

other bequests to the University of Sheffield are:—(a) Such of his books not bequeathed to the Literary and Philosophical Society as the University shall select; (b) optical and scientific instruments and apparatus; (c) cabinets and cases of geological and mineralogical specimens and preparations not bequeathed to the citizens of Sheffield; (d) manuscript books and notes upon geological and other scientific subjects; (e) lantern-slides similar to those bequeathed to the citizens of Sheffield, and the whole of his large collection of lantern-slides illustrating many scientific and other subjects; (f) microscopical objects of rocks, minerals and metals, and other things of a like nature. A legacy of 6500*l.* is bequeathed to the University, and the University is desired to appropriate out of other funds 3500*l.*, the amount of a gift which Dr. Sorby made to the University College of Sheffield in 1903, making together 10,000*l.*, as an endowment for a professorship of geology or such other subject as the University may think more suitable. This legacy is charged upon the funds to be appropriated to answer certain annuities given by the will and payable as and when the annuities fall in. To the Royal Society of London is bequeathed the sum of 15,000*l.*, the income therefrom to be devoted to the establishment of a fellowship or professorship for the carrying on of original scientific research. The object is to promote the discovery of new facts rather than the teaching of what is known. It is suggested that when possible the research shall be carried out in one of the laboratories of the University of Sheffield. This condition may, however, be dispensed with when the nature of the investigation requires that the work should be done elsewhere. So long as in the opinion of the council of the Royal Society the University of Sheffield is not efficiently equipped in laboratories and appliances, then the income shall be administered in such manner as the said council shall think best for the promotion of original research. Other legacies are:—the Literary and Philosophical Society of Sheffield, 500*l.*, and the Geological Society of London, 1000*l.*

## SOCIETIES AND ACADEMIES.

### LONDON.

**Royal Society**, February 27.—“The Influence of Temperature on Phagocytosis.” By J. C. G. **Ledingham**. Communicated by Dr. C. J. Martin, F.R.S.

(1) When serum, cocci, and leucocytes are mixed directly and incubated at different temperatures, the number of cocci taken up increases more or less regularly with the temperature. By this method it has been shown that the phagocytic intake at 18° C. is only about one-fourth to one-fifth of that at 37° C.

(2) This fall, at least within the temperature range 37° C. to 18° C., is due to the diminished rate of combination of the serum with the coccus as the temperature falls.

(3) When cocci which have previously been exposed to the action of serum, either at 37° C. or at 18° C., are put in contact with leucocytes, the intake is practically the same, whether the phagocytosis takes place at 37° C. or at 18° C. The number taken up, however, after combination at 18° C., and more especially at 7° C., falls very short of the number taken up after combination at 37° C.

(4) Experimental results, detailed above, lead one to assume that prolonged contact of a serum with cocci at a low temperature (18° C. or 7° C.) leads to a maximum absorption of opsonin by the cocci (corresponding to that temperature), so that the subsequent phagocytosis is identical whether it takes place at 37° C. or at 18° C.

(5) Provided that cocci loaded with opsonin up to a certain maximum are presented to the leucocyte, the phagocytic energy of the latter is independent of the temperature within a wide range.

(6) From the appearances on stained films, it would seem that sensitised micro-organisms exposed to the action of leucocytes at very low temperatures tend to congregate near the periphery of the leucocytes, although little or no phagocytosis may take place. Hence, within a suitable temperature range, it may be presumed that the inclusion

of sensitised micro-organisms by the leucocyte is a surface-tension effect taking place between the coccus and the protoplasmic wall, amoeboid energy playing only a subordinate part in the process.

### MANCHESTER.

**Literary and Philosophical Society**, March 24.—Prof. H. B. Dixon, F.R.S., president, in the chair.—An annotated list of the alien plants of the Warrington district: G. A. **Dunlop**. One hundred and seventy-five species, comprising with others several of Papaver, Senecio, and Sisymbrium, were enumerated in the paper. Thirty of these are now extinct.—Field notes on the birds of the Ravenglass gully, 1906: C. **Oldham**. The author describes in his paper the habits, during the breeding season, of the black-headed gull, common, lesser, and Sandwich terns, as observed by him at Ravenglass, on the Cumberland coast. The term “gully” he applies to that portion of the sandhills which is occupied by colonies of these birds. He also mentions other species—such as the oyster-catcher and sheld-duck—which nest in or in the immediate vicinity of the “gully.”

### PARIS.

**Academy of Sciences**, April 21.—M. H. Becquerel in the chair.—An addition to the demonstration of the mechanism of monocular stereoscopy: A. **Chauveau**.—Concerning *Trypanosoma congolense*: A. **Laveran**. A goat, inoculated with *T. congolense* on November 15, 1906, was cured in July, 1907, from the infection produced by this trypanosome. Re-inoculated with the same organism on August 22, it was infected again, but the second infection was slight, and the animal was cured at the beginning of the following November. Two fresh inoculations, made December 20, 1907, and February 6, 1908, produced no re-infection; the goat had acquired immunity for *T. congolense*. Further inoculation of the same animal with *T. dimorphon*, made on April 1, 1908, produced a well-characterised infection, tending to prove that *T. congolense* constitutes a distinct species from *T. dimorphon*.—A new French observatory: Robert **Jonckheere**. This is the Hem Observatory, situated 8200 metres north-east of the fortifications of Lille. Astronomical observations will be commenced before the end of the year.—The influence of the silent discharge on the isolation resistance of insulators: F. **Nègre**. The resistance of the insulators studied was found to be constant up to a certain critical tension. The latter depends on the dimensions, form, and condition of the surface of the insulator, the resistance falling rapidly as soon as the silent discharge appears over the surface.—The flame spectra of iron: G. A. **Hem-salech** and C. **de Watteville**. The metal is obtained in a fine state of division by passing one of the gases supplying the burner over two electrodes of the metal, either an arc or sparks passing between the latter. The spectra obtained depended on the nature of the flame; thus with coal-gas and air in the region between  $\lambda$  2250 and  $\lambda$  5000 750 lines were obtained, with coal-gas and oxygen 250, and with hydrogen and oxygen 210.—The reducing power of the ferropyrophosphates: P. **Pascal**. Clear solutions of ferropyrophosphate of soda in water, together with a small amount of sodium pyrophosphate, reduce gold and silver, but not platinum salts. Salts of mercury and copper are also reduced, and there is a strong tendency to the production of highly coloured stable colloidal solutions of the metals.—Combustion without flame, and its application to lighting with incandescent mantles: Jean **Meunier**. The author holds that the temperature of the mantle is much higher than that of the flame surrounding it, and attributes this to the fact that each particle of oxide becomes the focus of an intense local combustion. The combustion by incandescence lowers considerably the inferior limit of inflammability of a gas mixture.—A demonstration of Gibb's phase rule: J. A. **Muller**.—Remarks on a wire-drawing machine of the seventeenth century: Ch. **Fremont**.—The progress of modern surgery judged by the statistics of operations on the knee (resections): M. **Lucas-Championnière**. For this particular operation the mortality has been lowered from 36 per cent. or higher to less than 1 per cent. by the

application of the antiseptic methods of Lister. These results were obtained without the use of an aseptic operating room.—The structure of the trachean network of the excretory canals of the kidneys of *Machilis maritima*: L. Bruntz.—The Senonian and the Eocene of the north edge of the Moroccan Atlas: A. Brives.—A fan-shaped apparatus of *Cetorhinus* found in the fossil state in the Antwerp Pliocene: Maurice Leriche.—The direct measurement of the vertical component of terrestrial magnetism. Application to the exploration of the chain of Puy: B. Brunhes and P. David.

## DIARY OF SOCIETIES.

THURSDAY, APRIL 30.

ROYAL SOCIETY, at 4.30.—On Scandium: Sir William Crookes, F.R.S.—Note on the Representation of the Earth's Surface by Means of Spherical Harmonics of the First Three Degrees: Prof. A. E. H. Love, F.R.S.—On the Hysteresis Loss and other Properties of Iron Alloys under very small Magnetic Forces: Prof. E. Wilson, V. H. Wilson, and G. F. O'Dell.—The Relation between the Crystalline Form and the Chemical Constitution of the Picryl Derivatives: G. Jerusalem and Prof. W. J. Pope, F.R.S.—The Condensation of Certain Organic Vapours: T. H. Laby.—A Photographic Determination of the Elements of the Orbits of Jupiter's Satellites: B. Cookson.

ROYAL INSTITUTION, at 3.—Mendelian Heredity: William Bateson, F.R.S.

ROYAL SOCIETY OF ARTS, at 4.30.—Reminiscences of Indian Life: Lord Lamington, G.C.M.G., G.C.I.E.

MATHEMATICAL SOCIETY, at 5.30.—On a General Convergence Theorem, and the Theory of the Representation of a Function by Series of Normal Functions: Dr. E. W. Hobson.—On the Multiplication of Series: G. H. Hardy.—On  $q$ -Integration and Differential Equations: F. H. Jackson.—On the Upper and Lower Functions of a Sequence of Continuous Functions: Dr. W. H. Young.—(1) On Mersenne's Numbers; (2) On Quartans with numerous Quartan Factors: Lt.-Col. A. Cunningham.—The Relation between the Convergence of Series and Integrals: T. J. A. Bromwich.—Poisons: H. Bateman.—The Influence of Viscosity on Wave Motion: W. J. Harrison.—On the Ordering of the Terms of Polars and Transvectants: L. Isserlis.

FRIDAY, MAY 1.

ROYAL INSTITUTION, at 9.—The Scientific Work of Lord Kelvin: Prof. Joseph Larmor, Sec.R.S.

GEOLOGISTS' ASSOCIATION, at 8.—Structural Analogies between Alloys and Igneous Rocks: W. G. Fearnside.

SATURDAY, MAY 2.

ROYAL INSTITUTION, at 3.—Chile and the Chilians: G. F. Scott Elliot.

MONDAY, MAY 4.

ARISTOTELIAN SOCIETY, at 8.—The Methodological Postulates of Psychology: Dr. T. Percy Nunn.

SOCIETY OF CHEMICAL INDUSTRY, at 8.—The Manufacture of Sodium Nitrite: Dr. G. T. Morgan.—On some Simple and Mixed Esters of Cellulose. The Alkaline Decomposition of Nitro Derivatives of Cellulose and other Carbohydrates: Dr. W. Smith, junr.—The Mechanism of Filtration: E. Hatschek.—Metanil Yellow: its Use as a Selective Indicator: E. Linder.—The Conversion of Oleic Acid into Stearic Acid: Dr. J. Lewkowitsch.

INSTITUTE OF ACTUARIES, at 5.—The Select and Ultimate Method of Valuation: M. M. Dawson.

TUESDAY, MAY 5.

ROYAL INSTITUTION, at 3.—The Development of the Modern Turbine and its Application: Gerald Stoney.

ROYAL ANTHROPOLOGICAL INSTITUTE, at 8.15.—Report on the Hythe Crania: F. G. Parsons.

WEDNESDAY, MAY 6.

ROYAL SOCIETY OF ARTS, at 8.—The Gramophone, and the Mechanical Recording and Reproduction of Musical Sounds: Lovell N. Reddie.

GEOLOGICAL SOCIETY, at 8.—Solution-Valleys in the Glyme Area (Oxfordshire): Rev. E. C. Spicer.—On the Stratigraphy and Structure of the Tarnthal Mass (Tyrol): Dr. A. P. Young; with a Note on Two Cephalopods, collected by Dr. A. P. Young on the Tarnthal Köpfe (Tyrol): G. C. Crick.

ENTOMOLOGICAL SOCIETY, at 8.

SOCIETY OF PUBLIC ANALYSTS, at 8.—The Examination of Oil of Turpentine and Turpentine Substitutes: J. H. Coste.—The Estimation of Ferrocyanide in Crude Commercial Products: Dr. H. G. Colman.—Studies in Steam Distillation. Part iii., The Fatty Acids: H. Droop Richmond.—A New Method for Milk Testing, and some Remarks on the Sydney Supply: W. M. Doherty.

THURSDAY, MAY 7.

ROYAL SOCIETY, at 4.—Election of Fellows.—At 4.30.—Helium and Radio-activity in Rare and Common Minerals: Hon. R. J. Strutt, F.R.S.—The Action of Resin and Allied Bodies on a Photographic Plate in the Dark: Dr. W. J. Russell, F.R.S.—A Tantalum Wave-detector, and its Application in Wireless Telegraphy: L. H. Walter.—Seleno-aluminium Bridges: Prof. G. M. Minchin, F.R.S.

ROYAL INSTITUTION, at 3.—Mendelian Heredity: William Bateson, F.R.S.

CHEMICAL SOCIETY, at 8.30.—The Interaction of Diazonium Salts with Mono- and Di-hydric Phenols and with Naphthols: K. J. P. Orton and R. W. Everatt.—The Condensation of Benzoin with Methyl Alcohol: J. C. Irvine and D. McNicoll.—The Mutual Solubility of  $\alpha$ -Methyl-piperidin and Water: O. Flaschner and B. MacEwen.—The Melting Points of the Anilides,  $\beta$ -Toluidides, and  $\alpha$ -Naphthylamides of the Normal Fatty Acids: P. W. Robertson.—The Refraction and Dis-

person of Triazo-compounds: J. C. Philip.—The Dissociation Constants of Triazoacetic and  $\alpha$ -Triazopropionic Acids: J. C. Philip.—The Absorption Spectrum of Camphor: W. N. Hartley.—The Viscosity of Solutions: C. E. Fawcitt.—The Action of Fused Potassium Hydroxide and of Hydrogen Peroxide on Cholesterol, Preliminary Note: R. H. Pickard and J. Yates.—The Fermentation of Mannose and Fructose by Yeast Juice, Preliminary Communication: A. Harden and W. J. Young.—The Volumetric Estimation of Silver: W. R. Lang and J. O. Woodhouse.—The Constituents of Olive Leaves: F. B. Power and F. Tutin.—The Constituents of Olive Bark: F. B. Power and F. Tutin.

LINNEAN SOCIETY, at 8.—Colony-formation as a Factor in Organic Evolution: H. M. Bernard.—Antipatharia from the Voyage of H.M.S. *Sealark*: C. Forster-Cooper.—A List of the Fresh-water Fishes, Batrachians, and Reptiles obtained by Mr. J. Stanley Gardiner's Expedition to the Indian Ocean: G. A. Boulenger, F.R.S.—A Cinematographic Representation of the Movements of Peipatus and other Invertebrate Animals: F. Martin Duncan.

CIVIL AND MECHANICAL ENGINEERS' SOCIETY, at 8.—Abbreviated Formulae for Structural Engineers: E. Fiander Etchells.

INSTITUTE OF ELECTRICAL ENGINEERS, at 8.—The Manufacture of Electrical Condensers: G. F. Mansbridge.

FRIDAY, MAY 8.

ROYAL INSTITUTION, at 9.—Ice and its Natural History: J. Y. Buchanan, F.R.S.

ROYAL ASTRONOMICAL SOCIETY, at 5.

PHYSICAL SOCIETY, at 8.—A Modified Theory of Gravitation: Dr. C. V. Burton.—An Examination of the Formulæ for the Grading of Cables: C. S. Whitehead.—Illustrations of Geometrical Optics: R. M. Archer.

SATURDAY, MAY 9.

ROYAL INSTITUTION, at 3.—Chile and the Chilians: G. F. Scott Elliot.

## CONTENTS.

	PAGE
Ancient Britain . . . . .	601
Linear Algebra. By G. B. M. . . . .	603
Medical Physics. By J. H. R. . . . .	604
Our Book Shelf:—	
Hue: "Musée ostéologique; Étude de la Faune Quaternaire, Ostéométrie des Mammifères."—R. L. Mitton: "The Children's Book of Stars."—W. E. R. Noble: "Cradle Tales of Hinduism" . . . . .	604 605 605
Rawitz: "Lehrbuch der mikroskopischen Technik."—Prof. R. T. Hewder . . . . .	605
Letters to the Editor:—	
The Presence of Water Vapour in the Atmosphere of Mars.—Prof. Percival Lowell . . . . .	606
The Condensation of Helium. (With Diagram.) Dr. Morris W. Travers, F.R.S. . . . .	606
The Radio-activity of Ordinary Metals: the Penetrating Radiation from the Earth.—Prof. J. C. McLennan . . . . .	607
The Theory of Dispersion and Spectrum Series.—Norman R. Campbell . . . . .	607
The Oligochaetous Fauna of Lake Birket el Qurun and Lake Nyassa. By Frank E. Beddard, F.R.S.	608
The Forthcoming Dublin Meeting of the British Association. By E. E. F. . . . .	608
The Science Court of the Franco-British Exhibition. (With Plan.) . . . . .	609
The Scientific Study of Starvation. By W. D. H. . . . .	610
Recent Progress of the Metric System . . . . .	611
Notes . . . . .	612
Our Astronomical Column:—	
Astronomical Occurrences in May . . . . .	616
A New Star-Finder . . . . .	616
Saturn's Rings . . . . .	616
The Systematic Motions of the Stars . . . . .	616
Determination of the Errors of the Paris Observatory Réseaux . . . . .	617
The Herschels' Nebulae . . . . .	617
Horizon and Prime-vertical Curves for Latitudes $+30^\circ$ to $+60^\circ$ . . . . .	617
Educational Leakage. (With Diagram.) . . . . .	617
The Scientific Results of the Voyage of the S.Y. "Scotia." (Illustrated.) . . . . .	618
The Meteors of Halley's Comet. By W. F. Denning . . . . .	619
Some Unsolved Problems in Metal-Mining. By Prof. Henry Louis . . . . .	619
Science and Industry . . . . .	621
University and Educational Intelligence . . . . .	621
Societies and Academies. . . . .	623
Diary of Societies . . . . .	624