magnetism of the Carnegie Institution of Washington since its establishment in 1904, news has just been received of the successful completion of two of the most important and interesting ones. Mr. D. C. Sowers headed an expedition which started out from Peking, China, on January 30 of

this year, passing through China and Chinese Turkestan, reaching Kashgar on August 2, and then crossing the Himalayan range and arriving at Leh, India, at the end of September. Magnetic observations and other geographical data were obtained along the entire route traversed. Mr. Sowers's chief assistant was Prof. Fuson, formerly professor of history and geography at the Christian College, Fuson, China.

Mr. C. C. Stewart started out from Washington last July to take charge of a canoeing magnetic exploring expedition in British North America. After reaching Lake Abitibi the party next proceeded to Moose Factory, then crossed James Bay to Rupert House, then up the Rupert River, and coming out at Roberval, Lake St. John, the middle of October.

News has also been received of the successful progress of the land magnetic surveys in Africa under the charge of Profs. Beattie and Morrison, research associates of the Carnegie Institution, and of the magnetic work in charge of Mr. J. C. Pearson in Persia, Asia Minor, and southern Asiatic Russia.

With the resumption of the ocean magnetic work by the *Carnegie*, the director of the department, Dr. Bauer, estimates that at the present rate of progress it will be possible in another five years to construct accurate magnetic charts of declination, dip, and force, as based on freshly acquired data, for the region of the earth  $60^\circ$  N. to  $60^\circ$  S.

The department is also cooperating with polar expeditions so as to secure information in regions which cannot be entered by the *Carnegie*, this vessel not having been built for going into the ice. Thus instruments were loaned and instructions drawn up for Mr. Jackson, of the Canadian Meteorological Office, who was detailed for duty on the Canadian exploring steamer *Arctic* (formerly the *Gauss*), in command of Captain Bernier, the vessel having recently returned to Quebec. Mr. Jackson has informed Dr. Bauer that he has secured a series of magnetic, atmospheric electric, tidal and meteorological observations at various points in the Arctic regions.

So also Dr. C. C. Craft, magnetic observer of the department, was assigned to Commander Peary's auxiliary steamer, the *Eric*, a year ago, and obtained magnetic data at a number of points in Labrador, Baffin Land, and Greenland.

During the past summer Mr. E. Kidson, formerly assistant at the Christchurch Magnetic Observatory, completed a magnetic survey of the interior of Newfoundland, and in the early part of the year an expedition, in charge of Mr. C. Sligh, made magnetic observations along the coasts and in the interior of Central America.

#### ETHNOGRAPHY IN THE PHILIPPINE ISLANDS.

THE Government Bureau of Science of the Philippine Islands is actively prosecuting inquiries into the physical anthropology and ethnography of the archipelago. The fourth part of the fourth volume of its Proceedings contains two papers of more than ordinary importance.

Mr. R. B. Bean contributes an elaborate article on the littoral population of Luzon and the adjacent islands, based on measurements of students at Manila. The view generally accepted is that of M. L. J. Montano ("Rapport a M. le Ministre de l'Instruction publique sur une Mission aux Îles Philippines et en Malaisie," Paris, 1879-81), who classes the inhabitants of the mountainous regions of the interior as Negritos; those of the fertile parts of the interior as Indonesian; those of the coast lands as Malay. In addition to these there is a considerable Spanish element, and, since the last conquest of the archipelago, American and negro mestizos or half-castes are springing up in every part of the islands, thus presenting in a very mixed population a series of most interesting problems for the physical anthropologist. Mr. Bean, from his recent inquiries, classifies the coast population into Modified Iberian, Australoid, and Primitive, with several intermediate types. The Modified Iberians correspond to the Mediterranean race of Sergi; the Australoids are below