

base, an unconformable contact with the Carboniferous. There is also minor production from the Cretaceous beds.

The point at once arises that the Carboniferous rocks (Madison limestone) may be the ultimate source of the oil and that the Jurassic can only claim migrated supplies. The unconformity is a big one, so that this may indeed be the case, though Mr. A. J. Collier, the author of the recent bulletin on the subject (U.S. Geological Survey, No. 812-B) giving the latest account of this field, inclines to the view that the indigenous source is the Ellis formation, and backs his opinion with data of more than local interest.

### University and Educational Intelligence.

CAMBRIDGE.—The Sheepshanks Exhibition for proficiency in astronomy has been awarded to R. D. H. Jones, scholar of Gonville and Caius College.

The Appointments Committee of the Faculty of Archaeology and Anthropology has reappointed R. U. Sayce to be University lecturer in material culture and physical anthropology.

Sir William Pope announces that Dr. Ernest Fourneau, of the Pasteur Institute, Paris, will give a lecture on the Liversidge Foundation on Friday, May 9, at 5 P.M., on "Chemo-Therapy".

APPLICATIONS for grants from the Chemical Society Research Fund must reach the Assistant Secretary of the Society, Burlington House, W.1, not later than June 2. The requisite form is obtainable upon request.

RAMSAY memorial fellowships for chemical research, one limited to candidates educated in Glasgow, will shortly be awarded. The fellowships will each be of the yearly value of £250 plus, possibly, a grant for expenses. They will be tenable for two years, with a possible extension of a year. Applications must be sent to reach the secretary of the Ramsay Memorial Fellowship Trust, University College, Gower Street, W.C.1, by June 5 at latest.

STATE grants to Universities in Great Britain are to be increased by £250,000 a year. For five years they have stood at £1,550,000, to which figure Sir Austen Chamberlain raised them in 1925. When the Universities presented to the Chancellor of the Exchequer last November, through a deputation introduced by Lord Cecil, the case for a further increase, they asked also for capital grants for buildings. Mr. Snowden recognised "the great and increasing extent to which they are serving the social and industrial progress of the people" and that "it is quite reasonable that the State should contribute in substantial measure to the cost of maintaining our universities and colleges as active centres of education and research, and few, if any, items of public expenditure can be of clearer national value", but he holds that there is comparatively little weight in the arguments for capital grants. The most cogent argument for increased assistance is based on the increased expensiveness, due to the progress of science, of the plant and staff requisite for maintaining the high standard of efficiency in instruction and research which is indispensable for national well-being in the face of the economic competition of other nations in the world of commerce. For the provision of new plant Mr. Snowden thinks that "the fine record of benefactions received by the universities during the last four or five years encourages the hope that during the coming quinquennium private generosity may again prove not unequal to the task".

### Historic Natural Events.

May 11, 1894. Remarkable Hail.—During a severe hailstorm at Vicksburg (U.S.A.) a remarkably large hailstone was found to have a solid nucleus, consisting of a piece of alabaster, from  $\frac{1}{2}$  to  $\frac{3}{4}$  inch in length. During the same storm, at Borina, 8 miles east of Vicksburg, a gopher turtle, 6 in. by 8 in., and entirely encased in ice, fell with the hail. These hailstorms occurred on the south side of a region of cold northerly winds; they were apparently accompanied by local whirls which carried heavy objects from the earth's surface up to the clouds, where they were encased by successive layers of snow and ice.

May 12, 1811. Tornado in Derbyshire.—About 5 P.M. at Bonsall, in the Peak district, a singular motion was observed in a cloud of serpentine form, which moved in a circular direction, from south by west to north, extending itself to the ground. It began near Hopton, and continued along a course about five or six miles in length and about four or five hundred yards in breadth, tearing up plantations, levelling barns and miners' cots. It uprooted large ash trees, carrying them 20-30 yards, and twisted the tops from the trunks of other trees, dropping them 50-100 yards away. Cows were lifted from one field to another, and injured by the fall; miners' bubble-tubs, wash-vats, and other materials were carried to a considerable distance and forced into the ground. The tornado was accompanied by a tremendous hailstorm; stones and lumps of ice fell which measured from nine inches to a foot in circumference, breaking windows and injuring cattle.

May 13, 1922. Hailstorm at Montpellier, France.—On this date a hailstorm occurred at Montpellier, France. So great was the fall that traffic was blocked in the streets, and the inhabitants were obliged to clear the pavements with shovels. The hailstones averaged half an inch in diameter, and on open ground they lay to a depth of four inches, but in streets where they were washed into heaps by the accompanying rain, and caked together, they formed a layer from  $1\frac{1}{2}$  to 2 feet deep.

May 13-17, 1921. Magnetic Storm and Sunspot.—A magnetic storm of great intensity and long duration commenced on May 13.6 and lasted until May 17. At Greenwich the traces of declination, horizontal force, and vertical force passed continually beyond the recording sheets; the measured ranges of the three elements were respectively  $>100^\circ$ ,  $>740\gamma$ , and  $>460\gamma$ . At Kew the corresponding ranges were  $132^\circ$ ,  $>650\gamma$ , and  $1500\gamma$ . The storm reached its greatest intensity between 0<sup>h</sup> and 8<sup>h</sup> G.M.T. on May 15. Oscillations of the needles were frequently so rapid that the movements were barely recorded on the photographic sheets. The disturbance was accompanied by brilliant displays of the aurora, and there were serious dislocations of the telephone and telegraph services over a great part of the world. At the time of the commencement of the storm, a large naked-eye sunspot was one day's travel east of the sun's central meridian. The spot, which was situated on the sun's equator, was of unusual development.

May 14, 1886. Floods.—Following three days of excessive rainfall in Wales and the west Midlands on May 11-13, disastrous floods occurred on May 14 and 15. At Worcester the Severn rose to 17 ft. 10 in. above the ordinary summer level; this was described as the highest flood for 115 years. The Trent at Nottingham was nearly 19 feet above the summer level, but did not equal the flood of 1852.

May 15, 1586. Waterspout.—At Kestran in Bohemia a powerful whirlwind carried the water of two

ponds into the air with all the carp and pike that they contained. On the following day there was a water-spout on Lake Constance near Meilen.

May 15, 1608. Cold Spring.—Not only the winter of 1607–8 (see Jan. 10) but also the following spring, were abnormally cold. The rivers remained frozen well into the spring, and it is recorded that so late as May 15 boys were sliding on the frozen ditches at Dantzic. The season was also severe in North America, and resulted in the destruction of the European colony of Sagadahoc.

May 15, 1893. Drought.—The famous 'spring drought' of 1893 was, while it lasted, one of the most severe on record in England and the neighbouring parts of Europe. For a period of 114 days commencing on Feb. 28, the total rainfall in London was only 1.09 in., and during the four months March to June less than a third of the normal rainfall was experienced in southern England. At Hurst Castle (Hampshire) a period of 59 days from Mar. 18 to May 15 was completely rainless, and a large part of southern England had no rain in April.

May 16, 1646. Rain of Brimstone.—Worm relates that "the whole city of Hasnia [? Asniara Is. off Italy] and all its streets were inundated with a mighty rain so that men were prevented from walking and the air was infested with a sulphureous odour; when the waters had subsided somewhat it was possible in some places to collect a sulphureous powder, some of which would pass for real sulphur as regards taste, colour, smell, etc."

## Societies and Academies.

### LONDON.

Geological Society, April 9.—Léon W. Collet: The structure of the Canadian Rockies. The results of a two months' expedition (financed by the Shaller Fund) along the Athabasca Valley (Jasper National Park) and round Mount Robson (B.C.). A complete section across the Rockies was made, from the eastern border to Yellow Head Pass. This mountain-chain is made up of seven 'blocks' thrust one over the other from west to east, and separated by 'clean-cut thrusts' of the type of the North-West Highlands of Scotland. The Canadian Rockies and the Alps show two different types of folding. The structure in blocks of the Canadian Rockies corresponds to Argand's 'ground folds' (*plis de fond*), while the Alps are made up of 'recumbent folds' developed in a geosyncline. In the Canadian Rockies the energy necessary for the folding was much greater than in the Alps for in the former the strata have been cut into blocks as far down as the Pre-Cambrian. The Ordovician and the Silurian are missing in the eastern part of the Rockies. The Ordovician alone appears in the western part. This stratigraphical gap is a repercussion, across the Canadian Shield, of the Caledonian folding of the Canadian Appalachians.

Royal Meteorological Society, April 16.—S. K. Banerji: The electric field of overhead thunderclouds. Changes in the electric field produced by eighteen thunderclouds during their passage over the Colaba Observatory in 1929 suggest that the majority were of the 'unitary type' and had their front part negatively charged, the central part positively charged, and the rear negatively charged. A few were of the 'double type' and produced changes in the field as if two thunderclouds of unitary type had passed over in succession. In those thunderclouds which caused heavy rainfall, fluctuations in the central positive field occurred by loss of charge by rainfall or by in-

creased concentration of positive charge by increased vertical current, in agreement with the breaking-drop theory. The monsoon clouds produced an electric field which was pre-eminently negative during periods of rainfall.—F. J. W. Whipple: The great Siberian meteor and the waves, seismic and aerial, which it produced. On June 30, 1908, a great meteor fell in Siberia, probably the greatest meteor which has occurred in historic times. The blast of air produced by the meteor devastated the forests over an enormous area. Leonard Kulik explored the region in 1927 and found the numerous holes in which, it is presumed, the fragments of the original meteor are buried. The impact of the meteorites caused seismic waves which were recorded at four observatories, the most distant of which was Jena. Remarkable waves recorded by sensitive barographs in England were produced by the meteor. The waves took five hours to travel from Siberia to England, the velocity being a little greater than that of the waves due to the famous eruption of Krakatoa.

### PARIS.

Academy of Sciences, Mar. 24.—Bigourdan: The instruments and observations of P. J. de Beauchamp. Historical account of the astronomical instruments used at the end of the eighteenth century by Beauchamp at Bagdad and elsewhere.—A. Cotton and M. Scherer: The magnetic double refraction of specimens of petroleum from various sources. Six specimens, with boiling points up to 250° C. and roughly refined, were examined, the large Bellevue magnet being utilised for the observations. The ratio  $\frac{C_m}{d} \times 10^{14}$ , where  $C_m$  was the double refraction for unit field and unit thickness, varied between 5.53 for Pechelbronn petroleum to 27.0 for the Morenic oil.—Henri Villat and Maurice Roy: The problem of Saint-Venant in the case of pure torsion.—Alfred Rosenblatt: Certain relations between the integrals of the first species of Picard belonging to an algebraic surface.—M. Cioranescu: Certain inverse problems relating to potential.—Maurice Coissard: A class of partial differential equations of the first order, with two independent variables.—Antonio Signorini: A mixed problem.—T. Bonnesen: Inequalities between arithmetical means.—J. Dieudonné: Some applications of the lemma of Schwarz.—Henri Cartan: The analytical transformations of encircled domains.—L. Ahlfors: Some properties of meromorphic functions.—Elie Cartan: Linear representations of simple and semi-simple groups.—R. Swyngedauw: The measurement of the power dissipated in organs of transmission.—N. S. Argeanicoff: The theory of Witoszinsky.—Alexandre Rajchman: An algebraic equation which occurs in the kinetic theory of gases.—Th. De Donder: The signification and invariance of the quantum constant  $h$  deduced from gravities.—Pierre Bricout: An absolute micromanometer with electrostatic compensation.—A. Poirot: The anodic rays of sodium, potassium, calcium, and barium.—Constantin Salceanu: The magnetic double refraction of organic substances in the fused state. The measurements were made with the large electro-magnet of the Academy of Sciences in a field of about 43,000 gauss. Data are given for  $\beta$ -methylnaphthalene, at temperatures between 89° C. and 36.5° C., and for three different wave-lengths.—R. Coustal and F. Prevet: The optimum concentration for the phosphorogen and flux in zinc sulphide, copper, and the variation of this optimum with the temperature of the preparation. Copper behaves differently from other phosphorogens, especially as regards the extremely small quantities required when the temperature of preparation is high.—Guy Emschwiller: The photolysis of organic