

## Societies and Academies.

## EDINBURGH.

**Royal Society, June 7.**—Prof. F. O. Bower, president, in the chair.—D. **Balsillie**: The intrusive rocks of the Dundee district. These belong to two types, viz. diabases and felsites. The former are generally fine-grained dark masses that contain hypersthene and free quartz, which minerals, along with monoclinic pyroxene and abundant plagioclase feldspar (60 per cent. anorthite), occur in a highly felspathic ground mass. Hornblende, biotite, iron ores, and apatite occur as accessories, the first-mentioned, however, only rarely. Occasionally free quartz disappears, the place of hypersthene being then taken by olivine. As a type of olivine diabase may be cited the large intrusive mass near Newton, west from Auchterhouse station. The hypersthene diabases are characterised by the presence of acid segregation veins that often show beautiful graphic intergrowth of quartz and feldspar. Nearly all these basic rocks are much altered, the phenomenon of albitisation being of frequent occurrence, and typically displayed in the diabases of Castle Huntly, west from Dundee. The pink rocks would probably have been classed by the older writers as mica oligoclase porphyrites, which name still sufficiently describes them. Reference was also made to an outcrop of highly solidified ash occurring at Mill of Mains, north of Dundee, that probably marks the site of an old volcanic vent. In discussing the age of the intrusions, the opinion was put forward that these rocks of the Dundee district should be regarded as belonging to the volcanic cycle of Lower Old Red Sandstone times.—F. L. **Hitchcock**: An identical relation connecting seven vectors.

June 21.—Prof. F. O. Bower, president, in the chair.—J. **Goold**: The musical scale. The author described a new way of regarding the genesis of the musical scale. Beginning with the four notes, or with the three perfect fifth intervals determined by the four notes F, C, G, and D, the author showed that the group of four notes a major third above these, and the third group of four notes a major third below them, gave, when reduced to the range of one octave, all the notes of the recognised chromatic scale. Another point emphasised was that all the notes of the scale had relative frequencies which depended on powers and products of the numbers 3 and 5.—J. **Marshall**: A law of force giving stability to the Rutherford atom. It was shown that if the law of force between a positive nucleus and a negative electron were of the form

$$\frac{1}{r^2} \left( 1 - \frac{b^{n-2}}{r^{n-2}} \right)$$

a value of  $n$  can be found which will preserve the stability of a group of electrons not exceeding seven in number. Since  $b$  is small compared to the radius of an atom, this law is indistinguishable from the inverse square law for distances large in comparison with the radius of the atom. If in the case of an atom built up of a series of rings of electrons the tentative assumption be made that the inner rings act on the individuals of the outer rings as if the inner set were replaced by an equivalent charge at the centre, the investigation may be generalised to include such cases also; and it is found that for displacements perpendicular to the plane of the orbit the configuration is unstable when the number of electrons in the outer ring exceeds seven. This would seem to indicate that the atom could be built up of a series of rings of seven electrons, and that we should expect a periodicity in the chemical properties

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of the atoms corresponding to Mendeléeff's classification, which was stated by Newlands in 1864 in the form: "The eighth element starting from a given element is a kind of repetition of the first."—Prof. A. W. C. **Menzies**: The explanation of an outstanding anomaly in the results of measurement of dissociation pressures.—Prof. J. A. **Gunn** and Dr. D. G. **Marshall**: The harmful alkaloids in malaria.

## PARIS.

**Academy of Sciences, July 5.**—M. Henri Deslandres in the chair.—A. **Lacroix**: An eruption of the Karthala volcano at Grand Comore in August, 1918. This eruption commenced with a quiet flow of lava; a fortnight later explosions commenced, with emission of ashes reaching a great height. The explosive emission is considered as being probably due to the action of superficial water.—Em. **Bourquetot** and M. **Bridel**: The biochemical preparation of cane-sugar, starting with gentianose. Experiments made in 1910 indicated the probability of cane-sugar being one of the products of emulsin on gentianose, but the sugar could not be isolated. In 1920, using emulsin specially purified from traces of invertin, after separation of the glucose as  $\beta$ -methylglucoside, saccharose was obtained in a pure state.—A. A. **Michelson**: The application of interference methods to astronomical measurements. A development of a method described in the *Philosophical Magazine* in 1896. Measurements on Capella made with the 250-cm. reflector at Mount Wilson Observatory gave the parallax of this star as slightly under 0.050", with an accuracy of about 1/1000th of a second of arc. Experiments at Mount Wilson on a larger scale are contemplated.—W. **Kilian** and P. **Falot**: The existence of the facies of various Jurassic layers in the province of Tarragon (Catalonia).—A. **Righi**: Observations concerning a recent note on Michelson's experiment. An adverse criticism of some calculations by M. Villey.—W. **Sierpinski**: The measurable B ensembles.—E. **Cartan**: The projective applicability of surfaces.—E. **Berger**: The production of chlorides with a primer.—M. **Godchot**: The oxidation of coal. The experiments described afford no support to the view recently put forward that the oxidation of coal results from the action of bacteria pre-existing in the coal.—E. E. **Blaise**: The action of substituted hydrazines upon acyclic 1:4-diketones. A study of the reaction between dipropionylethane and phenylhydrazine. Substituted hydrazines give pyrrol derivatives with 1:4-diketones.—M. **Delépine**: Ethylene sulphide,  $C_2H_4S$ . Previous attempts to prepare the sulphur analogue of ethylene oxide have been unsuccessful. It can be obtained by the action of sodium sulphide upon ethylene chlorothiocyanate,  $CH_2Cl \cdot CH_2 \cdot CNS$ , and subsequent distillation in a current of steam. Ethylene thiocyanate,  $CNS \cdot CH_2 \cdot CH_2 \cdot CNS$ , can replace the chlorothiocyanate in this preparation.—J. **Bougault** and P. **Robin**: The iodoamidines. Benzamidine with iodine and dilute soda solution gives the compound  $C_6H_5N_2I$ , in which the iodine is attached to a nitrogen atom, since it is quantitatively removed by potassium iodide in acid solution. The reaction appears to be a general one for amidines.—M. **Guerbet**: A reaction for benzoic acid based on its diazotisation: its application to toxicological detection of atropine, cocaine, and stovaine. The reaction is based on the production of  $\beta$ -naphtholazobenzoic acid, and will detect readily 0.1 milligram of benzoic acid.—P. **Idrac**: Convection currents in the atmosphere in their relation to hovering flight and certain forms of clouds.—P. **Nottin**: The absorptive power of earth for manganese. When manganese solutions are treated with soil, manganese is fixed and some lime

is found in solution. Calcite was proved not to react with manganese salts, but lime was dissolved from aragonite and manganese retained.—**M. Gallaud**: A race of wallflowers with multiple and hereditary anomalies.—**A. Marie** and **L. MacAuliffe**: Study of 344 gypsies. An anthropometrical comparison with the French race.—**E. Roubaud**: The mode of action of powdered trioxymethylene on the larvæ of *Anopheles*. Further details of the best method of using trioxymethylene for the destruction of mosquito larvæ.—**J. Dufrenoy**: The excretion of vital colouring matters and degenerescence in Ascidiæ.—**E. Chatton**: A morphological and physiological xeno-parasitic complex: *Neresheimeria catenata* and *Fritillaria pel-lucida*.—**R. Combiér**: The purification of sewage by activated sludge.—**A. Mayer**, **L. Plantefol**, and **A. Tournay**: The physiological action of symmetrical dichlorodimethyl ether.

## CAPE TOWN.

**Royal Society of South Africa**, May 19.—**Dr. A. Young** in the chair.—**J. Moir**: Colour and chemical constitution. Part xi.: A systematic study of the brominated phenolphthaleins regarding the relation between position and colour. The spectra of twenty-three bromine derivatives of phenolphthalein are described, these being selected from the 658 possible isomers so as to give clear evidence of the value of each of the twelve possible positions for bromine as regards change of colour. These values are tabulated, whereby any of the uninvestigated isomers should be calculable. Phenolphthalein differs from benzaurine in not having a negative paraposition; hence the author concludes that the current chemical formula for the former is incorrect, and suggests a new formulation.—**J. R. Sutton**: The relationship between cloud and sunshine. A brief discussion of the observations of sunshine and cloud made during the twenty years 1900-19 at Kimberley. In a general way much sunshine postulates little cloud; but the relation is not intimate, and a sunshine recorder cannot be regarded as an automatic device for determining the cloudiness of the sky. August gets the most sunshine and February the most cloud.—**Miss Ethel M. Doidge**: The haustoria of the genera *Meliola* and *Irene*. The fungi belonging to the genus *Meliola* are true parasites, sending haustoria into the cells of the host. The most common type is that which has a fine filament penetrating the cuticle and a small globular, thin-walled, uninucleate vesicle in the epidermal cell. Certain species penetrate through the epidermis, through sclerenchyma cells, if these are present, into the first chlorophyll-containing cells of the mesophyll. The haustoria cause a considerable disorganisation of the cells into which they penetrate, and the mycelium completely blocks many of the stomata.

## SYDNEY.

**Linnean Society of New South Wales**, May 26.—**Mr. J. J. Fletcher**, president, in the chair.—**Dr. R. J. Tillyard**: The Neuropteroid insects of the Hot Springs Region, New Zealand, in relation to the problem of trout-food. Examination of the contents of trout-stomachs showed that the most abundant foods were the green manuka-beetle, *Pyronota festiva*, the larvæ of caddis-flies of the family Leptoceridæ, and a small mollusc, *Potamopyrgus* sp. Less abundant were larvæ of dragonflies, mayflies, stoneflies, other families of caddis-flies, etc. Since the introduction of the trout the insect fauna of the region has been very greatly reduced, the percentage reduction being estimated as follows: Mayflies, more than 50; stoneflies, 80; and caddis-flies, 90. In the vicinity of a few streams to which the trout have no access insects are

still comparatively very abundant. Suggestions for improving the position are made along two lines: (1) Improvement of the food-supply, and (2) reduction in the number of trout.—**Dr. R. J. Tillyard**: The Panorpid complex. Additions to part 3. Additional evidence is brought forward from the study of the pupal tracheation of *Morova (Siculodes) subfasciata*, Walk., to support the conclusion that it is unlikely that any existing Heteroneurous type represents even a close approximation to the original archetype of the Rhopalocera.

## WASHINGTON, D.C.

**National Academy of Sciences** (Proceedings, vol. vi., No. 1, January).—**C. Barus**: An example of torsional viscous retrogression. Observations interesting in their bearing on Maxwell's theory of viscosity.—**C. M. Myers** and **C. Voegtlin**: The chemical isolation of vitamins. The method eliminates purines, histidine, proteins, and albumoses, leaving a liquid that can be crystallised, and probably contains histamine or histamine-like substances. The physiological action of the active fractions resembles that of extracts from the mucosa of the small intestine when the intestinal and yeast extracts are purified in the same manner.—**C. G. Abbot**: A new method of determining the solar constant of radiation. A method using the pyranometer applicable on many more days than the old method, and having the advantage that several independent observations of the solar constant may be made on a single day.—**F. G. Benedict**: The basal metabolism of boys from one to thirteen years of age. A formula and a curve are given, and it is shown that, although age and stature as well as body-weight must be considered in predicting heat output for adults, it is not necessary to consider more than the body-weight in the case of boys—a fact probably due to the close correlation between the changes in age, weight, and stature for boys.—**R. A. Dutcher**: The nature and function of the antineuritic vitamin. A general review of the theory, with numerous references, is followed by a brief sketch of the author's work, suggesting that the hormone supply is dependent upon the vitamin-content of the food.—**H. F. Osborn** and **C. C. Mook**: Reconstruction of the skeleton of the Sauri-pod Dinosaur *Camarasaurus*, Cope (*Morosaurus*, Marsh); and **W. K. Gregory**: Restoration of *Camarasaurus* and life-model. A restoration both in the articulation and in the musculature, with a brief statement of the essential characteristics of each.—**W. D. Matthew**: Plato's Atlantis in palæogeography. It is suggested that the present conformation of the Atlantic bottom dates back, in part at least, to the Palæozoic era.—**A. A. Noyes** and **D. A. MacInnes**: The ionisation and activity of largely ionised substances. A general discussion, with considerable bibliography, leading to the conclusion that most of the largely ionised inorganic substances at moderate concentration may be considered as completely ionised, and the decrease in the conductance-ratio wholly attributed to the decrease of ion mobility, and the change in activity-coefficient entirely attributed to some unknown effect of a physical nature.—**A. C. Lunn**: The commutativity of one-parameter transformations in real variables. A proof previously given by Lie and Engel applicable to analytic functions is supplanted by a proof assuming the existence of continuous first partial derivatives only.—**D. L. Webster**: The intensities of X-rays of the L series. II.: The critical potentials of the platinum lines. After a discussion of the special apparatus employed, a discussion of the lines observed places six lines in  $L_1$ , six in  $L_2$ , three in  $L_3$ . The faint lines of Dershem and Overn are unassigned.

Critical points and intensity ratios are discussed.—**J. B. Murphy**: The effect of physical agents on the resistance of mice to cancer. The evidence points to the lymphoid tissue as an important agent in the immunity reaction of transplanting cancer of mice.—**H. C. Sherman**: The protein requirement of maintenance in man. For the maintenance of healthy men and women an intake of not more than 35-45 grams of protein per "man" of 70 kg. per day is sufficient even when the protein is not especially selected, and hence the "standard" allowance of 1 gram of protein per kg. of body-weight per day provides an ample margin of safety.—**R. P. Cowles**: The transplanting of sea-anemones by hermit crabs. A study of behaviour with the problems it presents in this particular case.—**J. A. Anderson**: Spectra of explosions. Discussion of a new method for obtaining intense spectra of short duration, the new source of light being of the order of one hundred times the brilliancy of the sun.—Report of the Autumn Meeting: The report contains items of business, including the award of medals, the distribution of research grants, and the list of papers read before the Academy.

### Books Received.

Gold: Its Place in the Economy of Mankind. By B. White. Pp. xi+130. (London: Sir I. Pitman and Sons, Ltd.) 3s. net.

British Museum (Natural History). Catalogue of the Lepidoptera Phalænæ in the British Museum. Supplement, vol. ii. Catalogue of the Lithosiadæ (Arctianæ) and Phalænoididæ in the Collection of the British Museum. By Sir George F. Hampson. Plates xlii-lxxi. (London: British Museum (Natural History).) 32s. 6d.

Splendours of the Sky. By Isabel M. Lewis. Pp. vii+343. (London: J. Murray.) 8s. net.

The United States Forest Policy. By Prof. J. Ise. Pp. 395. (New Haven: Yale University Press; London: Oxford University Press.) 21s. net.

Lectures on Modern Idealism. By J. Royce. Pp. xii+266. (New Haven: Yale University Press; London: Oxford University Press.) 12s. 6d. net.

The Mediæval Attitude towards Astrology, particularly in England. (Yale Studies in English, No. lx.) By T. O. Wedel. Pp. vii+168. (New Haven: Yale University Press; London: Oxford University Press.) 10s. 6d. net.

Some Famous Problems of the Theory of Numbers, and in particular Waring's Problem. An Inaugural Lecture delivered before the University of Oxford. By Prof. G. H. Hardy. Pp. 34. (Oxford: At the Clarendon Press.) 1s. 6d. net.

Anthropology and History. Being the twenty-second Robert Boyle Lecture delivered before the Oxford University Junior Scientific Club on June 9, 1920. By W. McDougall. Pp. 25. (London: Oxford University Press.) 2s. net.

Manuel de Topométrie. Opérations sur le Terrain et Calculs. By J. Baillaud. Pp. vii+222. (Paris: H. Dunod.) 13 francs.

Bureau of Education, India. Indian Education in 1918-19. Pp. ii+86+plates. (Calcutta: Government Printing Office.) 1.8 rupees.

Ministry of Agriculture, Egypt. Report on the Maintenance and Improvement of the Quality of Egyptian Cotton and the Increase of its Yield. By H. Martin Leake. Pp. iv+38. (Cairo: Government Press.) P.T. 5.

The National Physical Laboratory. Report for the Year 1919. Pp. 152. (London: H.M. Stationery Office.) 5s. net.

Dictionary of Explosives. By A. Marshall. Pp. xiv+159. (London: J. and A. Churchill.) 15s. net.

The North of Scotland College of Agriculture. Guide to Experiments at Craibstone, 1920. Pp. 44. (Aberdeen: Milne and Hutchison.)

Ministry of Public Works, Egypt. Report on Psychrometer Formulæ based on Observations in Egypt and the Sudan. (Physical Department Paper No. 2.) By E. B. H. Wade. Pp. ii+45-72+2 plates. (Cairo: Government Press.) P.T. 5.

The Journal of the Royal Anthropological Institute. Vol. xlix., July to December, 1919. Pp. 181-370+12. (London.) 15s. net.

An Ethno-Geographical Analysis of the Material Culture of Two Indian Tribes in the Gran Chaco. (Comparative Ethnographical Studies, i.) By E. Nordenskiöld. Pp. xi+295. The Changes in the Material Culture of Two Indian Tribes under the Influence of New Surroundings. (Comparative Ethnographical Studies, ii.) By E. Nordenskiöld. Pp. xvi+245. (London: Oxford University Press.) 20s. net, 2 vols.

Ministry of the Interior, Egypt. Department of Public Health. Reports and Notes of the Public Health Laboratories, Cairo. Egyptian Water Supplies. Pp. ii+105. (Cairo: Government Press.) P.T.20.

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