

Early Science at Oxford.

May 31, 1687. Mr. Caswel gave in a Table shewing ye difference between Kirching his Ephemeris and ye London Latin Ephemeris for ye present year 1687. Dr. Lister's Book *de cochleis Exoticis* was presented to the Society.

June 1, 1686. A letter from Mr. Flavel, a Physician in Newberry, to Mr. Anderton, was read: wherein he affirms that opening a great dog, before he was quite dead, in one of his kidneys he found a worm 16 inches long, and an inch in girth.

June 2, 1685. A Letter (dated May 28th) from Mr. Aston S.R.S. brought newes, that the Council of ye Royall Society has lately made an order, that such Persons, as are of the Oxford or Dublin Society, and likewise of ye Royall Society, in consideration of the charges they are at in ye places, where they reside, for carrying on the common work (ye discovery of Naturall Science) shall be excused half their weekly payments to the Royall Society, and be accountable to their Secretary only for £1 6s. per annum. Which order shews such generous and reall encouragement for the advancement of Learning, that this Society, considering that many of their Members may enjoy the Benefit of it, think themselves very much obliged by it, and accordingly order'd their Secretary to returne their humble thanks to the Royal Society for it.

A Letter from Mr. Cole, dated Bristol May 21. tells us, that the best time to see the severall colours afforded by the Purple-fish with the help of ye Sun is by drying the ting'd cloth in a Morning Sun.

An account of a piece of Watch-work by Mr. Samuel Watson of Coventry was communicated and read, it is a *Moving Ephemeris*.

June 3, 1684. Mr. Bernard, and some others of ye Society, gave an account that on ye 27th of May last in ye evening, they tried to discover ye *Spot* in ye Sun, which Mr. Flamsteed had observed a month before, and which he conjectured would continue during a second revolution of the Sun; but they could discern nothing, tho they made use of a good telescope, 15 foot long, and ye air was clear.

A letter from Mr. Wheeler was read, concerning ye description of a *watch*, invented by him, that may be so fram'd, as to move upon a declivity without any spring, or any other weight, then what is included in ye body of ye watch; wherein he also fully, and learnedly, shewed ye reason of its motion, and ye manner how it should be pois'd.

Dr. Plott then produc'd a peice of *Natrôn*, or Nitre, found on ye top of a lake in Ægypt, which he observed ye last year to yeild, and melt near ye time of ye rising of ye Nile. He said it did not grow moist in ye thaw, nor all ye winter, but it began to relent three or four dayes agoe, and ye paper it was put in, was now moistened all over; He promised to observe its increase, or decrease of weight, and to give an account of it. Afterwards Dr. Plott read a discourse concerning *Vines*, observing that after ye late great frost ye Vines bearing white grapes have suffered much more, than those that bear red; and consequently seem more tender, especially the white *Muscadine*, which are (some of them) quite dead, but ye *Frontinjer*, *Burlake*, and *Rhenish*, not so; these springing again fresh from ye root, though all ye old branches are dead, and yet none of these have escaped so well as ye red, whose Branches are not dead above half way down but even amongst ye red grapes too, there is a difference.

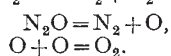
1690. Sir George Mackenzy observ'd that ye highest, and coldest hills in Scotland had ye greatest quantities of Shelly Concretions.

Societies and Academies.

LONDON.

Royal Society, May 21.—W. E. Curtis and R. G. Long: The structure of the band spectrum of helium. III. The doublet bands. New data extend the main series to the eighth member. Previous difficulties of interpretation are overcome by employing a non-integral quantum number ($m - \epsilon$). For the earlier bands ϵ comes out $+\frac{1}{4}$ within the limits of error, but it departs from this value for the higher members of the series, except in the case of the Q branches, where it remains constant at $\frac{1}{4}$. The bands are capable of very accurate representation by the addition of a term $\beta(m - \epsilon)^4$ to the usual parabolic formula, and this leads to new and much more accurate values of the molecular moments of inertia and separation of the nuclei. This information, in conjunction with deductions concerning the electron orbits, affords support to Lenz's suggestion that the structure of the helium molecule may be related to that of the hydrogen molecule. The results of the analysis of the second series of doublets are closely similar to those obtained from the main series. The two series seem to originate from the same molecule, but a different radiating electron.—G. S. Adair: (1) A critical study of the direct method of measuring the osmotic pressure of proteins. In certain solvents the osmometric observations on hæmoglobin satisfy the three criteria—permanence, reversibility, and reproducibility; therefore they may be regarded as true osmotic pressures. Readings remained constant within 6 per cent. for nine weeks, and no products of protein breakdown could be detected in the outer liquids. With rigorous control of conditions and with adequate criteria for equilibrium, the osmometer method proved thoroughly trustworthy; and when certain corrections were applied it proved capable of giving results accurate to 0.1 mm. of mercury, which corresponds to about one hundred thousandth of a degree in depression of the freezing point. (2) The osmotic pressure of hæmoglobin and the absence of salts. In the theory of hæmoglobin solutions previously accepted, the molecular weight of pure hæmoglobin is supposed to be equal to the equivalent 16,700, and it was supposed that traces of salts caused aggregations. Pressures corresponding to the theory were obtained only in the presence of ionising impurities, and it is suggested that the so-called aggregation changes are better explained by the theory that the observed pressure is the sum of the hæmoglobin partial pressure and the partial pressure of undialysed impurities.—J. W. Fisher: Some further experiments on the gyro-magnetic effect. It was sought to detect a gyro-magnetic effect by magnetising a substance (in most cases magnetite) by a rotating magnetic field and looking for a component of magnetisation in a direction perpendicular to the plane of rotation of the field; such a component would be expected to arise if a rotation of the magnetic axes of the molecules is set up by the rotating field. Fields rotating at frequencies of 2 to 5×10^4 cycles per second gave no evidence of an effect of this kind even for rotating fields of more than 100 gauss.—G. A. Elliott and I. Masson: Thermal separation in gaseous mixtures. Equilibrium thermal separations have been measured, with nearly constant temperature difference approaching 500° C., for mixtures of hydrogen, helium, and carbon dioxide, taken two at a time and in varying proportions. The results obtained are unexpectedly high. In each case the constituent of higher molecular weight becomes more concentrated in the cold part of the mixture. The greatest separation was obtained from mixtures such that the cold side contained about 55 per cent. of

hydrogen in hydrogen-carbon dioxide, about 60 per cent. of helium in helium-carbon dioxide, and about 60-55 per cent. of helium in hydrogen-helium mixtures. The displacement seems to be specific for helium, whether it is the lighter gas of the pair or not. The separations observed may be attributed almost entirely to mutual intermolecular actions, and not appreciably to differences in the individual thermal expansibilities of the constituents of the gas mixtures.—O. W. Richardson: Structure in the secondary hydrogen spectrum. The paper deals with 10 lines of this spectrum previously classified by Richardson and Tanaka as $52P(m)$. These, together with 24 additional lines, are now rearranged as two new P series, two new Q series, two new R series and a fragment each of a P and Q series. The P and R series have a superficial resemblance to a doublet band. The seven series show four sets of intercombinations. There are abnormalities which show a curious similarity throughout the different sets of term numbers.—C. N. Hinshelwood and C. R. Prichard: The catalytic decomposition of nitrous oxide on the surface of gold. At 334° - 990° C. the surface reaction is unimolecular and is unretarded by oxygen. The gold provides a temporary abode for oxygen atoms, so that the reaction $2N_2O = 2N_2 + O_2$ can resolve itself into



Probably every molecule of nitrous oxide which strikes the gold wire with a kinetic energy greater than 30,000 calories per gram-molecule gives up its oxygen atom.—E. H. Callow: The velocity of ice crystallisation through supercooled gelatin gels. With "ash-free" gelatin, increase in concentration of gelatin causes decrease in velocity of crystallisation. Such decreases are considerable for concentrations above 1 per cent. (above 2 per cent. at P_H 4.75), e.g. at P_H 1.50 the velocity through a 1 per cent. gel is 960 cm./hr. (about half the velocity through distilled water), and that through a 1.5 per cent. gel is only 40 cm./hr. When the hydrogen-ion concentration is varied by means of hydrochloric acid, the velocity is a minimum near the iso-electric point of gelatin and a maximum about P_H 2.6. Sodium hydroxide increases the velocity. Neutral salt causes a slight increase in velocity of crystallisation through gelatin-water gels, but when sodium chloride is added to gelatin-chloride gels there is a marked decrease in velocity.—R. C. Johnson: Further spectra associated with carbon. The effect of helium on carbon spectra has been investigated in the ultra-violet region. The comet-tail spectrum and a new line spectrum of carbon have been completely measured. The new lines probably constitute the true "arc" spectrum of carbon. No series relationships have, however, been identified. A new band spectrum associated with the comet-tail bands has also been measured and disposed in series. Under the conditions in which the above spectra were produced in helium, the negative band spectrum of carbon was developed with great strength.—W. Sucksmith: The gyromagnetic ratio for magnetite and cobalt.—Ian Sandeman: The secondary spectrum of hydrogen at higher pressures. With the aid of the arc spectrum a band has been selected with head at 4582.58 Å.U. and shading towards the violet. The value of the initial moment of inertia of the molecule emitting the band, when calculated by the aid of the formula of Kramers and Pauli, comes out as 19.326×10^{-41} gm. (cm.)², agreeing with the value predicted by a static model of triatomic hydrogen, H_3 . The lines of the P , Q , and R combination discovered by Richardson and Tanaka are also present in the same condition of the arc, and the intensity distribution found for them agrees with that found for the new band.

Mineralogical Society, March 17.—S. Tomkeiff: The structure of aragonite. A new method of etched figures which can be used for the estimation of crystal structure is described. A structure of aragonite, constructed in such a way that the transformation into calcite can be attained with a small expenditure of energy, has been tested by this method. For six of the eight faces examined the spacings are the same as those observed by Sir William Bragg, but the remaining two give only half of the spacings observed. This anomaly is explained by the hypothesis that aragonite in its natural occurrence has undergone a partial transformation into calcite. The structure proposed is unable to explain the intensities of X-ray spectra. Aragonite is considered to be pseudo-orthorhombic.—I. E. Knaggs: Crystalline structure of penta-erythritol tetranitrate. From X-ray examination, the dimensions of the ditetragonal bipyramidal unit cell are $a = b = 13.2$ Å.U., $c = 6.66$ Å.U., and it contains four molecules, each possessing fourfold symmetry. The crystals are built on the Bravais lattice Γ_4 and belong to the space-group D_{4h}^7 . A structure is proposed in which the molecules have a digonal axis with two planes of symmetry parallel to (100) intersecting in it. There is a considerable departure from the tetrahedral angle of the bonds from the central carbon atom of the molecules. The strain caused thereby, together with the comparative proximity of eight oxygen atoms at intervals in the structure, may contribute to the explosive nature of the compound. The configuration of the nitro-group ($-NO_2$) is in favour of the oxygen atoms being equivalent.—E. D. Mountain: Potash-oligoclase from Mt. Erebus, South Victoria Land, and anorthoclase from Mt. Kenya, East Africa. Felspar crystals of two types, occurring in the tuffs of Mt. Erebus, have a chemical composition intermediate between anorthoclase and andesine and are referred to potash-oligoclase, being identical with certain rhomb-porphyrty phenocrysts. Similar crystals from Mt. Kenya and Kilima-njaro contain less lime. A complete series of felspars exists between anorthoclase and andesine having continuously varying properties and mostly of porphyritic occurrence. This necessitates a slight modification in the definition of kenyte, but the limits of the type must depend upon the natural series rather than upon any chemical distinction.—A. Brammall: Further notes on the association of lime with other oxides of RO-type in minerals. Volume-relationships accentuate the differences in chemical behaviour between lime on one hand and magnesia, ferrous oxide, and manganese oxide on the other, and partly control those early molecular associations which promote differentiation in the fluid magma. Particular cases of differentiation in the Dartmoor granite furnish features analogous with those of the anorthosite-peridotite schism, and suggest also that a high concentration of ferrous oxide and magnesia promotes the early separation of orthoclase as phenocrysts, and the zoning of the ground-mass plagioclase.—G. Greenwood: Crystallographic data of some new organic compounds.

Royal Anthropological Institute and the Prehistoric Society of East Anglia (Joint Meeting), April 21.—Mr. Henry Balfour: The status of the Tasmanians among Stone Age peoples. The Tasmanians are probably the only people of whom it can be said with confidence that they remained into quite recent times (to the middle of the last century) in an arrested culture-phase which may be described as strictly palaeolithic. A decided similarity can be indicated between the form and technique of many Tasmanian implements and certain characteristic implements of the Mousterian series. Many of the

types of implements which are particularly characteristic of the Aurignacian culture-horizon are well and abundantly represented in the Tasmanian series. One of the types, which is particularly associated with the Aurignacian division, *i.e.* the "grattoir à museau" of French archæologists, is by far the most abundant of the Tasmanian tools, and it is very significant that the implements within this category exhibit very commonly a flaking technique—a very delicate parallel flaking—which is identical with that which has been specially named "la retouche aurignacienne." The characteristic, more specialised implements of Tasmania; then, suggest a dual analogy—Mousterian and Aurignacian—and if we evaluate the status of this culture in accordance with the highest achievements, we must base our estimate chiefly upon the Aurignacian analogy and promote the Tasmanians to a culture level comparable with that of early late-Palæolithic man. The resemblance is only partial, since several important elements in the culture of Aurignacian man are missing from that of the Tasmanians.—Nina F. Layard: Recent excavations at the neolithic site of Sainte-Gertrude, Holland. Excavations were carried out in October last at the neolithic station of Sainte-Gertrude, Holland, undertaken by the kind permission of M. le Comte René de Geloës, and under the auspices of the Trustees of the Percy Sladen Research Fund. Points of special interest which were observed were the following: Division of labour, suggested by the finding of ateliers specially devoted to the turning out of one type of implement—thus a profusion of picks on one spot, axes on another, and cores found in abundance on a third; the extraordinary number of implements argues either a long occupation or a large number of settlers; the working places were not the living places; the equipment of the miner included picks, axes and racloirs; habits of economy are very noticeable—witness the number of re-fashioned tools. A comparison of the various implements found at Sainte-Gertrude, with those from Cissbury, Grimes' Graves, and other neolithic mining stations, may help in the dating of these English sites.

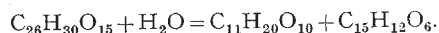
MANCHESTER.

Literary and Philosophical Society, March 31.—G. H. Carpenter: Collembola from southern New Zealand. There are species of the widespread genera Pseudachorutes from Mount Algidus, as well as of Paronella which had previously been known across the eastern tropics from West Africa to Queensland. But the most important discoveries are a species of Cryptopygus at Ben More, Canterbury, and two species of Lepidophorella. The former had previously been known from Graham Land and the South Orkneys; the latter from Chile and Patagonia. Their presence in New Zealand and its outlier is most suggestive for comparison with distributional facts derived from the study of other groups which indicate ancient extensions of antarctic and sub-antarctic lands.—F. E. Weiss: On the structure of the leaves of the graft-hybrids, *Cratægo-mespilus Asniersii* and *Cratægo-mespilus Dardari*. It has been a common practice on the continent to graft the medlar (*Mespilus germanica*) on the stem of the hawthorn (*Cratægus monogyna*). In several instances shoots have been produced from near the region of the graft which partook of the nature of both stock and scion. These have been termed graft-hybrids. In the leaves of the two forms discussed, in the former the epidermal cells of the upper surface of the leaves are in surface view

small and more or less straight-walled like those of the hawthorn, and not large and sinuous as in the medlar. The resemblance to the hawthorn may be due to the fact that the leaf is in shape and size more like that of the hawthorn than the medlar. The leaves of *Cratægo-mespilus Dardari*, which are in shape more like those of the medlar though smaller in size, have epidermal cells, intermediate in shape and size between those of the medlar and hawthorn. If these graft-hybrids are periclinal chimæras, their epidermal cells have in the leaves at all events been modified to a great extent by the underlying tissues, with which they are no doubt organically connected by protoplasmic threads.

PARIS.

Academy of Sciences, April 20.—Le Prieur: With the De Goys expedition from Paris to Gao. An account of the results obtained with the author's apparatus (which automatically records the path taken by an aeroplane), in two air voyages between Paris and Gao, a distance of 4000 kilometres.—Bertrand Gambier: The surfaces of translation of Sophus Lie.—A. Lafay: A means of modifying the wake of a cylinder moving in a fluid.—B. Hostinsky: The theory of magnetism in movement by Poisson.—F. Baldet: The influence of pressure on the band spectra of carbon in the thermo-electronic bulb. Consequences for the theory of comets. It is shown that the pressure plays an essential part in the existence of the different groups of carbon bands.—Arvid Leide: Researches on the *K* series of the X-rays. The table given shows the results of the measurements in the zone 29Cu-53I.—A. Maubert, L. Jaloustre, and P. Lemay: The influence of radium on the catalase of the liver. As with the bromide of thorium-X, radium in strong doses paralyse while in weak doses it activates the catalase. Radium emanation acts similarly, at least with small doses. The only difference observed between the effects of radium and thorium-X is that the β and γ rays of radium reduce the activity of catalase, an effect not observed in the earlier experiments with thorium-X.—Mlle. Germaine Cauquil: The thermochemical study of the sodium derivatives of cyclohexanol.—Marcel Frèrejacque: The structure of the phenylhydrazones of glucose.—Henry Derville: The facies of the carboniferous limestone in the Boulonnais.—E. F. Gautier and J. Savornin: The red layers of Ouaouizert (Central Morocco).—Pierre Le Conte: The regime of the waters of the Channel and the transformation into heat of a fraction of the energy of the tidal currents.—M. Bridel and C. Charaux: The products of the ferment hydrolysis of rhamnucoside: primeverose and rhamnucogenol. The hydrolysis of rhamnucoside by a ferment produces primeverose and rhamnucogenol in accordance with the equation



Rhamnucogenol is a derivative of methylanthranol.—René Jeannel: Apterism in insular insects. The study of Trachinæ in various localities shows only one example which might be interpreted as a case of apterism produced by isolation in an island; this is *T. quadristriatus* in the island of Elba. Other examples from Madeira, the Canaries, Corsica, and Sardinia prove, on the contrary, that the fact of living on an island has no effect in producing disappearance of the wings.—Edouard Chatton and Mme. Chatton: The action of external factors on the Infusoria. The determinism of the formation of chains in Colfidium.—F. Diénert: The purification of water.