

Biblioteka Główna i OINT  
Politechniki Wrocławskiej



100100161463



A 610 II

~~M~~





# ANNALS



## JOURNAL OF STATE









NATURE, AUGUST 5, 1933

# Nature

A WEEKLY

JOURNAL OF SCIENCE

VOLUME CXXXI

JANUARY, 1933, to JUNE, 1933

*"To the solid ground  
Of Nature trusts the mind that builds for aye."*—WORDSWORTH.



London

MACMILLAN AND CO., LIMITED

NEW YORK: THE MACMILLAN COMPANY

1933.211.







## INDEX

## NAME INDEX

- Abdoulhoff (I.), [D. Ivanoff and], Velocity of Disengagement of Hydrocarbons produced by the action of Indene on Fatty Organomagnesium Derivatives, 483
- Abe (N.), Age and Growth of Limpets, 30
- Abel (E.), and H. Schmid, Flow Kinetics: Model of Photolysis, 251
- Abruzzi (Duke of the), [death], 427, [obituary article], 717
- Achalme (P.), Chemical Nature of the Neutron, 559
- Achard (C.), and A. Boutaric, Suspensions starting with Proteins separated from Serum, 178
- Ackermann (A. S. E.), Illuminated Fountains, 396
- Ackermann (Dr. W.), Detection of Traces of Carbon Monoxide in Air, 441
- Acworth (Capt. B.), Economic Significance of Coal, 478
- Adams (L. E.), Moles Storing Worms, 466
- Addington (J. N.), Gaseous Tubes for Lighting, 235
- Adelsberger [Scheibe and], Oscillating Quartz Crystal as an Accurate Clock, 281
- Agello (Warrant Officer F.), New Air Speed Record, 580
- Agostinelli (C.), Concurrent Directions in a Variety  $V_n$ , 851
- Aitken (Dr. A. C.), awarded the Makdougall-Brisbane prize of the Royal Society of Edinburgh, 359
- Aiyar (P. R. Chidambara), Earth's Influence on Sunspots, 245
- Alcock (Lieut.-Col. A. W.), [death], 462; [obituary article], 273
- Alessandri (C.), Apparent Velocity of the Surface Propagation of Earthquakes in relation to the Hypocentral Depth, 923
- Alexander (Dr. F.), The Medical Value of Psychoanalysis (Review), 532
- Alexander (Prof. T.), [death], 266
- Alfvén (H.), Origin of Cosmic Radiation, 619
- Algar (J.), Isabella M. McCarthy and Eveline M. Dick, Synthesis of Diflavones, 666
- Allan (D.), Candles and Candlemaking, 269
- Allcock (H. J.), and J. R. Jones, The Nonogram: the Theory and Practical Construction of Computation Charts (Review), 785
- Allen (Dr. E. J.), Prof. Johannes Schmidt, 424
- Allen (W. E. D.), A History of the Georgian People: from the Beginning down to the Russian Conquest in the Nineteenth Century (Review), 308
- Allibone (T. E.), F. S. Edwards, and D. B. McKenzie, A New Impulse Generator for Three Million Volts, 129
- Allix (A.), Progressive Darkening of the Lyons Atmosphere, 179
- Allmand (Prof. A. J.), Photochemical Reaction of Hydrogen and Chlorine, 656; Simple Molecules and Elementary Processes, 173
- Aloisi (P.), An Andalusite Twin, 851
- Alpatov (Dr.), Egg Production in Vestigial- and Long-winged Flies, 176
- Alter [Baxter and], Lead from Cyrtolite, 881
- Amati (A.), [G. Mezzadrolì and], Action of certain Alkaloids on the Development of *Aspergillus niger*, 339
- Ambler (H. R.), and T. C. Sutton, Detection of traces of Carbon Monoxide in Air, 736
- Amiel (J.), Slow Combustion of Benzene, 774
- Anderson (J.), appointed professor of surgery in St. Andrews University, 848
- Anderson (R. M.), Methods of Collecting and Preserving Vertebrate Animals, 906
- Anderson, Wilson Photographs of Cosmic Ray Phenomena, 590
- Andrewes (late Sir Frederick W.), and Mrs. Ethel M. Christie, The Hæmolytic Streptococci: their Grouping by Agglutination, 593
- Annis (L. G.), Upper Devonian Rocks of the Chudleigh Area, South Devon, 482
- Anstey (Dr. Vera), appointed Cassel lecturer in commerce at the London School of Economics, 480
- Antonadi (Dr. E. M.), The Minor Details of the Planet Mars, 802
- Antoniani (C.), the Phytosterol Group (2), 483; and F. Zanelli, Cholesterol of the Human Brain, 71
- Appleton (Prof. E. V.), Fine Structure of the Ionosphere, 872; Thermionic Vacuum Tubes and their Applications (Review), 9; and R. Naismith, Kennelly-Heaviside Layer, 808; Weekly Measurements of Upper Atmospheric Ionisation, 522
- Appleyard (R.), Charles Parsons: his Life and Work (Review), 891
- Armstrong (Dr. E. F.), Enzymes: a Discovery and its Consequences, 535; Alcohol through the Ages, 810; Chemistry and our Idiosyncrasies (Review), 314; and others, Utilisation of Coal, 479
- Armstrong (Prof. H. E.), Agriculture and Milk Supply, 605; An Indian Sage (Review), 672; Caution in Christening, 330; Chemistry and the Art of Living (Sir Jesse Boot Foundation lecture), 795; elected president of the Lancaster Frankland Chemical Society, 197; Huxley and Scientific Education, 684; In Chase of Truth of Alcohol, 53; the Work of Sir Edward Frankland, 196
- Arakatsu (B.), Anomalous Absorption of  $\gamma$ -Rays, 696
- Arend [Delporte and], A Remarkable Short-Lived Nova, 553
- Arnaud (F. W. F.), elected president of the Society of Public Analysts, 359
- Arrow (G. J.), and others. Edited by W. P. Pycraft, The Standard Natural History: from Amœba to Man (Review), 152
- Ashworth (Prof. J. H.), Lieut.-Col. J. Stephenson, 193
- Aston (Dr. F. W.), Physical Atomic Weights, 172
- Atkins (Dr. W. R. G.), [Dr. H. H. Poole and], Photocells of the Dry Rectifier Type for the Measurement of Daylight, 850; Reversal of Current in Rectifier Photo-Cells, 547; Reversal of the Current from a Cuprous Oxide Photo-Cell in Red Light, 133
- Atkinson (Ll. B.), elected an honorary member of the Institution of Electrical Engineers, 128
- Atmanathan (S.), Katabatic Winds, 696
- Atta (Van), [Van de Graaf, Compton and], Electrostatic Production of High Voltages, 475
- Audubert (R.), Differentiation of the Electronic Effects and the Photoelectric Effects in Photovoltaic Elements, 482



- Auger (P.), and G. M. Herzen, Emission of Neutrons by Aluminium under the Action of the  $\alpha$ -Particles, 523
- Aung (Maung Htin), Burmese Spirit-World, 767
- Austen (Major E. E.), and A. W. McKenny Hughes, Clothes Moths and House Moths, 55
- Awbery (J. H.), and Dr. E. Griffiths, Heats of Combustion of Carbon Monoxide in Oxygen and of Nitrous Oxide in Carbon Monoxide at Constant Pressure, 446
- Aynsley (E. E.), Dr. T. G. Pearson and Dr. P. L. Robinson, New Experimental Evidence in the Sulphur-Hydrogen Reaction, 471
- Babington (Dr. William), Centenary of the Death of, the Work of, 613
- Bacharach (A. L.), Research on Vitamins (*Review*), 857; Vitamin C and Ascorbic Acid, 364
- Backlund (Dr. N. O.), Dewaxing and Acid Refining Mineral Oils, 31
- Badcock (W. C.), and Dr. E. J. Holmyard, Electricity and Magnetism for Beginners (*Review*), 347
- Badouin (M.), An Intentional Fabrication of an Engraving of a Horse's Hoof on Granite, by means of a Stone Tool, 375
- Bailey (Alice A.), Ultra-Violet Light and Fungi, 404; [G. B. Ramsey and], Tomato Late-Blight Rot, 440
- Bailey (C. R.), and A. B. D. Cassie, Form and Vibrational Frequencies of the Nitrogen Dioxide Molecule, 910; Infra-Red Absorption Spectrum of Nitrogen Dioxide, 239; Infra-Red Region of the Spectrum (8), 286
- Bailey (Prof. E. B.), Help from America in Reading Scottish Tectonics, 522; and Dr. J. Weir, Submarine Faulting in Kimmeridgian Times, 244
- Bailey (Dr. K. C.), [T. N. Richardson and], Supersaturation of Liquids with Gases, 762
- Bailey (V. A.), Quantitative Theory of Interaction between Different Species of Animals, 524
- Bain (A. D. N.), Younger Intrusive Rocks of the Kuduru Hills, Nigeria, 214
- Bainbridge-Bell (L.), [R. A. Watson Watt and], Recording Wireless Echoes at the Transmitting Station, 657
- Baker (E. S. Stuart), The Nidification of Birds of the Indian Empire, Vol. 1 (*Review*), 384
- Baker (Prof. H. B.), Photochemical Reaction of Hydrogen and Chlorine, 27
- Baker (Dr. J. F.), appointed professor of civil engineering in Bristol University, 848
- Balbi (C. M. R.), Talking Pictures and Acoustics (*Review*), 188
- Baldock (A. L.), [W. E. Cohen, A. G. Charles and], Chemical Composition of the Woods of the Ironbark Group of Eucalypts, 333
- Baldwin (I. L.), [E. B. Fred, Elizabeth McCoy and], Root Nodule Bacteria and Leguminous Plants, 99
- Ball (Sir Charles Arthur Kinahan), appointed Regius professor of surgery in Dublin University, 772
- Ball (Dr. W. C.), [death], 866
- Ballinger (Sir John), [death], 50
- Balls (Dr. W. L.), Capacitance Hygroscopy, 329
- Bamberger (Prof. E.), [death], 195
- Bancroft (W. D.), and J. E. Rutzler, Jr., Agglomeration Theory of Sleep, 739
- Banerjee (S.), [K. S. Krishnan and], Orientations of Molecules in the *p*-Benzoquinone Crystal, 653
- Banerji (Prof. A. C.), Momentum and Energy in the Special Theory of Relativity, 517
- Banerji (Prof. S. K.), and K. N. Sohoni, Hydraulic Seismographs, 547
- Banks (C. A.), awarded the gold medal of Consolidated Gold Fields of South Africa, Ltd., 432
- Banks (W. H.), [Dr. C. W. Davies and], Dissociation of Acetic Acid in Water, 328
- Bannerman (W. B.), [death], 866
- Bannister (F. A.), with chemical analyses by M. H. Hey, Identity of Mottramite and Psittacinite with Cupriferous Descloizite (Cuprodescloizite), 250
- Baramnikov (M. A.), Gypsy Art in Russia, 271
- Barber (Dr. C. A.), [death], 298; [obituary article], 389
- Barbey (Dr. A.), Les Insectes Forestiers du Parc National Suisse, 234
- Barbier (D.), [A. de La Baume Pluvinel and], Total Eclipse of the Sun on August 31, 1932, 922
- Bardach (M.), [J. Basset, Mme. E. Wollman, M. A. Macheboeuf and], Biological Effects of Ultra-Pressures, 774
- van Baren (Prof. J.), [death], 231; [obituary article], 390
- Baring (Wing-Comdr. the Hon. Maurice), elected a member of the Athenæum Club, 510
- Barker (A. H.), Electricity, Gas and other Fuels as Heating Agents, 32
- Barker (Dr. S. G.), Fibres from the Coat of a Blackface Lamb, 799
- Barkla (Prof. C. G.), Properties of X-Radiation, 166
- Barlot (J.), A New Method of Analysis of Bituminous Schists, 774
- Barnes (Col. F. P.), Mechanical Transport in India, 578
- Baroni (A.), Diselenomesoxanilides and Oxyselenanilides, 107; Lithium Alloys (1), 71; Protoselenosulphochloride, 483
- Barrell [Rolt and], Sources of Light for Interferometer Work, 244; [J. E. Sears and], A New Apparatus for Determining the Relationship between Wave-Lengths of Light and the Fundamental Standards of Length, 192
- Barringer (D. M.), Meteor Crater, Arizona, 579.
- Barritt (J.), Methionine in Wool, 689
- Barrow (W.), elected pro-chancellor of Birmingham University, 336
- Bartlett (Prof. F. C.), Remembering: a Study in Experimental and Social Psychology (*Review*), 309
- Bartlett (R. W.), Co-operation in Marketing Dairy Products. 2 Parts (*Review*), 188
- Barton (A. C.), Burial of a Bari Rain-maker, 29
- Bary (P.), Causes of the Thixotropy of Certain Salts, 338
- Basewood (Dr. H.), [obituary article], 865
- Basset (J.), and M. A. Macheboeuf, Biological Effects of Ultra-Pressures, 251; Mme. E. Wollman, M. A. Macheboeuf and M. Bardach, Biological Effects of Ultra-Pressures, 774
- Bateman (Prof. H.), Variation Problems for a Symmetrical Region, 472
- Bates (Dr. L. F.), and B. J. Lloyd Evans, A Compact Electromagnet for General Purposes, 558
- Bates (G. H.), Eradication of the Stinging Nettle, 208
- Bather (Dr. F. A.), A Peculiar Visual Experience, 62; awarded the Mary Clark Thompson medal of the National Academy of Sciences, Washington, 304; re-elected president of the Palæontographical Society, 649
- Baubiac (J.), [E. Crausse and], Modification of the Chrono-photographic Method and some Applications, 482; Transitory Regimes, 559
- Baudiš (Prof. J.), [obituary article], 830
- Bauerman (Hilary), centenary of the birth of, 355
- Baur (Dr. E.), elected a foreign member of the Linnean Society of London, 759
- Bavink (B.), translated, with additional notes and bibliography, by H. S. Hatfield, The Anatomy of Modern Science: an Introduction to the Scientific Philosophy of To-day (*Review*), 707
- Baxter and Alter, Lead from Cyrtolite, 881
- Bayard-Duclaux (Mme. F.), Methods for putting in Circuit Specimens of Rock for Measuring their Electrical Resistance, 887
- Baylis (Dr. H. A.), Worms Parasitic in Cetacea, 551
- Beach (late A. C. G.), Talbot's Bands, 702
- Beadles (C. F.), [death], 86; [obituary article], 122
- Beal (Dr.), Aluminium in Foodstuffs, 432
- Bean (Prof. R. B.), The Races of Man: Differentiation and Dispersal of Man (*Review*), 712
- Beasley (H. G.), Hawaiian Feather Cape, 171
- Beattie (Prof. J. M.), Prof. R. Donaldson, 122
- Beatty (Dr. R. T.), Hearing in Man and Animals (*Review*), 147
- Beauverie (J.), and Mlle. S. Monchal, Life of Green Plants in a Confined Atmosphere, 36



- BechtereV (Prof. V. N.), translated by Emma and W. Murphy, *General Principles of Human Reflexology: an Introduction to the Objective Study of Personality* (*Review*), 675
- Beck (Conrad), elected president of the Royal Microscopical Society, 128
- Beckett (H. E.), 'Raw' Weather, 132
- Beckley (V. A.), and F. McNaughtan, *Distribution of Nitrates in the Soil and Root Development in Coffee*, 878
- Beckstrom (R. C.), *Petroleum Production in Russia*, 541
- Beddington (R.), elected president of the Freshwater Biological Association, 796
- Bedel (C.), *Magnetic Susceptibility of Ferro-Silicons Rich in Silicon*, 375
- Beebe (Dr. W.), *Deep Sea Dives in the Bathysphere, etc.*, 776
- Bell (A. H.), *The Exponential and Hyperbolic Functions and their Applications* (*Review*), 319
- Bell (Prof. E. T.), *The Queen of the Sciences* (*Review*), 319
- Bell (Dr. G. D. H.), appointed University demonstrator in agricultural biology in Cambridge University, 920
- Bell (G. E.), [Dr. G. W. C. Kaye and], *Measurement of X-Ray Tube Current and Voltage*, 552
- Bell (Mary), and S. E. Green, *Radiometer Action and the Pressure of Radiation*, 374
- Belling (Dr. J.), [death], 390; [obituary article], 575
- Benedict (W. S.), [Dr. L. Harris, G. W. King and], *Form and Vibrational Frequencies of the NO<sub>2</sub> Molecule*, 621
- Bennett (Dr. I.), *The Practical Treatment of Diabetes* (*Review*), 9
- Berger (P.), [G. Tiercy and], *Aerological Soundings and the Wind Gradient in Switzerland*, 143
- Bergmann (Prof. M.), *Amino-Acids, Proteins and Proteolytic Enzymes*, 662, 698
- Berkeley (C.), *Oxidase of the Crystalline Style*, 94
- Berliner (Dr. Arnold), *Seventieth birthday of*, 127
- Bernacchi (Commdr. L. C.), *A Very Gallant Gentleman* (*Review*), 782
- Bernal (J. D.), and D. Crowfoot, *Crystal Structure of Vitamin B<sub>12</sub> and of Adenine Hydrochloride*, 911
- Bernard (P. N.), and J. Guillemin, *Transmissible Lysis of the Cholera Vibriion*, 887
- Bernatzik (Dr. H. A.), *mit einem Beitrag von B. Struck, Äthiopien des Westens: Forschungsreisen in Portugiesisch-Guinea, Band 1 und 2* (*Review*), 599
- Bertholf (Prof. Ll. M.), *Eyes and Colour Change*, 331
- Berthon (R.), *Heats of Moistening Silica Gel with Various Liquids*, 106
- Bertrand (G.), and L. Silberstein, *Importance of Sulphates as Manure*, 215
- Besicovitch (A. S.), *Almost Periodic Functions* (*Review*), 384
- Betz [Volmar and], *Emetic Derivatives of Lactic Acid*, 410
- Beutel and Kutzelnigg, *Fluorescence of Zinc Oxide*, 917
- Bhattacharya (A. K.), [Prof. N. R. Dhar, B. L. Mukerji and], *Kinetics of the Iodine-Oxalate Reaction*, 840
- Bickham (S. H.), *bequest by, to Cambridge University*, 884
- Bierry (H.), B. Gouzon and Mlle. C. Magnan, *Application of the Iodometric Method to the Estimation of Sugar in the Blood*, 667
- van Biesbroeck (Prof.), *Comets*, 245
- Biot (M.), *Critical torsional Oscillations of a Rotating Accelerated Shaft*, 631
- Biquard (P.), *An Optical Method for the Measurement of the Absorption of Ultra-Sound Waves by Liquids*, 375
- Birch (T. W.), and Dr. W. J. Dann, *Estimation and Distribution of Ascorbic Acid (Vitamin C) and Glutathione in Animal Tissues*, 469; Dr. L. J. Harris and S. N. Ray, *Hexuronic (Ascorbic) Acid as the Antiscorbutic Factor, and its Chemical Determination*, 273
- Bjerknes (Prof. V. F. K.), *elected a foreign member of the Royal Society*, 798
- Black (F. A.), *The Calendar and its Reform* (*Review*), 859
- Blackett (P. M. S.), *appointed professor of physics at Birkbeck College*, 480; *Cosmic Radiation* (Symons Memorial Lecture), 429; [Dr. J. Chadwick, G. Occhialini and], *New Evidence for the Positive Electron*, 473; and G. Occhialini, *Photography of the Tracks of Penetrating Radiation*, 286; *Wilson Photographs of Cosmic Ray Phenomena*, 589
- Blacktin (Dr. S. C.), *Interaction between Soot Films and Oil*, 873
- Blackwelder (Prof. E.), *Age of Meteor Crater*, 404
- Blaringhem (L.), *A Case of Atavism in a Strain of the Opium Poppy*, 178
- Blatchford (A. H.), *Diffraction of X-Rays by Liquid Sulphur*, 813
- Blau (Marietta), and Hertha Wambacher, *Photographic Detection of Protons Liberated by Neutrons* (2), 287
- Bledisloe (Lord), *Economic Value of Agricultural Science*, 197
- Bliss (E. W.), *Tabulation of World Weather* (5), 35
- Boardman (E. M.), [E. T. Burton and], *Effects of Solar Eclipse on Audio Frequency Atmospherics*, 81
- Bloch (A. M.), [D. M. Newitt and], *Slow Combustion of Ethane at High Pressures*, 214
- Boas (Prof. F.), *Aims of Anthropological Research*, 196
- Bobrovnikoff (N. T.), *Halley's Comet in its Apparition of 1909-1911*, 282
- Bocking (T. G.), *Magnetic Data and Mine Surveying*, 768
- Boggio (T.), *Curvature of Lines of Varieties*, 71
- Bohr (Prof. N.), *Light and Life*, 421; 457
- Bolam (Dr. T. R.), *The Donnan Equilibria: and their Application to Chemical, Physiological and Technical Processes* (*Review*), 859
- Boman (late Dr. E.), *Archæological Researches in the Argentine*, 63
- Bond (Dr. W. N.), *Numerical Examples in Physics* (*Review*), 320
- Bone (Prof. W. A.), *awarded the medal of the Society of Chemical Industry; the work of*, 793; *Photographic Analysis of Explosion Flames*, 300; *Researches on Gaseous Combustion (Bakerian Lecture)*, 494; and others, *Gaseous Combustion at High Pressures*, 245
- Bonner (J.), [K. V. Thimann and], *Growth Hormone of Plants* (2), 631
- Bonot (A.), *Modification of the Seric Proteins Isolated by the Acetone Method and Myxoprotein*, 106
- Boratynski (K.), and A. Nowakowski, *Modifications of Phosphoric Anhydride*, 595
- Bordier (H.), *Production of Merget's Phenomenon by d'Arsonvalisation with Short Waves*, 375
- Boring (Dr. Alice M.), C. C. Liu and S. C. Chou, *Handbook of North China Amphibia and Reptiles*, 304
- Borradaile (L. A.), and F. A. Potts. With chapters by Prof. L. E. S. Eastham and J. T. Saunders, *The Invertebrata: a Manual for the use of Students* (*Review*), 76
- van den Bos (W. H.), *Measures of Double Stars at the Union Observatory, Johannesburg*, 476
- Bossolasco (M.), *Magnetic Measurements at Mogadiscio*, 560
- Bossuet (R.), *Examination of Minerals for the Alkali Metals*, 923; *Photographic Sensibility of the Lines of the Alkaline Metals in the Oxyacetylene Flame*, 482
- Bostock (Dr. J.), *The Neural Energy Constant: a Study of the Bases of Consciousness* (*Review*), 80
- Boswell (Prof. P. G. H.), [Dr. L. S. B. Leakey, Prof. H. Reek, A. T. Hopwood, Dr. J. D. Solomon and], *The Oldoway Human Skeleton*, 397
- Bottoni (O.), *Relationships between the Chemical Composition of the Soil and that of its Colloidal Contents*, 560
- Boulton (Prof. W. S.) *the title of emeritus professor conferred upon*, 336
- Bouquet (Rev. A. C.), *A Study of the Ordinary Arguments for the Existence and Nature of God; Religious Experience; its Nature, Types and Validity; Phases of the Christian Church: a Short View of its History* (*Review*), 677



- Bourdon (B.), and others, A History of Psychology in Autobiography. Vol. 2 (*Review*), 321
- Bourne (G.), Vitamin C in the Adrenal Gland, 874
- Bourne (Prof. G. C.), [death], 390; [obituary article], 496
- Boutaric (A.), [C. Achard and], Suspensions prepared starting with Proteins separated from Serum, 178; and Mlle. Madeleine Roy, Influence of Radio-Active Radiations on the Flocculation of Colloids, 738
- Boutry (G. A.), [P. Fleury and], Exact Measurement of Photographic Densities, 738
- Bowden (Dr. F. P.), S. D. D. Morris and Dr. C. P. Snow, Absorption Spectrum of Vitamin A at Low Temperatures, 582
- Bowden (Dr. P.), and T. Moore, Absorption Spectrum of the Vitamin E Fraction of Wheat-Germ Oil, 512
- Bower (S. Morris), Summer Thunderstorms, 473
- Bower (W. R.), and Prof. R. Satterly, Practical Physics. Third edition (*Review*), 491
- Bowles (E. O.), [W. B. Marshall and] New Fossil Fresh Water Molluscs from Ecuador, 589
- Bowser (W. E.), and J. D. Newton, Effect of Weed-killers on the Soil, 880
- Boycott (Prof. A. E.), Local Lists of Animals, 94
- Boyle (C.), and J. J. Ryan, Grass Silage, 410
- Boys (Dr. C. V.), A Destructive Lightning Flash, 765; Progressive Lightning: a New Stereoscope, 492
- Bracewell (S.), [A. Brammall and], Garnet in the Dartmoor Granite, 250
- Brackett (F. S.), and E. S. Johnstone, Functions of Radiation in the Physiology of Plants, 331
- Braddick (Dr. H. J. J.), and Prof. R. W. Ditchburn, Absorption of Light in Cæsium Vapour, 132
- Bradfield (A. E.), A. R. Penfold and J. L. Simonsen, Essential Oil from the Wood of *Eremophila Mitchellii*, 667
- Bradley (A. J.), and A. H. Jay, Quartz as a Standard for Accurate Lattice-Spacing Measurements, 813; and Phyllis Jones, X-Ray Investigation of the Copper-Aluminium Alloys, 589
- Bradley (H.), Physics in the Boot and Shoe Industry, 756
- Bragg (Sir William), Old Trades and New Knowledge (*Review*), 860; presentation of a Portrait of, to the Royal Institution, 647; The Crystals of the Living Body, 125; The World of Sound (*Review*), 860
- Bragg (Prof. W. L.), Structure of Alloys, 749
- Brailsford (Dr. J. F.), appointed radiological demonstrator in anatomy in Birmingham University, 248
- Brammall (A.), and S. Bracewell, Garnet in the Dartmoor Granite, 250
- Brandt (L.), Yangtse-Kiang Flood of 1931, 280
- Brata (Luang), [Dr. C. F. Powell and], Positive Ion Emission from Oxide Catalysts, 168
- Brazier (C. E.), and L. Génaux, The Earthquake of March 2, 1933, 596
- Bricout (P.), A Magnetic Apparatus for the Determination of Thicknesses, 595
- Bridgman (Prof. P. W.), High Pressure Research, 280; The Physics of High Pressure (*Review*), 259
- Brierley (Prof. W. B.), elected president of the Association of Economic Biologists, 304
- Briers (C. T.), Fauna of Hot Springs in North America, 403
- Briggs (Prof. H.), [Prof. P. F. Kendall and], Formation of Rock Joints and the Cleat of Coal, 922
- Briggs (Dr. L. J.), appointed director of the U. S. Bureau of Standards, 580
- Brightman (R.), The Cost of a New World Order (*Review*), 183
- Brillouin (M.), Linear Partial Differential Equations in the Plane, 410
- Bristowe (W. S.), Insect-Eating in Siam, 234
- British Drug Houses, Ltd., Guide to the B.P., 1932, 128
- Broadhurst (E.), and J. D. Campbell, Geology and Petrology of the Mount Leinster District, North-East Victoria, 703
- Brock (G. C.), A Method of Preparing a Filter for the 3130 Mercury Line, 410
- Brocklehurst (Prof. R. J.), Neuro Humoral Mechanisms, 65
- Brockway (L. O.), and L. Pauling, Determination of the Structures of the Hexafluorides of Sulphur, Selenium and Tellurium by the Electron Diffraction Method, 739
- van den Broek (Prof. J. A.), Elastic Energy Theory (*Review*), 347
- de Broglie (Prof. L.), Théorie de la quantification dans la nouvelle mécanique (*Review*), 639
- Broniewski (W.), and S. Jaslan, Influence of Oxygen on the Properties of Copper, 338
- Brooks (Dr. C. E. P.), Climate: a Handbook for Business Men, Students and Travellers. Second edition (*Review*), 9; and Theresa M. Hunt, Variations of Wind Direction in the British Isles since 1341, 814
- Brooks (Harriet), (Mrs. Frank Pitcher), [obituary article], 865
- Brooks (Matilda Moldenhauer), Penetration of *m*-Bromophenol Indophenol and of Guaiacol Indophenol into *Valonia Ventricosa*, 631
- Brotherton (C. R.), Gift to Leeds University, 665
- Brown (F. J.), Life-History of the Fowl Tapeworm, *Davainea proglottina*, 276
- Brown (Prof. J. Macmillan), Education and Economic Recovery, 538
- Brown (R.), Nitrogen Fixation in the Genus *Lolium*, 169
- Brown (Prof. W. Langdon), elected a member of the Athenæum Club, 510
- Browne (W. M.), Photographing the Moon's Shadow on the Earth, 697
- Browne (W. R.), Possible Correlation of certain Pre-Cambrian Granites of Australia and some Deductions Therefrom, 667
- Bruhat (G.), and A. Guinier, Improvement of the Photoelectric Polarimeter, 630
- Brunt (D.), Adiabatic Lapse-Rate for Dry and Saturated Air, 814
- Bryce (J.), Economic Possibilities of Rice Grass, 368
- Bryce (Prof. T. H.), [N. H. W. Maclaren and], Early Stages in the Development of Cavia, 922
- Brydon (H. B.), Canals on Mars, 518
- Buch (K.), Boric Acid in Sea Water and its Effect on the Carbon Dioxide Equilibrium, 688
- Buck (Dr. P. H.), (Te Rangi Hiroa), Ethnology of Manihiki and Rakahanga, Cook Islands, 588
- Buckley and Snyder, Spreading of Liquids on Solid Surfaces, 407
- Bugnard (L.), P. Gley and A. Langevin, Recording and Measurement of the Blood Pressure, 375
- Bullen (K. E.), [Dr. H. Jeffreys and], Corrections to the Times of the *P* Wave in Earthquakes, 97
- Bunker (J. W. M.), [R. S. Harris and], Bacterial Detoxification, 244
- Burch (F. P.), [obituary article], 390
- Burden (Mrs. R. G.), Gift for Research into Mental Problems and Disorders, 159
- Buret (R.), [C. Dufraisse and], The Dissociable Organic Oxides, 70
- Burge (W. S.), Power Station Efficiency, 518
- Burger (Dr. H. C.), [Dr. L. S. Ornstein, Dr. W. J. H. Moll and], Objektive Spektralphotometrie (*Review*), 824
- Burgers (Dr. W. G.), Recrystallisation Power and Shear Hardening in Aluminium Single Crystals, 326
- Burgevin (H.), Nitrogenous Manuring of Legumes, 660
- Burkitt (Prof. A. N. St. G. H.), elected president of the Linnean Society of N.S.W., 759
- Burkitt (M. C.), Racial Distribution in Palæolithic Europe, 540; [E. J. Wayland and], Stone Age Culture in Uganda, 730
- Burnell (Maise), [H. E. Dadswell and], Identification of the Coloured Woods of the Genus *Eucalyptus*, 280
- Burrows (H.), Prof. E. C. Dodds, and N. M. Kennaway, Some Effects observed in Mice under Continued Treatment with Oestrin, 801
- Burt (C. E.), and May Danheim Burt, Reptiles and Amphibians of the Pacific Islands, 767
- Burt (Prof. C. L.), appointed Heath Clark lecturer of London University for 1933, 336



- Burt (May Danheim), [C. E. Burt and], Reptiles and Amphibians of the Pacific Islands, 767
- Burton (E. T.), and E. M. Boardman, Effects of Solar Eclipse on Audio Frequency Atmospheric, 81
- Burton (M.), Locomotion in Sponges, 356
- Bushe-Fox (Dr. J. P.), Roman Richborough, 539
- Butler (Dr. J. A. V.), and Miss L. C. Connell, Rôle of the Solvent in Electrolytic Dissociation, 800
- Cadman (Sir John), awarded the gold medal of the Institution of Mining and Metallurgy, 432; awarded the Melchett medal of the Institute of Fuel, 581
- Cairns [Common and], Colonisation of a Disused Millpond at Hillsborough, Co. Down, 702
- Cairns (H.), and A. E. Muskett, *Phytophthora megasperma* causing Pink Rot of the Potato, 277
- Calder (J. W.), [E. W. Hullett and], Fluorescence in Rye-grasses, 474
- Calder (Mary G.), the Kidston Collection of Fossil Plant Slides (2), 922
- Calderwood (Dr. W. L.), Salmon Hatching and Salmon Migrations: being the Buckland Lectures for 1930 (*Review*), 42
- Calman (Dr. W. T.), A Dodecapodous Pycnogonid, 242 and Isabella Gordon, *Dodecolopoda mawsoni*, a New Species representing a New Genus of Pycnogonida, 774
- Calvet (J.), [C. Matignon and], Ageing of the Aluminium-Beryllium Alloys after Tempering, 886
- Cambier (R.), and L. Leroux, Estimation of Organic Nitrogen in the Presence of Nitrates by Kjeldahl's Method, 179
- Campbell (Prof. A. N.), Constitution of Binary Alloys at Room Temperature, 438
- Campbell (J. D.), [E. Broadhurst and], Geology and Petrology of the Mount Leinster District, North-East Victoria, 703
- Campbell (J. S.), Nuclear Moments of the Gallium Isotopes 69 and 71, 204
- Campbell (Sir Malcolm), Motor-car Speed Record, 303
- Campbell (Dr. N. R.), Convention and Fact, 237; Measurement of Visual Sensations, 850
- Campin (R. H.), Underground Lighting in Mines, 465
- Candler (W. E.), awarded a Rayleigh prize of Cambridge University, 408
- Cannata (C.), An Extension of Woo's Formula, 339
- Cantacuzène (J.), and A. Tchekirian, Presence of Vanadium in Certain Tunicates, 35
- Capatos (L.), [N. Perakis and], Constant Paramagnetism of Metallic Rhenium, 559
- di Capua (A.), [A. Quilico and], Aspergillin, the Pigment of the Spores of *Aspergillus niger* (1), 851; (2), 924
- Carey (Gladys), and Lilian Fraser, Embryology and Seedling Development of *Aegiceras majus*, Gaertn., 287
- Carey (Commdr. W. M.), [death], 646
- Carline (G. R.), [obituary article], 86
- Carlini (Mlle.), [E. Carrière and], Decomposition of Thiosulphuric Acid in Dilute Solution at the Boiling Point, 286
- Carlow (C. A.), elected president of the Mining Institute of Scotland, 650
- Carmichael (J.), 'Bull-Dog' Calf in African Cattle, 878
- Carpanese (T.), Mineral Deposits of Monte Rosso di Verra, 775; (2), 924
- Carpenter (Dr. G. D. Hale), appointed Hope professor of zoology in Oxford University; the work of, 159
- Carpenter (Sir Harold), Metals in the Service of Human Life and Industry, 733
- Carr (Dr. F. H.), and W. Jewell, Characteristics of Highly Active Vitamin A, 92
- Carré (P.), and D. Libermann, Mechanism of the Reaction of Phosphorus Pentachloride on Neutral Alkyl Sulphites, 143; Reaction of Phosphorus Pentachloride on the Neutral Aryl Sulphites, 667
- Carrière (E.), and Mlle. Carlini, Decomposition of Thiosulphuric Acid in Dilute Solution at the Boiling Point, 286
- Carroll (J.), The Potato Eelworm (*Heterodera schachtii*) in the Irish Free State, 850
- Carroll (Prof. J. A.), Zones of Apparent Inhibition of Sunspots on the Solar Disc, 548
- Carr-Saunders (Prof. A. M.), and P. A. Wilson, The Professions (*Review*), 863
- Carter (C. S.), [obituary article], 829
- Carty (Dr. J. J.), [obituary article], 85; awarded the John J. Carty medal and award of the U.S. National Academy of Sciences, 754
- Cassie (A. B. D.), Structure of Triatomic Molecules, 438; [C. R. Bailey and], Form and Vibrational Frequencies of the Nitrogen Dioxide Molecule, 910; Infra-Red Absorption Spectrum of Nitrogen Dioxide, 239; Infra-Red Region of the Spectrum (8), 286
- Castelfranchi (Prof. G.), translated by Dr. W. S. Stiles and Dr. J. W. T. Walsh, Recent Advances in Atomic Physics, 2 vols. (*Review*), 319
- Castellani (Sir Aldo), Climate and Acclimatization: some Notes and Observations (*Review*), 712
- Casterat (N.), Discovery of Cave Paintings in the Pyrenees, 19
- Castle (W. E.), and C. E. Keeler, Blood Group Inheritance in the Rabbit; Tests for Linkage between the Blood-Group Genes and Other Known Genes of the Rabbit, 775
- Cavinato (A.), Thermal Expansion in Crystals and Häuy's Law, 71
- Cawood (Dr. W.), and H. S. Patterson, A New Temperature Recorder, 332
- Cayeux (L.), Constitution of the Devonian Phosphates of Tennessee, 666; Modes of Existence of Glauconite in Limestone, 143; Rôle of the Trilobites in the Genesis of the Palæozoic Deposits of Calcium Phosphate, 850
- Chadwick (Dr. J.), The Neutron (Bakerian Lecture), 794; P. M. S. Blackett and G. Occhialini, New Evidence for the Positive Electron, 473
- Chamberlain (Prof. C. J.), Methods in Plant Histology. Fifth edition (*Review*), 44
- Champetier (G.), Action of Solutions of Orthophosphoric Acid on Ordinary Cellulose, 703
- Champion (H. G.), Twisted Trees, 133
- Chapin (J. P.), Bird Migration in Tropical Africa, 331
- Chapman (F.), Origin of Tektites, 876; Palæozoic Fossils from Victoria, 703
- Chapman (F. S.), and others, Northern Lights: the Official Account of the British Arctic Air Route Expedition, 1930-1931 (*Review*), 317
- Chapman (F. W.), Cathode Ray Photography of Random Electrical Transients, 620
- Chapman (P. F.), [Dr. M. Nierenstein and], the Authorship of the "Ordinal of Alchemy", 520
- Chapman (Prof. S.), Atoms, Molecules and the Atmosphere, 271; elected president of the Royal Meteorological Society, 200
- Chapman (V. J.), elected Frank Smart student in botany in Cambridge University, 408
- Chappell (E.), Career of Samuel Pepys, 533
- Charles (A. G.), [W. E. Cohen, A. L. Baldock and], Chemical Composition of the Woods of the Ironbark group of Eucalypts, 333
- Charrier (G.), and E. Ghigi, Action of Alkylmagnesium Iodides on (1:9)-Benzanthrone-(10), 107; Action of Ammonia on Acenaphthenequinone, 107
- Chartrou (J.-J.), Pétroles naturels et artificiels (*Review*), 455
- Chatelet (M.), A Pyridine-Iodine Molecular Association, 923
- Chatley (Prof. H.), Number 60 in Time Measurements, 914
- Chaudron (G.), [A. Girard and], Dissociation of Cubic Ferric Oxide, 447; [J. Herenguel and], Sublimation of Magnesium in a Vacuum and Casting in an Atmosphere of Argon, 179
- Cheesman (E. E.), Hybrid Bananas, 552
- Cherubino (S.), Classification of Hyper-elliptic Surfaces from the Real Point of View, 339
- Cherbuliez (E.), and F. Meyer, New Researches on Casein, 215



- Chevenard (P.), awarded the medal of the Société d'Encouragement pour l'Industrie Nationale; the work of, 867
- Child (J. M.), Elements of Coordinate Geometry (*Review*), 603
- China (W. E.), Cattle Blood-Sucking Habit of a Bug, 806
- Chodat (F.), and M. Junquera, Reduction of Methylene Blue by an *Endomyces* at the Expense of its Endocellular Hydrogen Donators, 815
- Chodat (Prof. R.), presented with the Linnean Medal of the Linnean Society of London; the work of, 793
- Choucroun (Mlle.), A Correct Arrangement for Electro-phoresis, 630
- Chowdhury (K. A.), Identification of Indian Sleeper Woods, 30
- Christie (Mrs. Ethel M.), [late Sir Frederick W. Andrewes and], The Hæmolytic Streptococci: their Grouping by Agglutination, 593
- Chudoba (Dr. K.), Die Feldspäte und ihre praktische Bestimmung (*Review*), 384
- Churcher (B. G.), and A. J. King, Scales of Loudness, 760
- Churchward (J. G.), Geographical Distribution of *Tilletia* Species on Wheat in Australia in 1931, 631
- de la Cierva (J.), awarded the Elliott Cresson medal of the Franklin Institute, 871
- Cilento (Dr. R. W.), The Medical Sciences in Relation to Depopulation, 519
- Cimino (M.), The Einsteinian Correction of Time in a Planetary Motion, 107
- Clark (Miss A. R.), [Mrs. E. W. Sexton and], Further Mutations in the Amphipod *Gammarus chevreuxi*, Sexton, 201
- Clark (Dr. E. L.), [Dr. E. R. Clark and], Disposal of Debris by Blood-vessels, 880
- Clark (Dr. E. R.), and Dr. E. L. Clark, Disposal of Debris by Blood-vessels, 880
- Clark (F. H.), Hydrocephalus, a Hereditary Character in the House Mouse, 288
- Clark (Dr. G. A.), appointed professor of physiology in Sheffield University, 736
- Clarke (Dr. Ernest), [obituary article], 85
- Claude (G.), Manufacture of Commercial Oxygen, 70
- Claxton, (T. F.), Climate of Hong-Kong, 104
- Clay (Prof. J.), Earth-Magnetic Effect and the Corpuscular Nature of (Cosmic) Ultra-Radiation, 136
- Clay (Dr. R. S.), and T. H. Court, The History of the Microscope: Compiled from Original Instruments and Documents, up to the Introduction of the Achromatic Microscope (*Review*), 219
- Clayton (Dr. G. C.), the Institute of Chemistry, 357
- Clement (M. A.), Mexican and Eucadorian Copper and Bronze Axes, 279
- Clements (D. I.), N. H. Howes, and G. P. Wells, Is Plasticine Edible? 330
- Clerk (Sir Dugald), Bequests for Science, 235
- Close (Col. Sir Charles), The Map of England: or About England with an Ordnance Map (*Review*), 260
- Clowes (A. J.), Influence of the Pacific on the Circulation in the South-West Atlantic Ocean, 189
- Coales (J. F.), Errors Experienced on a Ship's Direction-finder, 846
- Coates (Dr. W. H.), Special Posts in Industrial Management, 268
- Cockcroft (Dr. J. D.), and Dr. E. T. S. Walton, Disintegration of Light Elements by Fast Protons, 23
- Cockerell (Prof. T. D. A.), Sacred Sandstone of the Mayas, 656; Snails and Changes in Sea-level, 277
- Cockerham (G.), Nitrogen Content of Normal and Leaf-roll Potatoes, 375
- Cohen (W. E.), A. L. Baldock, and A. G. Charles, Chemical Composition of the Woods of the Ironbark group of Eucalypts, 333
- Colani (Mlle. M.), Artificial Ridges of the Valves of Lamellibranchs (Northern Annam), 523
- Colebrook (F. M.), High Selectivity Tone Corrected Receiving Circuits, 442
- Collenette (C. L.), Effect of the Preying of Birds on Butterflies, 200
- Collip (Prof. J. B.), Dr. H. Selye, and Prof. D. L. Thomson, Gonad-stimulating Hormones in Hypophysectomised Animals, 56
- Combe (A. D.), and others, Geology of South-West Ankole and Adjacent Territories, 172; and W. C. Simmons, The Volcanic Area of Bufumbira. Part 1: The Geology of the Volcanic Area of Bufumbira, South-West Uganda; with Notes on the Petrology and Economic Geology (*Review*), 821
- Comber (Prof. N. H.), An Introduction to the Scientific Study of the Soil. Second edition (*Review*), 316
- Common and Cairns, Colonisation of a Disused Millpond at Hillsborough, Co. Down, 702
- Compton (Prof. A. H.), Cosmic Rays, 807; Latitude Variation of Cosmic Rays, 769; Nature of Cosmic Rays, 713
- Compton (K. T.), Accommodation Coefficient of Gaseous Ions at Cathodes, 631
- Compton (P.), The Genius of Louis Pasteur (*Review*), 40
- Compton [Van de Graaf, Van Atta and], Electrostatic Production of High Voltages, 475
- Connell (Miss L. C.), [Dr. J. A. V. Butler and], Rôle of the Solvent in Electrolytic Dissociation, 800
- Conant (Prof. J. B.), elected president of Harvard University, 700; and Emma M. Dietz, Structural Formulæ of the Chlorophylls, 131
- Conti (Prince Ginori), 'Red Coal', 679
- Conzemius (Dr. E.), Shamans and Spiritism on the Mosquito Coast, Honduras, 135
- Cook (Prof. C. W.), [death], 538
- Cook (Major F. C.), appointed chairman of the Road Research Board, 686
- Cook (Dr. J. W.), and Prof. E. C. Dodds, Sex Hormones and Cancer-producing Compounds, 205; Prof. E. C. Dodds, and C. L. Hewett, A Synthetic Œstrus-exciting Compound, 56
- Cooper (G. A.), [Dr. C. Schuchert and], Brachiopod genera of the Sub-Orders Orthoidea and Pentamerioidea, 244
- Cooper (J. W.), and T. C. Denston, A Textbook of Pharmacognosy (*Review*), 419
- Copland (Prof. D. B.), appointed Alfred Marshall lecturer for 1933-34 in Cambridge University, 884
- Corbet (Dr. A. S.), The Bacterial Growth Curve and the History of Species, 61
- Corkill (Dorothy E.), [R. J. Lythgoe and], Measurement of Visual Acuity, 98
- Cornford (Prof. F. M.), Before and After Socrates (*Review*), 491
- Cornish (Dr. Vaughan), Lessons in Visualisation from the Royal Academy, 644; Flow of Water between Moving Boundaries, 731
- Correns (Prof. C. E.), [death], 353; [obituary article], 537
- Costa (C. de A. Martins), appointed director of the Brazilian Meteorological Service, 581
- Costantin (J.), Objections to the Mycorrhizal Theory, 447; Variations in the Virulence of Degenerescence in the Potato, 850
- Coste (J. H.), Interaction between Soot Films and Oil, 691
- Cotton (A.), Circular Magnetic Dichroism and Magnetic Rotatory Dispersion, 70; Construction of Thermoelectric Elements, 559; and M. Schérer, Magnetic Rotatory Dispersion of a Coloured Diamagnetic Compound, Thiobenzophenone, 215
- Cotton (F. T.), [R. W. Fenning and], A Bomb Calorimeter Determination of the Heats of Formation of Nitrous Oxide and Carbon Dioxide, 446
- Coulson (A.), Diabase Rocks at the You Yango near Geelong, 71; The Older Volcanic and Tertiary Marine Series at Curlewis near Geelong, 71
- Cournot (J.), and Mlle. Louise Halm, Measurement of the Degree of Polishing in view of the Determination of the Amount of Corrosion of Rustless Steels, 738
- Court (T. H.), [Dr. R. S. Clay and], The History of the Microscope: Compiled from Original Instruments and Documents, up to the Introduction of the Achromatic Microscope (*Review*), 219
- Courtauld (Dr. S.), elected a member of the Athenæum Club, 200
- Courtauld (W. J.), gift to Cambridge University, 444



- Coustal (R.), Connexion between the Two General Methods for the Preparation of Phosphorescent Zinc Sulphide, 887
- Coventry (J. E. C.), [S. M. Naudé and], Intensity of Cosmic Radiation in South Africa, 411
- Cowan (S. L.), Action of Quarternary Ammonium Salts on Nerve, 658
- Coward (T. A.), [death], 158; [obituary article], 297
- Cox (E. G.), and Dr. E. L. Hirst, Constitution of Vitamin C<sub>1</sub>, 402
- Cox (L. R.), Fossiliferous Siliceous Boulders from the Anglo-Egyptian Sudan, 70
- Craigie (J. H.), Union of Pycniospores and Haploid Hyphæ in *Puccinia Helianthi* Schw., 25
- Crampton (C.), [C. E. Horton and], A Radio Compass developed in H.M. Signal School, 846
- Crausse (E.), and J. Baubiac, Modification of the Chronographic Method and Some Applications, 482; Transitory Regimes, 559
- Crawford (B. H.), [W. S. Stiles and], The Luminous Efficiency of Rays entering the Eye Pupil at Different Points, 250
- Crawford (M. E. F.), E. O. V. Perry, and Dr. S. S. Silva, Vitamin Content of Australian, New Zealand and English Butters, 770
- Crawford (M. F.), and A. M. Crooker, Nuclear Moment of Arsenic, 655
- Crawhall (T. C.), Iron-working in the Bahr el Ghazal, 474
- Crew (Prof. F. A. E.), Non-disjunction in the Fowl, 446
- Crocco (G. A.), Stability of 'Instrumental' Flight, 71
- Crommelin (Dr. A. C. D.), Halley's Comet in 1909-11, 282
- Crooker (A. M.), [M. F. Crawford and], Nuclear Moment of Arsenic, 655
- Crosby (Elizabeth C.), [G. K. Huber and], A Phylogenetic Consideration of the Optic Tectum, 739
- Crossland (Dr. C.), Distribution of the Polychæte Worm, *Syllis ramosa*, McIntosh, 242
- Crothwait (Col. H. L.), Mount Everest, 10
- Crow (Dr. A. D.), and W. E. Grimshaw, Rate of Burning of Colloidal Propellants, 60. The Combustion Problem of Internal Ballistics, 805
- Crowden (G. P.), Muscular Work, Fatigue and Recovery (*Review*), 321
- Crowfoot (D.), [J. D. Bernal and], Crystal Structure of Vitamin B<sub>1</sub>, and of Adenine Hydrochloride, 911
- Crowther (J. G.), Osiris and the Atom (*Review*), 320; The A B C of Chemistry (*Review*), 895
- Crump (L. M.), Eugenics and Marriage Laws, 540
- Culey (Alma G.), Mineralogy of the Narrabeen Series of New South Wales, 523
- Cummer (Dr. C. L.), A Manual of Clinical Laboratory Methods. Third edition (*Review*), 116
- Cunningham (Dr. Brysson), Canadian Water Power Development in 1932, 788
- Cunningham (J. T.), and D. M. Reid, Pelvic Filaments of Lepidosiren, 913
- Curie (Mme. Irène), and F. Joliot, Conditions of Emission of Neutrons by the Action of  $\alpha$ -Particles on the Light Elements, 447
- Curie (M.), and S. Takvorian, Radioactivity of a Neodymium-Samarium Fractionation, 702
- Curry (J.), and Dr. G. Herzberg, Extension of the Visible Absorption System of NO<sub>2</sub> to Longer Wave-lengths, 842
- Curtis (A. L.), British Coals, 580
- Curtis (Prof. W. E.), Arc Spectrum of Iodine, 398
- Cushing (Prof. H. W.), elected a foreign member of the Royal Society, 798
- Cuthbertson (J. W.), Fatigue Limit of Medium Carbon Steel, 140; Fatigue-resisting Properties of Aluminium Alloys at High Temperatures, 660
- Dadswell (H. E.), and Maisie Burnell, Identification of the Coloured Woods of the Genus *Eucalyptus*, 280
- D'Agostino (O.), [N. Parravano and], Velocity of Dissolution of Industrial Aluminas in Fused Cryolite, 107
- Dakin (Prof. W. J.), Unusual Occurrence of Pelagic Organisms, 239
- Dale (Miss A. B.), The Form and Properties of Crystals: An Introduction to the Study of Minerals and the use of the Petrological Microscope (*Review*), 44
- Dale (Sir Henry), Ultramicroscopic Organisms and the Troubles which they cause, 370
- Daly (Prof. I. de Burgh), appointed professor of physiology in Edinburgh University, 700
- Dampier (Sir William Cecil), appointed a Development Commissioner, 581
- Dana (Prof. E. S.), A Treatise on Mineralogy: with an extended treatise on Crystallography and Physical Mineralogy. Fourth edition, revised and enlarged by Prof. W. E. Ford (*Review*), 318
- Dangeard (P. A.), A Centrosomic Apparatus in Species of the Genus *Lonicera*, 886
- Dann (Dr. W. J.), Hexuronic (Ascorbic) Acid as the Antiscorbutic Factor, and its Chemical Determination, 274; Methylornarcotine, Glycuronic Acid, and Vitamin C, 24; [T. W. Birch and], Estimation and Distribution of Ascorbic Acid (Vitamin C) and Glutathione in Animal Tissues, 469
- Darby (Dr. H. H.), Insects and Micro-climates, 839
- Darling (Dr. F. F.), [Dr. W. Orr and], Sterility in Domesticated Animals, 200
- Darlington (Dr. C. D.), Chromosomes and Plant-breeding (*Review*), 5; Recent Advances in Cytology (*Review*), 5
- Darzens (G.), and M. Meyer, New General Method for the Synthesis of Aldehydes, 483
- Das (Prof. B. K.), [M. Rahimullah and], Making Whole Mounts of Vertebrate Skeletons, 171
- Dasgupta (Dr. Surendranath), A History of Indian Philosophy. Vol. 1. Second impression. Vol. 2 (*Review*), 855
- David (P.), Radiation of the Radio-transmitter of the Eiffel Tower, 179
- Davidson (Dr. A. M.), and Dr. P. H. Gregory, Development of Fuseaux, Aleuriospores, and Spirals on Detached Hairs infected by Ringworm Fungi, 836
- Davidson (Dr. J.), Effect of Rainfall-Evaporation Ratio on Insects inhabiting the Soil Surface, 837
- Davie (J. H.), Fixation of Mitochondria, 59
- Davies (Dr. C. W.), and W. H. Banks, Dissociation of Acetic Acid in Water, 328
- Davies (D. A. Bryn), The Ordovician Rocks of the Trefriw District, North Wales, 595
- Davies (G. M.), A French-English Vocabulary in Geology and Physical Geography (*Review*), 604
- Davies (Col. L. M.), The Genera *Dictyoconoides*, *Lockhartia*, and *Rotalia*, 279
- Davis (Prof. W. M.), Glacial Epochs of the Santa Monica Mountains, California, 288
- Davison (Dr. C.), The Recent Japanese Earthquake, 351
- Davison (F. T.), elected president of the American Museum of Natural History, 236
- Davy (C. H.), and C. H. Sparks, High Pressure Boilers, 90
- Dawe (M. T.), appointed director of agriculture and forests, Palestine, 543
- Dawson (Prof. H. M.), Ionisation of Sulphuric Acid, 375
- Deaglio (R.), Photoelectric effect in the Mono-crystals of Cuprite, 887
- Deane (C.), New Species of Corylophidæ (Coleoptera), 287
- Dearborn (Dr. N.), Fur-bearing Animals in Michigan, 127
- Deberne (A.), New Radioactive Substances, 630
- Debye (Prof. P.), elected a foreign member of the Royal Society, 798; Relations between Stereo-chemistry and Physics (Faraday lecture), 498
- Dee (P. I.), appointed a university demonstrator in the Dept. of Physics of Cambridge University, 811
- Defant (Dr. A.), awarded the Alexander Agassiz medal of the U.S. National Academy of Sciences, 754
- Dei (C.), Sensitivity and Approximation of Measurements of the Amplification Coefficients of Triodes, 923
- Delporte and Arend, A Remarkable Short-lived Nova, 553
- Demontvignier (M.), [A. Labarthe and], Measuring and Recording Rapidly Variable Pressures, 179
- Denbigh (K. G.), and Prof. R. Whytlaw-Gray, Higher Homologues of Sulphur Hexafluoride, 763
- Densmore (Miss). Yuman Music, 98



- Denston (T. C.), [J. W. Cooper and], A Textbook of Pharmacognosy (*Review*), 419
- Denton (Prof. F. M.), Dimensions of Fundamental Units, 585
- Desmarrez [Muller and], Differential Microscopic Characters of the Bone of Adult *Cynocephalus* and of Human Bone, 739
- Detwiler (S. R.), Segmentation of Spinal Nerves in Salamander Embryos, 739
- Deulofeu (Dr. V.), A Rule for the Rotatory Direction of the Acetylated Aldonic Nitriles, 548
- Deutschbein (O.), [Prof. R. Tomaschek and], Fluorescence of Pure Salts of the Rare Earths, 473
- Devaux (J.), [C. Maurain and], Electrical Conductivity and Atmospheric Condensation Nuclei during a Voyage to Greenland, 35; Total Calorific Radiation in Greenland, 106
- De Vito (G.), [E. Parisi and], Distribution of Nitrates and 'Organisation' of Nitrogen in the Leaves of Green Plants, 107
- Dewey and others, Falling Water-Level in the Chalk under London, 882
- Dhar (Prof. N. R.), A. K. Bhattacharya, and B. L. Mukerji, Kinetics of the Iodine-Oxalate Reaction, 840; and Atma Ram, Presence of Formaldehyde in Dew, 800
- Dick (Eveline M.), [J. Algar, Isabella M. McCarthy and], Synthesis of Diflavones, 666
- Dick (Dr. George F.), and Dr. Gladys H. Dick, awarded the Cameron prize of Edinburgh University, 177
- Dick (Dr. Gladys H.), [Dr. George F. Dick and], awarded the Cameron prize of Edinburgh University, 177
- Dick (J.), appointed assistant lecturer in mechanical engineering in Sheffield University, 736
- Dickens (Dr. F.), Iodoacetic Acid, Glutathione and Tissue Glyoxalase, 130
- Dickinson (Dr.), Motor Car Lights on the Road, 20
- Dickinson (Dr. S.), resignation of, from the University College of South Wales and Monmouthshire, 444
- Dietz (Emma M.), [J. B. Conant and], Structural Formulæ of the Chlorophylls, 131
- Dinsdale (A.), First Principles of Television (*Review*), 456
- Ditchburn (Prof. R. W.), Frequency Distribution of Resonance Radiation; Separating Isotopes by the use of Resonance Radiation, 106; Transmission of Resonance Radiation through a Gas, 738; [Dr. H. J. J. Braddick and], Absorption of Light in Cæsium Vapour, 132
- Divoux (J.), [A. Donzelot and], Compensating Plate Currents, 106
- Dixon (Prof. H. H.), Bast Sap, 367; Strepsinema Stage in Reduction, 437
- Dixon (Dr. M.), appointed university lecturer in Biochemistry in Cambridge University, 665
- Dixon (S.), Relation of Food to Disease, 333
- Dixon (late Prof. W. E.), Memorials to, 832
- Dobbie (Dr. J. C.), Effects of Tidal Displacements of the Vertical on Latitude Variation, 769
- Dobinski (S.), Dielectric Constant of Liquid Phosphorus, 447
- Dobson (Dr. G. M. B.), 'Raw' Weather, 28
- Dobzhansky (T.), [A. H. Sturtevant and], Genetics of Certain Chromosome Anomalies in *Drosophila melanogaster*, 627
- Dodds (Prof. E. C.), [H. Burrows, N. M. Kennaway and], Some Effects Observed in Mice under Continued Treatment with Œstrin, 801; [Dr. J. W. Cook and], Sex Hormones and Cancer-producing Compounds, 205; [Dr. J. W. Cook, C. L. Hewett and], A Synthetic Œstrus-exciting Compound, 56
- Dodé (M.), [C. Matignon, H. Moureu and], Causes of the Simultaneous Production of 1-butene and 2-butene, 738
- Dodwell (Prof. H. H.), elected a member of the Athenæum Club, 510
- Donaldson (Prof. R.), [death], 86; [obituary article], 122
- Donatien (A.), [E. Sergent, L. Parrot, F. Lestoquard and], Experimental Suppression of Sexual Reproduction in *Theileria dispar*, 143
- Donnan (Prof. F. G.), elected an honorary member of the Bunsen Society, 871
- Dono (Tsurumatsu), The Copper Age in Ancient China, 243; 917
- Dony (O.), Inverse Sublimation, 731
- Donzelot (P.), and J. Divoux, Compensating Plate Currents, 106
- Douglas (J. A.), Geology of the Marcapata Valley in Eastern Peru, 70
- Drilhon (Mme. Andrée), Glucose and Shedding the Shell of Crustaceans, 483
- Druce (Dr. G. Claridge), The Comital Flora of the British Isles (Flora Comitalis Britannicæ: Fl. Com. Brit.) (*Review*), 309
- Druce (Dr. J. G. F.), Kronman's Rhenium (*Review*), 224
- Dryden (L.), Xenohelix in the Maryland Miocene, 775
- Drysdale (Dr. C. V.), appointed to the Safety in Mines Research Board, 91
- Dubois (G.), Stratigraphic Subdivision of the Schistogreywacke Complex of the Vosges, 339
- Dubois (P.), Action of Hydrogen Peroxide on Permanganate, 923
- Dubouloz (P.), Yield of Fluorescence of Sodium Salicylate, 850
- Duckert (R.), [H. Paillard and], Catalytic Oxidation of Acenaphthene, 815
- Duclaux (Prof. M. J.), Structure of Cellulose, 553
- Dufay (J.), and Ssu-Pin Liau, Absorption of Light in Interstellar Space, 923
- Dufour (R.), Initial Electrolytic Overvoltage in the Disengagement of Hydrogen on Mercury, 482
- Dufraisse (C.), and R. Buret, The Dissociable Organic Oxides, 70; and J. A. Monier, Jr., Dissociable Organic Oxides, 887
- Dufton (A. F.), Inheritance of Intelligence in Man, 763
- Dunn (Dr. J. T.), elected president of the Society of Chemical Industry, 432; Public Analysis and the Food Industry (*Review*), 822
- Dunsheath (P.), Ionisation in Cable Dielectrics, 404
- Dupin (P.), and M. Teissié-Solier, Vortices Produced by Obstacles revolving round an Axis parallel to the General Direction of Flow, 179
- Durell (C. V.), Advanced Algebra. Vol. 1 (*Review*), 319
- Durham (Bishop of), Ethical Conditions of Scientific Method (Fison lecture), 902
- Durst (C. S.), Breakdown of Steep Wind Gradients in Inversions, 35; Intrusion of Air into Anticyclones, 737; Thermal Balance of a Water Drop or Ice Particle Suspended in the Atmosphere, 35; Variations in the Structure of Wind over Different Surfaces, 814
- Duthie (E. S.), [Prof. J. B. Gatenby and], Cultures of Snail's Tissue, 474
- Dwyer (F. P.), and D. P. Mellor, Occurrence of  $\beta$ -Cristobalite in Australian Opals, 524
- Dyer (Dr. B.), and Dr. C. A. Mitchell, The Society of Public Analysts and other Analytical Chemists (*Review*), 822
- Dyson (Sir Frank), Complimentary luncheon to, 391
- Earl (J. C.), and N. F. Hall, Chemical Changes Involved in the Formation of Aminoazo-compounds (2), 667
- Ebner (R.), [F. Werner and], Results of a Zoological Expedition to Morocco (1930): (5) Scorpions, 287
- Eckersley (T. L.), Polarisation of Echoes from the Kennelly-Heaviside Layer, 512
- Eddington (Sir Arthur), Method of Least Squares, 374; The Expanding Universe (*Review*), 637
- Edgell (J. W.), appointed Davy bacteriologist in Bristol University, 848
- Edisbury (J. R.), [Dr. R. A. Morton and], Absorption Spectrum of the Unsaponifiable Matter from Wheat-Germ Oil, 618
- Edmond (F.), appointed to the Safety in Mines Research Board, 91
- Edwards (F. S.), [T. E. Allibone, D. B. McKenzie and], A New Impulse Generator for Three Million Volts, 129



- Edwards (George), the work of, T. E. James, 124
- Edwards (Capt. L. N.), Evolution of Early American Bridges, 429
- Edwards (K. H. R.), Constitution and Temperament in Man, 832
- Edwards (T. I.), Temperature and Seed Germination, 404
- van Eckelen (M.), and A. Emmerie, A Carotene Derivative giving with Antimony Trichloride an Absorption Band at 610-630  $\mu$ , 275
- Egal (A.), A new Method of Realisation of Thermo-electric Phenomena, 410
- Egerton (A.), and M. Milford, Fusion of Carbon, 169; and F. L. Smith, Hydrocarbon Combustion in an Engine, 725
- Eggert (Prof. J.), translated by Dr. S. J. Gregg, Physical Chemistry (*Review*), 419; und Dr. R. Schmidt, Einführung in die Tonphotographie: photographische Grundlagen der Lichtton-Aufzeichnung (*Review*), 781
- Eibenschütz (G.), Nature of Electrodynamic Forces, 923
- Eichholz (Dr. A.), [death], 195
- Einaudi (R.), Magnetic Behaviour of the Oxygen Molecule, 71
- Einstein (Prof. A.), appointed professor of mathematical physics at the Collège de France, 581; The Method of Theoretical Physics (Herbert Spencer lecture), 867
- Elford (W. J.), Principles of Ultra-filtration as applied to Biological Problems, 178
- Elkin (Dr. A. P.), The Cultural and Racial Clash in Australia, 520
- Elkin (Prof. W. L.), [death], 866
- Elliott (Dr. K. A. C.), elected a fellow of Selwyn College, Cambridge, 920
- Ellis and Mott, Internal Conversion of  $\gamma$ -Rays, 517
- Ellsworth (H. V.), Canadian Minerals of the Rare Elements, 660
- Ellsworth (J.), The Double System *RZ Cassiopeiae* with Eclipses, 850
- Elmhirst (R.), Quantitative Studies between the Tide Marks, 767
- Elmore (F. E.), bequest to Cambridge University, 700
- Elsasser (Dr. W.), A Possible Property of the Positive Electron, 764
- Elvey (Dr. C. T.), The Gegenschein or Counter-glow, 590
- Emelús (Dr. K. G.), appointed professor of experimental physics in Belfast University, 628
- Emelús (Dr. H. J.), awarded the Harrison memorial prize, 91
- Emmerie (A.), An Inhibitor of the Antimony Trichloride Test for Vitamin A in Cod Liver Oil, 364; [M. van Eckelen and], A Carotene Derivative giving with Antimony Trichloride an Absorption Band at 610-630  $\mu$ , 275
- Emmerson (T.), [Prof. R. Whiddington and], Scattering of Electrons in Helium, 814
- Emmons (Prof. W. H.), Batholiths and Ore Deposits, 730
- Emschwiller (G.), Action of Gaseous Hydrogen Iodide on some Iodine Derivatives of Hydrocarbons, 738
- Enright (J. J.), H. E. Friesell, and M. O. Trescher, Cause and Nature of Dental Caries, 918
- Enriques (F.), Certain Invariant Series of Groups of Points on an Algebraic Surface, 559
- Enriques (Prof. P.), [death], 22; [obituary article], 265
- Eriksson [Svedberg and], Hæmocyanin of *Octopus vulgaris*, 137
- Esclanong (E.), Remarkable Epoch of Solar Activity, 559
- Evans (B. J. Lloyd), [Dr. L. F. Bates and], A Compact Electromagnet for General Purposes, 558
- Evans (Dr. C.), [R. C. T. Evans and], A Complex Solar Halo, 613
- Evans (I. H. N.), Excavations at Kuala Selinsing, Perak, 135
- Evans (R. C. T.), and Dr. C. Evans, A Complex Solar Halo, 613
- Evans (Dr. R. H.), appointed lecturer in civil engineering in Leeds University, 772
- Eyring (Dr. H.), awarded the American Association prize, 304; Zero Point Energy and the Separation of Isotopes, 739
- Fabris (A.), Absorptive Power of Soil for Pyrophosphoric Acid, 775
- Fairbrother (F.), and E. Nightingale, General Science. Part I (*Review*), 420
- Falkenhagen (Prof. H.), Elektrolyte (*Review*), 382
- Famiani (V.), Capacity for Food Consumption after Fasting; Reconstructive Food Value of the Embryos of various Cereals and Leguminous Seeds, 339; Nutritive Value of Wheat Embryos, 107
- Fantham (Prof. H. B.), Biology's Message for Civilization, 197
- Farmer (E.), The Causes of Accidents (*Review*), 895
- Farmer (Dr. E. H.), and R. A. E. Galley, Catalytic Hydrogenation of Olefinic Compounds, 60
- Farran (G. P.), Unusual Occurrence of Pelagic Organisms, 240
- Faure (Prof. J. C.), The Phases of Locusts in South Africa, 423
- Favarger (P.), [H. Paillard and], Chlorination of Acenaphthene, 815
- Fawcus (Lieut.-Gen.), Health of the British Army during 1931, 509
- Fawcett (Prof. C. B.), elected president of the Institute of British Geographers, 51
- Fawsitt (Prof. C. E.), Viscosity Measurements of Liquids by the Oscillating Disc Method, 97
- de Fazi (R.), Chemical Constitution of Cholesterol, and a New Isomeride of Cholesterol, 924
- Feather (Dr. N.), appointed a university demonstrator in the department of physics of Cambridge University, 811
- Fedden (A. H. R.), awarded a silver medal of the Royal Aeronautical Society, 510
- Fedotov (D. M.), Carboniferous Molluscs of the Donetz Basin, 404
- Fell (Dr. H. B.), and Dr. A. Robison, Glycogen in Cartilage, 62
- Fenning (R. W.), and F. T. Cotton, A Bomb Calorimeter Determination of the Heats of Formation of Nitrous Oxide and Carbon Dioxide, 446
- Ferguson (Dr. A.), A Vanished World (*Review*), 75; Edmond Halley, 153; Old Wine and New Bottles (*Review*), 417; Surface Tension and its Measurement, 66
- Fermor (Dr. L. L.), The Place of Geology in the Life of a Nation, 227
- Ferrari (A.), and G. Trampetti, Behaviour of Mixtures of Zinc Oxide and Anhydrous Zinc Chloride at High Temperature, 339
- Fewkes (Dr. V. J.), American Archaeologists in Yugoslavia, 393; Late Neolithic Fortress, Homolka, Bohemia, 207
- Finch (Prof. G. I.), and A. G. Quarrell, Crystal Structure and Orientation in Thin Films, 877; Determination of Crystal Lattice Constants by Electron Diffraction, 842; Structure of Magnesium, Zinc and Aluminium Films, 482; and R. W. Sutton, Control of Ignition-Coil Discharge Characteristics, 374
- Findlay (Prof. A.), A Rebuke to Scientists, 1
- Firth (Prof. R.), Anthropological Teaching and Research in Australia, 540; Indices of a Stable Population, 519
- Fisher (Eileen E.), The 'Sooty Moulds' of Some Australian Plants, 107
- Fisher (Miss N. I.), and Miss F. M. Harmer, Photographic Sensitisers for the Infra-Red, 475
- Fisher (Dr. R. A.), Number of Mendelian Factors in Quantitative Inheritance, 400; Statistical Methods for Research Workers. Fourth edition (*Review*), 383; Statistical Tables (*Review*), 893
- Fisk (Prof. H. W.), [obituary article], 229
- Fitzpatrick (H. M.), The Trees of Ireland, 35
- Filon (Prof. L. N. G.), elected vice-chancellor of London University, 177
- Flajolet (P.), Transparency of the Atmosphere in the Lyons Region, 339
- Fleming (Sir Ambrose), Television, 539
- Fletcher (C. J. M.), [C. N. Hinshelwood and], Kinetics of the Decomposition of Molecules of Intermediate Complexity, 24



- Fletcher (T. B.), Indian Microlepidoptera, 474  
 Fletcher (Sir Walter Morley), [death], 866  
 Fleure (Prof. H. J.), Archaeology and Folk-Tradition, 431  
 Fleury (P.), and G. A. Boutry, Exact Measurement of Photographic Densities, 738  
 Fleuss (H. A.), [obituary article], 298  
 Foëx (E.), [R. Maire, G. Malençon and], Etiology of 'Bayoud', a Disease of the Date Palm, 922  
 Fonda, Particle Size and X-Ray Spectroscopy, 332  
 Forbes (A. C.), Some Legendary and Historical References to Irish Woods, and their Significance, 246  
 Forbes (Dr. H. O.), [obituary article], 460  
 Forbes (Dr. J. G.), Diphtheria, Past and Present: its Etiology, Distribution, Transmission and Prevention (*Review*), 150  
 Forbin (V.), Le Pétrole de Mésopotamie et son Pipe-Line, 864  
 Ford (J. A.), Eskimo Culture Sequence, 243  
 Forestier (H.), Influence of the Magnetic Field on the Electrolysis of Nickel Salts, 70  
 Forster Cooper (C.), awarded a grant from the Balfour Fund of Cambridge University, 736  
 Fortune (Dr. R. F.), Omaha Secret Societies, 331  
 Fosse (R.), P. de Graeve and P. E. Thomas, A New Plant Principle: Uric Acid, 179; Alantonic Acid in the Higher Plants, 702  
 Foster (A. W.), Some Measurements of the Thermoelectric Powers of Nickel and Nickel-Chromium Alloys in the Neighbourhood of their Curie Points, 814  
 Fotheringham (Dr. J. K.), Divisions of Time in Ancient Mesopotamia, 299; Eclipse of Hi and Ho, 881  
 Fournier (G.), and M. Guillot, Absorption of the  $\beta$ -Rays by Matter, 179; Relation between the Absorption of  $\beta$ -Rays by Organic Compounds and the Molecular Structure of the Latter, 447  
 Fowler (Sir Henry), elected president of the Institute of Metals, 467  
 Fowler (H. W.), Fishes from the Tonga Archipelago, 63  
 Fox (Dr. Cyril), elected president of the Prehistoric Society of East Anglia, 520  
 Fox (Dr. C. S.), Bauxite and Aluminous Laterite. Second edition (*Review*), 347  
 Fox (Prof. H. Munro), Reversible Stoppage of the Blood Circulation in Sabellids, 26; and M. L. Johnson, Control of Respiratory Movements in Crustacea, 514  
 Foxon (G. E. H.), Meaning of Neoteny and Pædogensis, 93; Pelvic Fins of the Lepidosiren, 732; 913  
 Fraenkel (E.), and J. Zellner, Comparative Plant Chemistry (24), 888  
 Francis (W. L.), Output of Electrical Energy by Frog-Skin, 805  
 François (F.), Precipitation of Antimony Iodide and its Hydrolysis, 923  
 Franke (A.), A. Kroupa and S. Hadzidimitriu, A Synthesis of  $\alpha$ -alkyladipeic Acids, 287  
 Fraser (A. H. H.), and Dr. D. Robertson, Nutritional Condition of Sheep and Susceptibility to Stomach Worm, 94  
 Fraser (Lilian), [Gladys Carey and], Embryology and Seedling Development of *Aegiceras majus*, Gaertn., 287  
 Fred (E. B.), I. L. Baldwin and Elizabeth McCoy, Root Nodule Bacteria and Leguminous Plants, 99  
 Freeman (Dr. J. R.), Earthquake Damage and Earthquake Insurance (*Review*), 381; [obituary article], 266  
 Frenkel (Prof. J.), Wave Mechanics: Elementary Theory (*Review*), 860  
 Freudenberg (K.), [W. Kuhn und], Drehung der Polarisationsbene des Lichtes (*Review*), 677  
 von Freyberg (Prof. B.), Die Geologische Erforschung Thüringens in älterer Zeit: ein Beitrag zur Geschichte der Geologie bis zum Jahre 1843 (*Review*), 531  
 Fridenson (A.), [A. Girard, G. Sandulesco, J. J. Rutgers and], A New Crystallised Sex Hormone, 71  
 Friedheim (E.), Biological Signification of Melanogenesis, 483  
 Friend (Dr. J. Newton), A Text-Book of Physical Chemistry. Vol. 1: General Properties of Elements and Compounds (*Review*), 417  
 Friesell (H. E.), [J. J. Enright, M. O. Trescher and], Cause and Nature of Dental Caries, 918  
 Fritsch (K.), Flower-Visiting Insects in Styria, 1913, 852  
 Furtauer (R.), [J. Kisser and], Influence of certain Chemical Agents on the Carbon Dioxide Output of Germinating Seeds of *Pisum sativum* and *Triticum vulgare*, 251  
 Gaarder (T.), and R. Spærek, Norwegian Oyster Pools, 806  
 Gabiano (P.), [R. de Malleman and], Magnetic Rotatory Power of Chlorine and of Hydrochloric Acid Gas, 286  
 Gaden (H.), Proverbes et maximes Peuls et Toucouleurs traduits, expliqués et annotés (*Review*), 347  
 Gaede (Prof. W.), awarded the Duddell medal of the Physical Society; the work of, 195; presented with the Duddell medal of the Physical Society, 901  
 Gaidner (Alice E.), Sporangia containing Spermatozooids in Ferns, 621  
 Gale (Prof. R. C.), War and Post-War Explosives (*Review*), 452  
 Gallais (F.), Silver Iodomercurate, 215  
 Galley (R. A. E.), [Dr. E. H. Farmer and], Catalytic Hydrogenation of Olefinic Compounds, 60  
 Gamow (Dr. G.), Fundamental State of Nuclear  $\alpha$ -Particles, 618; Mechanism of  $\gamma$ -Excitation by  $\beta$ -Disintegration, 57; Nuclear Energy Levels, 433  
 Garard (Prof. I. D.), An Introduction to Organic Chemistry (*Review*), 420  
 Gardiner (A. A. M.), Hermaphrodite Frog, 330  
 Gardiner (Prof. J. Stanley), The John Murray Expedition, 640  
 Garfias (V. R.), Oil Reserves and Production, 868  
 Garner (Prof. W. E.), Decomposition and Detonation of Solids, 65; and C. H. Moon, Acceleration of the Decomposition of Crystals of Barium Azide by the Emission from Radium Emanation, 513; and H. R. Hailes, Thermal Decomposition and Detonation of Mercury Fulminate, 286  
 Garrod (Sir Archibald E.), The Inborn Factors in Disease: an Essay (*Review*), 314  
 Garrod (Miss Dorothy), Further Remains of Palestine Man, 19  
 Garssen (J. E.), Magnetic Susceptibility of some Mixtures of Substances of Large Electric Moment, 523  
 Gatenby (Prof. J. B.), and E. S. Duthie, Culture of Snail's Tissue, 474  
 Gates (Prof. R. R.), Evolution and Philosophy (*Review*), 380; Inheritance of Flower-Size, 136; Phylogeny in the Genus *Oenothera*, 589; Prof. C. Correns, 537  
 Gattermann (L.), Revised by H. Wieland, translated by Dr. W. McCartney, Laboratory Methods of Organic Chemistry (*Review*), 78  
 Gautheret (R.), [A. Guillaumond and], Microchemical Characters of the Oxyflavonic Compounds, 410  
 Gauzit (J.), Estimation of Atmospheric Ozone by Visual Photometry, 36  
 Gay (L.), and J. Soulié, A Boiling Point Apparatus for the Determination of the Dew Points and Boiling Points of Mixtures of Volatile Liquids, 630  
 Gayford (Squadron-Leader O. R.), and Flight-Lieut. G. E. Nicholetts, New Record for Non-Stop Flight, 232; awarded the British Silver Medal of the Royal Aeronautical Society, 685;  
 Geddes (late Sir. Patrick), tributes to, 466  
 Genard (Jean), Molecular Fluorescence of Antimony, 132  
 Génaux (L.), [C. E. Brazier and], The Earthquake of March 2, 1933, 596  
 Gerlach (Dr. W.), and Dr. E. Schweitzer, Foundations and Methods of Chemical Analysis by the Emission Spectrum (translation) (*Review*), 420  
 Ghermanesco (M.), Orthogonal Polynomials with two Variables, 107  
 Ghigi (E.), [G. Charrier and], Action of Alkylmagnesium Iodides on (1:9)-Benzanthrone-(10), 107; Action of Ammonia on Acenaphthenequinone, 107  
 Ghiron (D.), [G. R. Levi and], Magnesium Chlorite and Double Chlorites of Copper with Magnesium, Barium, and Thallium, 775



- Ghosh (Prof. P. N.), and A. K. Sen Gupta, Ultra-Violet Bands of Oxide of Phosphorus, 841
- Gibson (Prof. C. S.), Organic Compounds of Gold, 130
- Gifford (A. C.), Origin of the Solar System, 518
- Gifford (Emma), Primes and Factors (*Review*), 785
- Gifford (E. W.), Yuman Ethnology, 915
- Gigante (R.), A Non-Parasitic Alteration of the Olive, 851
- Gilding (H. P.), conferment upon, of the title of reader in experimental physiology, 177, 372
- Gill (D.), Aerial Survey in Relation to Economic Geology, 160
- Gion (L.), Photolysis of Aqueous Solution of Ammonia, 410
- Girard (A.), and G. Chaudron, Dissociation of Cubic Ferric Oxide, 447; [G. Sandulesco, A. Fridenson and], A New Crystallised Sex Hormone, 71
- Gire (G.), Thermal Decomposition of the Magnesium Silicides, 923
- Giroud (P.), [C. Nicolle, J. Laigret and], Passage of the Virus of Exanthematic Fevers by the Digestive Canal in the Rat, 375
- Glasspoole (J.), Rainfall over the British Isles, 1820 to 1929, 737
- Glazebrook (Sir Richard), awarded the gold medal of the Royal Aeronautical Society, 359
- Gleason (G. H.), and A. C. Loonam, Sewage Purification by a New Process, 697
- Gley (P.), [L. Bugnard, A. Langevin and], Recording and Measurement of the Blood Pressure, 375
- Gobert (E. G.), and H. Vaufrey, Iberomarussian, 367
- Godwin (H. and M. E.), Age of Maglemose in Britain, 551
- Godwin (M. E.), [H. Godwin and], Age of Maglemose in Britain, 551
- Gold (Col. E.), Climate of Hong-Kong, 236
- Goldschmidt (Prof. S.), Stereochemie (*Review*), 783
- Goldschmidt (Prof. V.), [death], 718; [obituary article], 791
- Golikere (R. K.), Through Wonderlands of the Universe (*Review*), 823
- Goodall (W. M.), [J. P. Schafer and], Characteristics of the Ionosphere, 804
- Goodrich (Prof. E. S.), Nephridia of *Amphioxus*, 439
- Gorbach (G.), and A. Schonbeck, Influence of Hydrocyanic Acid on Bacterial Proteases, 287
- Gordon (Isabella), [Dr. W. T. Calman and], *Dodecolopoda mawsoni*, a new species representing a new genus of Pycnogonida, 774
- Gorman (M. J.), Two Forms of Sampler used in Estimating the Number of Plants per Acre in Botanical Analyses of Grasslands, 410
- Gortner (Prof. R. A.), Machine Age's Starvation Predicted, 393
- Gott (Sir Benjamin), [death], 298; [obituary article], 426
- Goude (H.), Improvement of Colour of Apples, 331
- Gouzon (B.), [H. Bierry, Mlle. C. Magnan and], Application of the Iodometric Method to the Estimation of Sugar in the Blood, 667
- Govaert (F.), Estimation of the Halogens in Organic Substances by the Sodammonium Method, 179
- de Graeve (P.), [R. Fosse, P. E. Thomas and], Alantonic Acid in the Higher Plants, 702; A New Plant Principle: Uric Acid, 179
- de Graaf (Van), Compton and Van Atta, Electrostatic Production of High Voltages, 475
- Graham (Mrs.), Gift to Leeds University, 772
- Grainger (J.), and Rachel M. Heafford, Some Effects of the ordinary Tobacco Mosaic upon the Developmental Anatomy of the Host Plant, 814
- Grandidier (G.), et G. Petit, Zoologie der Madagascar (*Review*), 748
- Granet (Prof. M.), translated by Dr. E. D. Edwards, Festivals and Songs of Ancient China (*Review*), 346
- Granier (J.), Conducting Properties of India-rubber Heavily Loaded with Lamp-Black, 738
- Grant (G. H.), [C. N. Hinshelwood and], Upper Pressure Limit in the Explosive Chain Reaction between Hydrogen and Oxygen, 361
- Grant (R.), Occurrence of Ovulation Without 'Heat' in the Ewe, 802
- Gravely (Dr. F. H.), and T. N. Ramachandran, Hindu Metal Images, 279
- Gray (Dr. J.), Directional Control of Fish Movements, 774; Importance of Zoological Advice to the State, 88; Muscular Movements of Fishes, 825
- Gray (J. D. A.), appointed senior pathological officer in the department of preventive medicine of Bristol University, 848
- Gray (Prof. J. G.), Self-Erecting Gyrostats, 250
- Gray (J. L.), and Pearl Moshinsky, Genetic Psychology (1), 922
- Gray (Dr. R. W.), Peterhead Sealers and Whalers, 904
- Gredy (Mlle. B.), The Acetylene Linkage, 774; [R. Lespieau and], Study of Some  $\alpha$ -Ethylene Oxides, 447
- Green (S. E.), [Mary Bell and], Radiometer Action and the Pressure of Radiation, 374
- Green (W. J.), The Hydroxyl Group and Soap Film Structure, 873
- Greene (F. A.), appointed a fellow of King's College, London, 177
- Greenwood (Dr. T.), The Development of Indian Thought (*Review*), 855
- Gregory (Dr. P. H.), [Dr. A. M. Davidson and], Development of Fuseaux, Aleuriospores, and Spirals on Detached Hairs by Ringworm Fungi, 836
- Greig (J. W.), H. E. Merwin and E. S. Shepherd, Volatile Transport of Silica, 768
- Grenet (G.), The Geothermic Gradient in Limogne, 143
- Griffith (M.), appointed lands director of the Welsh Plant Breeding Station of the University College of Wales, 720
- Griffiths (Dr. E.), [J. H. Awbery and], Heats of Combustion of Carbon Monoxide in Oxygen and of Nitrous Oxide in Carbon Monoxide at Constant Pressure, 446
- Grimpe (G.), and E. Wagler. Herausgegeben von G. Grimpe. Die Tierwelt der Nord-und Ostsee. Lief. 21, Teil 1 d<sub>2</sub> und Teil 2g (*Review*), 116
- Grimshaw (W. E.), [Dr. A. D. Crow and], Rate of Burning of Colloidal Propellants, 60; The Combustion Problem of Internal Ballistics, 805
- Grosset (H.), Plant Geography of Uljanowsk, 696
- Grosrey (A.), [G. Tiercy and], Width of a Photographic Stellar Spectrum for Stars of the Type A5, 888
- Grout (Prof. F. F.), Petrography and Petrology: a Textbook (*Review*), 317
- Groves (J.), [death], 462
- Grumetz (Mme. M.), [Mme. Ramart-Lucas and], Colour and Structure of Oximes and Semicarbazones, 70
- Guareschi (C.), Internal Ear of Amphibia, 659
- Guérin (P.), Hydrocyanic Acid in *Glyceria aquatica*, 106
- Guerrieri (E.), Periodicity in the Progressive Course of the Rainfall at Capodimote during 1833-1931, 107
- Gudger (Dr. E. W.), The Whale Shark in the Waters around Ceylon, 165
- Guichard, Atomic Weight of Iodine, 738
- Guild (J.), Reversal of Current in Rectifier Photo-Cells, 327
- Guillaume (Dr. Ch.-Ed.), Invar, 658
- Guillerm (J.), [P. N. Bernard and], Transmissible Lysis of the Cholera Vibrium, 887
- Guilliermond (A.), and R. Gautheret, Microchemical Characters of the Oxyflavonic Compounds, 410
- Guillot (M.), [G. Fournier and], Absorption of the  $\beta$ -Rays by Matter, 179; Relation between the Absorption of  $\beta$ -Rays by Organic Compounds and the Molecular Structure of the Latter, 447
- Guinier (A.), [G. Bruhat and], Improvement of the Photoelectric Polarimeter, 630
- Gulland (Dr. J. M.), and T. F. Macrae, Action of Proteolytic Enzymes on the Oxytocic Principle of the Pituitary Gland, 470
- Gulick (A.), Evolutionist and Missionary, John Thomas Gulick: Portrayed through Documents and Discussions (*Review*), 532
- Gunn (Dr. R.), Origin of the Planetary System, 405
- Günther (P. L.), [Prof. F. A. Paneth and], Chemical Detection of Artificial Transmutation of Elements, 652



- Gunther (Dr. R. T.), *The Astrolabes of the World*, 2 vols. (*Review*), 819
- Gupta (A. K. Sen), [Prof. P. N. Ghosh and], *Ultra-Violet Bands of Oxide of Phosphorus*, 841
- Gurney (Dr. R. W.), appointed a research fellow in Bristol University, 772
- Gurwitsch (Dr. A.), *Mitogenetic Radiation of Nerve*, 912; *Unter Mitwirkung von Lydia Gurwitsch, Die mitogenetische Strahlung, zugleich zweiter Band der "Probleme der Zellteilung"* (*Review*), 79
- Gustafson (T.), and B. Kullenberg, *Inertia Currents in the Baltic*, 586
- Gutzeit (G.), and R. Monnier, *Utilisation of some Azo Derivatives of Oxyquinoline as Reagents in Qualitative Analysis*, 144
- Guyatt (Dr. B. L.), [Prof. H. D. Kay and], *Experimental Rickets as a Phosphorus Deficiency Disease*, 468
- Gwynn (A. M.), appointed entomologist in the department of agriculture, Nigeria, 871
- Gyllenberg (W.), *Proper Motions in the Lund Zone of the Astronomische Gesellschaft Catalogue*, 245
- Gysin (M.), *Petrographical Researches in the Haut-Katanga (1)*, 411; (2), 815; (3), 887
- de Haas (Prof. W. J.), E. C. Wiersma and Prof. H. A. Kramers, *Temperature below 0.27° K.*, 719
- Haberlandt (H.), *Luminescence Investigations with Fluorites (2)*, 851
- Hada (Y.), [T. Tamura and], *Growth of Corals*, 172
- Haddon (E. B.), *Tribes of the Southern Sudan (Review)*, 345
- Hadfield (Prof. G.), appointed professor of pathology in Bristol University, 848
- Hadfield, Bt. (Sir Robert), elected an honorary member of the Academy of Sciences of the U.S.S.R., 272; luncheon to, 355
- Haenny (C.), *Magnetic Double Refraction of some Cerium Salts in Aqueous and Non-Aqueous Solutions*, 887
- Hägg (Prof. G.), *Vacant Positions in the Iron Lattice of Pyrrhotite*, 167
- Haig-Brown (R. L.), *Silver: the Life-Story of an Atlantic Salmon (Review)*, 42
- Hailes (H. R.), [Prof. W. E. Garner and], *Thermal Decomposition and Detonation of Mercury Fulminate*, 286
- Haitinger (M.), [E. Haschek and], *A Simple Method of determining Colour*, 411
- Haldane (Prof. J. B. S.), appointed professor of genetics at University College, London, 336; *The Causes of Evolution (Review)*, 709; *The Inequality of Man: and other Essays (Review)*, 529
- Hall (E. R.), *Mammals of Vancouver Island*, 879
- Hall (N. F.), [J. C. Earl and], *Chemical Changes Involved in the Formation of Aminoazo-Compounds (2)*, 667
- Hall (P.), appointed a university lecturer in mathematics in Cambridge University, 848
- Hallett (Sir Frederic G.), [death], 195
- Halley (Edmond), *Correspondence and Papers of*, arranged and edited by E. F. MacPike, 153
- Hallimond (A. F.), and E. F. Herroun, *Magnetic Properties of Certain Igneous Rocks*, 338
- Halm (Mlle. Louise), [J. Cournot and], *Measurement of the Degree of Polishing in view of the Determination of the Amount of Corrosion of Rustless Steels*, 738
- Hamburger (H.), *Ribaucour's Transformation and Spherical Representation (3)*, 339
- Hamer (Miss F. M.), [Miss N. I. Fisher and], *Photographic Sensitisers for the Infra-Red*, 475
- Hamilton (Sir Ian), installed as Lord Rector of Edinburgh University, 372
- Hanley (F.), [R. Sayce and], *Kiln-dried Poultry Manure*, 198
- Harden (Prof. A.), *Alcoholic Fermentation (Bedson Lecture)*, 756
- Harding (Col. E. W.), *The Flyfisher and the Trout's Point of View: New Light on Flyfishing Theory and Practice (Review)*, 42
- Harding (J. W.), *Semi-Conductors in a Magnetic Field*, 731
- Hardy (A. C.), *Use of Oil and Coal in Ships*, 479
- Hardy (Sir William), *Food Storage at Low Temperature*, 459
- Harker (Dr. A.), *Metamorphism: a Study of the Transformations of Rock-Masses (Review)*, 310
- Harkins (Prof. W. D.), *The Neutron and Neutron, the New Element of Atomic Number Zero*, 23
- Harmer (Sir Sidney), re-elected president of the Ray Society, 466
- Harradon (H. D.), Prof. H. W. Fisk, 229
- Harris (Dr. L.), W. S. Benedict, and G. W. King, *Form and Vibrational Frequencies of the NO<sub>2</sub> Molecule*, 621
- Harris (Dr. L. J.), [T. W. Birch, S. N. Ray and], *Hexuronic (Ascorbic) Acid as the Antiscorbic Factor, and its Chemical Determination*, 273
- Harris (R. S.), and J. W. M. Bunker, *Bacterial Detoxification*, 244
- Harris (R. V.), *The Strawberry 'Yellow-edge' Disease*, 730
- Harris (R. W.), *Control of the Tsetse Fly*, 463
- Harrison (C. A.), *Broad Highway of Soviet Education*, 920
- Harrison (T. H.), and P. A. D. Hollom, *Spread of the Great Crested Grebe in Britain*, 135
- Hartley (Sir Harold), *Priestley's Service to Chemistry*, 555
- Hartmann (Dr. C. G.), *Sexual Cycle in the Rhesus Monkey*, 626
- Hartog (Sir Philip), *Priestley as a Scientific Man and Theorist*, 555
- Hartridge (Prof. H.), *A Method of Extending the Frequency Range of the Cathode Ray Tube*, 95; *Detection of Traces of Carbon Monoxide in Air*, 654
- Haschek (E.), and M. Haitinger, *A Simple Method of Determining Colour*, 411
- Haskell (Prof. E. E.), [death], 353
- Haslewood (G. A. D.), appointed a research student at the Research Institute of the Cancer Hospital, 509
- Hatfield (Dr. W. H.), awarded the Bessemer gold medal of the Iron and Steel Institute, 236
- Hatton (J. L. S.), [death], 86; [obituary article], 230
- Haughton (Dr. S. H.), *Geology of South Africa*, 624
- Hautot (A.), *Structure of the K Line of Boron*, 595; [M. Morand and], *Fine Structure of the Carbon Line K $\alpha$* , 143
- Haworth (Prof. W. N.), [Prof. A. Szent-Györgyi and], *Hexuronic Acid (Ascorbic Acid) as the Antiscorbic Factor*, 24
- Hawes (Dr. W. B.), awarded the Junior Moulton medal and prize of the Institution of Chemical Engineers, 510
- Hawkes (Hilda K.), [L. Hawkes and], *Sandfell Laccolith and 'Dome of Elevation'*, 214
- Hawkes (L.), and Hilda K. Hawkes, *Sandfell Laccolith and 'Dome of Elevation'*, 214
- Hawkins (Prof. H. L.), elected president of the 1934 Congress of the South-Eastern Union of Scientific Societies, 920
- Hawksworth (D.), *Ancestor Spirits among the Nuba*, 403
- Hawley (H.), *Phytosteryl Acetate Test for examining Butter Fats*, 814
- Hayford (Miss Phyllis), *Galactic Rotation*, 173
- Headlam-Morley (K.), appointed secretary of the Iron and Steel Institute, 272
- Heafford (Rachel M.), [J. Grainger and], *Some Effects of the Ordinary Tobacco Mosaic upon the Developmental Anatomy of the Host Plant*, 814
- Heard (R. D.), H. W. Kinnersley, J. R. O'Brien, Prof. R. A. Peters, and V. Reader, *Vitamin B<sub>4</sub> and Adenine*, 617
- Hedenius (Astrid), [Prof. The Svedberg and], *Molecular Weights of the Blood Pigments of the Invertebrates*, 325
- Hedin (Sir Sven), translated by E. G. Nash, *Jehol: City of Emperors (Review)*, 184
- Hedges (Dr. E. S.), *Liesegang Rings*, 169; *Liesegang Rings: and other Periodic Structures (Review)*, 316
- Hée (Mme. A.), *Earthquakes of Northern Africa*, 807



- Heilbron (Prof. I. M.), appointed professor of organic chemistry in Manchester University, 772; and J. C. E. Simpson, Hydroxyl Group in Ergosterol and Cholesterol, 438
- Hemming (H.), Aerial Survey in Relation to Economic Geology, 160
- Henderson (Prof. G. G.), presidential address to the Chemical Society, 498
- Herdman (D. W.), [C. Squire and], The Museums of Malta, Cyprus and Gibraltar, 430
- Herdman (H. F. P.), Soundings in the Scotia Sea, 440
- Herenguel (J.), and G. Chaudron, Sublimation of Magnesium in a Vacuum and Casting in an Atmosphere of Argon, 179
- Hermitte (Dr. L. C. D.), appointed demonstrator in pathology in Sheffield University, 884
- Hernegger (F.), Detection of Uranium in Spring Waters and Deposits, 704
- Herrick (C. J.), Functions of the Olfactory Parts of the Cerebral Cortex, 739
- Herring (E.), Methods of Warming and Ventilating the Masonic Peace Memorial Building, 541
- Herrman (L.), and Prof. L. Hogben, Intellectual Resemblance of Twins, 446
- Herroun (E. F.), [A. F. Hallimond and], Magnetic Properties of Certain Igneous Rocks, 338
- Hershey (Prof. J. W.), Components of the Atmosphere and Synthetic Gases in Relation to Animal Life, 238
- Herzberg (Dr. G.), [J. Curry and], Extension of the Visible Absorption System of NO<sub>2</sub> to longer Wave-Lengths, 842
- Herzberger (Dr. M.), Strahlenoptik (*Review*), 747
- Herzen (G. M.), [P. Auger and], Emission of Neutrons by Aluminium under the action of the  $\alpha$ -Particles, 523
- von Hevesy (Prof. G.), Chemical Analysis by X-Rays and its Applications (*Review*), 39; Properties of the Atom (*Review*), 4; and Dr. M. Pahl, Range of Radiation from Samarium, 434
- Hewett (C. L.), [Dr. J. W. Cook, Prof. E. C. Dodds and], A Synthetic Oestrus-exciting Compound, 56
- Hey (M. H.), A Possible Source of Error in the Determination of Symmetry from Optical Extinction-Angles, 630; Studies on the Zeolites (5), 630
- Heyl (P. R.), The Philosophy of a Scientific Man (*Review*), 491
- Heyroth (F. F.), and J. R. Looftbourow, Irradiation of Nucleic Acids and Uracil, 92
- Heyward (Jean), Two Species of *Ophiocytium Nageli* in Victoria, *O. terrestris* n.s. and *O. arbuscula* Rabenhorst, 107
- Hibben (Dr. J. G.), [death], 866
- Hickinbottom (Dr. W. J.), Alkylanilines with Tertiary Alkyl Groups, 762
- Hicks (Prof. C. Stanton), Scientific Centralisation in the British Empire, 397
- Hicks Prof. G. Dawes), Berkeley (*Review*), 322
- Hickson (Prof. S. J.), Gorgonacea from the Great Barrier Reef, 879
- Hilger, Ltd. (Adam), Spectrograph for Study of Fibrous Substances, 844
- Hill (Prof. A. V.), Living Machinery (*Review*), 860; Physical Nature of the Nerve Impulse, 233; 497; 501
- Hill (Dr. B.), Mortality from Whooping-Cough, 269
- Hill (Sir Leonard), 'Raw' Weather, 28; 241
- Hilton (Prof. H.), Plane Algebraic Curves. Second edition (*Review*), 383
- Himus (G. W.), Fuel Testing: Laboratory Methods in Fuel Technology (*Review*), 259
- Hinds (G. H.), [F. R. W. Hunt and], Rate of Burning of Colloidal Propellants, 206
- Hingston (Major R. W. G.), A Naturalist in the Guiana Forest (*Review*), 78
- Hinshelwood (C. N.), and C. J. M. Fletcher, Kinetics of the Decomposition of Molecules of Intermediate Complexity, 24; and G. H. Grant, Upper Pressure Limit in the Explosive Chain Reaction between Hydrogen and Oxygen, 361; M. Hughes and A. C. Rolfe, Reaction between Hydrogen and Oxygen, 625; Combination of Hydrogen and Oxygen in a Silver Vessel, 142
- Hiriyanna (M.), Outlines of Indian Philosophy (*Review*), 855
- Hiroa (Te Rangi), (Dr. P. H. Buck), Ethnology of Manihiki and Rakahanga, Cook Islands, 588
- Hirst (Dr. E. L.), [E. G. Cox and], Constitution of Vitamin C, 402; E. G. V. Percival and F. Smith, Constitution of Ascorbic Acid, 617
- Hitchen (C. S.), Skiddaw Granite and its Residual Products, 482
- Hoagland (H.), Impulses from Sensory Nerves of Catfish, 631
- Hoar (T. P.), awarded the Gordon Wigan prize for chemistry of Cambridge University, 284
- Hobson (Bernard), bequests for Geological Research, 500
- Hobson (Prof. E. W.), [death], 576
- Hocart (R.), Orientation of Arsenolite and of Senarmontite by Mica, 851
- Hodge (W. V. D.), appointed a university lecturer in mathematics in Cambridge University, 848
- Hodges (Prof. C.), The Background of International Relations: Our World Horizons, National and International (*Review*), 45
- Hodgson (Dr. W. C.), Forecasting the Herring Fishery off East Anglia, 98
- van Hoepen (Dr. E. C. N.), A New South African Culture? 393
- Hoffmann (J.), Alkali- and Barium-Silver Chlorides, 704
- Hogben (Prof. L.), [L. Herrman and], Intellectual Resemblance of Twins, 446
- Hogbin (Dr. I.), Ceremonial Exchange in Polynesia, 439
- Holden (Lord), re review of Bond's "Numerical Examples in Physics", 467
- Holland (Sir Thomas), elected president of the Geological Society of London, 432
- Holland (T.), and others, edited by Mary Adams, Science in the Changing World (*Review*), 674
- Hollis (H. P.), A Numerical Coincidence, 550
- Hollom (P. A. D.), [T. H. Harrison and], Spread of the Great Crested Grebe in Britain, 135
- Holm (Dr. H. T.), [death], 195
- Holmes (Dr. E. G.), appointed a university lecturer in biochemistry in Cambridge University, 665
- Holmes (Dr. W. H.), [death], 718
- Holmes (W. M.), The Mornington Earth Tremor of Sept. 3, 1932, 71
- Holmyard (Dr. E. J.), Pliny's Chemical Knowledge (*Review*), 305; Thomas Norton and the "Ordinal of Alchemy", 520; [W. C. Badcock and], Electricity and Magnetism for Beginners (*Review*), 347
- Holzl (F.), and W. Stockmair, Complex Anion of Buff's Compound and of Bunsen's Salt, 251
- Honda (Prof. Kôtarô), A New Alloy, 'Stainless-Invar', 587
- Hope (Lord Charles), Further Light on the Schneider Mediumship, 549
- Hope-Jones, Time Measurement: Old and New, 67
- Hopkin and Williams, Ltd., Organic Reagents for Metals, 396
- Hopkins (B. S.), and L. L. Quill, Use of Non-Aqueous Solvents in the Study of the Rare Earth Group, 739
- Hopkins (Sir Frederick Gowland), Installation of, as president of the British Association, 50
- Hopwood (A. T.), [Dr. L. S. B. Leakey, Prof. H. Reek, Prof. P. G. H. Boswell, Dr. J. D. Solomon and], The Oldoway Human Skeleton, 397
- Hornblower (G. D.), Dragons, 806
- Horton (C. E.), and Crampton, A Radio Compass Developed in H.M. Signal School, 846
- Horton (W.), Gift to Liverpool University, 557
- Houstoun (Dr. R. A.), Vision and Colour Vision (*Review*), 532
- Howard (B. A.), The Proper Study of Mankind (*Review*), 676
- Howell (A. B.), Jumping Rodents, 623
- Howes (N. H.), [D. I. Clements, G. P. Wells and], Is Plasticine Edible?, 330
- Huber (G. K.), and Elizabeth C. Crosby, A Phylogenetic Consideration of the Optic Tectum, 739



- Hudson (H.), [Prof. T. M. Lowry and], Optical Rotatory Power (4), 374
- Hudspeth (Major H. M.), appointed to the Safety in Mines Research Board, 91
- Huffer (Dr. C. M.), [Prof. J. Stebbins and], Absorption of Light in the Galaxy, 769
- Hughes (A. H.), and Prof. E. K. Rideal, Rate of Oxidation of Monolayers of Unsaturated Fatty Acids, 446
- Hughes (A. W. McKenny), [Major E. E. Austen and], Clothes Moths and House Moths, 55
- Hughes (J. V.), The Spurious Ring Exhibited by Fluorescent Screens, 558
- Hughes (M.), [Hinshelwood, Rolfe and], Reaction between Hydrogen and Oxygen, 625
- Hull (Miss Eleanor), Heathen Baptism in Early Britain, 403
- Hullett (E. W.), and J. W. Calder, Fluorescence in Ryegrasses, 474
- Hulme, Internal Conversion of  $\gamma$ -Rays, 99
- Hulthén (Prof. E.), and R. Rydberg, Predissociation and Pressure Effects in the Band Spectrum of Aluminium Hydride, 470
- Humason (Dr.), Spectral Types of Faint Stars, 209
- Humberstone (T. Ll.), The New Buildings for the University of London, 903
- Humphreys (F. E.), and H. Phillips, Examination of Leather for the Presence of Extractable Chromium Compounds, 813
- Hunsaker (Commdr. J. C.), awarded the Daniel Guggenheim medal, 871
- Hunt (F. R. W.), and G. H. Hinds, Rate of Burning of Colloidal Propellants, 206
- Hunt (Dr. J. Middlemass), bequest to Liverpool University, 51
- Hunt (Theresa M.), [Dr. C. E. P. Brooks and], Variations of Wind Direction in the British Isles since 1341, 814
- Hunter (Dr. J. de Graaff), Time Determination, 515
- Hunter (Miss M. M.), awarded the Wyse studentship of Cambridge University, 884
- Hurst (Dr. C. C.), Inheritance of Intelligence in Man, 764; The Mechanism of Creative Evolution (*Review*), 780
- Huxley (Dr. L.), [death], 718
- Huxley (L. G. H.), [G. H. Munro and], Atmospheric in Australia, 592
- Iimori (S.), Periodicity in the Solarisation of Calcite, 619
- Iling (Prof. V. C.), Migration of Oil and Natural Gas, 475
- Imamura (A.), T. Kodaira and H. Imamura, Earthquake Series at Nagusa, Japan, 136
- Imamura (H.), [A. Imamura, T. Kodaira and], Earthquake Series at Nagusa, Japan, 136
- Innes (Dr. R. T. A.), [death], 390; [obituary article], 461
- Ionescu (T. V.), and C. Mihul, Ionised Gases in the Magnetic Field, 106; High-Frequency Discharge in Gases, 887
- Iriki (Dr. S.), Chromosomes of Amphibians and Fishes, 659
- Isikawa (Dr. Tomoyosi), Physiological Standards and Occupational Characteristics of Bodily Functions of the Japanese, 588
- Ivanoff (D.), and I. Abdouloff, Velocity of Disengagement of Hydrocarbons produced by the Action of Indene on Fatty Organomagnesium Derivatives, 483
- Ivimey-Cook (Dr. W. R.), appointed assistant lecturer and demonstrator in botany in University College, Cardiff, 736
- Iwase (Ei-ichi), Bands in the Thermoluminescence Spectrum of Fluorite from Obira, Japan, 909
- Jabłoński (Dr. A.), Efficiency of Anti-Stokes Fluorescence in Dyes, 839
- Jacek (W.), Velocity of the Solution of Marble in Acids (3), 887
- Jackson (A.), Egyptian Neolithic Barley, 652
- Jackson (D. A.), Structure of the Lines of the Arc Spectrum of Silver, 691
- Jackson (Sir Herbert), Photographic Graticules, 766; Prof. J. Millar Thomson, 610
- Jackson (Sir John), [death], 496
- Jackson (L. C.), Principal Magnetic Susceptibilities of Some Paramagnetic Crystals at Low Temperatures, 338
- Jacob (S. M.), Census of Nigeria, 516
- Jacqué (L.), Alteration of Steels by Hydrogen, 36
- Jacquet (P.), Adsorption of Colloids by Metallic Surfaces, etc., 702; Strains in Electrolytic Copper Deposited in the Presence of Colloids, 70
- Jaffray (J.), High-Frequency Currents produced by High-Tension Magnetos, 559
- James (Dr. E.), appointed junior assistant bacteriologist and demonstrator in Sheffield University, 884
- James (T. E.), Tercentenary of Samuel Pepys, 228; The Old Ashmolean, Oxford, 716; The Work of George Edwards, F.R.S., 124
- Jaslan (S.), [W. Broniewski and], Influence of Oxygen on the Properties of Copper, 338
- Jausseran (C.), Evolution of the Latent Image, 410
- Jay (A. H.), [A. J. Bradley and], Quartz as a Standard for Accurate Lattice-Spacing Measurements, 813
- Jeffery (G. H.), [Dr. A. I. Vogel and], Limiting Nobilities of some Monovalent Ions and the Dissociation Constant of Acetic Acid at 25°, 27
- Jeffreys (Dr. H.), Evolution of Hydrodynamics (*Review*), 313; and K. E. Bullen, Corrections to the Times of the P-Wave in Earthquakes, 97
- Jeffreys (W. Rees), Transport Problems of the Empire, 126
- Jeffer (Prof. R. E.), [death], 646
- Jenkins (Dr. R. L.), Inheritance of Acquired Characters, 95
- Jenkins (Rhys), A Cornish Engineer, Arthur Woolf, 124
- Jenkins (S. H.), [Dr. A. G. Norman and], Lignin Content of Cellulose Products, 729
- Jenks (A. E.), Minnesota Pleistocene *Homo*, 739
- Jensen (H. L.), The Actinomycetales (4), 631
- Jespersen (Dr. P.), Food of the Herring in Icelandic Waters, 884
- Jevons (Dr. W.), Band-Spectra of Diatomic Molecules, 102
- Jewell (W.), [Dr. F. H. Carr and], Characteristics of Highly Active Vitamin A, 92
- Jezewski (M.), Application of the Resonance Method to the Determination of the Dielectric Constants of Aqueous Electrolytes, 448
- Job (P.), Constitution of Hydrochloric Acid Solutions of Cobalt Chloride, 338
- Johnson (Dr. C. H.), and A. Mead, Line Absorption of Chromic Salts in Relation to Co-ordination, 399
- Johnson (M. L.), [Prof. H. Munro Fox and], Control of Respiratory Movements in Crustacea, 514
- Johnson (Dr. R. C.), Band Spectra of Diatomic Molecules, 102
- Johnstone (E. S.), [F. S. Brackett and], Functions of Radiation in the Physiology of Plants, 331
- Johnstone (Prof. J.), [death], 22; [obituary article], 157
- Joliot (F.), [Mme. Irène Curie and], Conditions of Emission of Neutrons by the Action of  $\alpha$ -Particles on the Light Elements, 447
- Jones (Brindley), [W. Singleton and], Effects of the Addition of Tellurium to Lead, 696
- Jones (E. Gwynne), Hyperfine Structure of Perturbed Series, 813
- Jones (Grinnell), and S. K. Talley, Viscosity of Aqueous Solutions, 475
- Jones (Dr. H. Spencer), elected an honorary fellow of Jesus College, Cambridge, 213
- Jones (J. R.), [H. J. Allcock and], The Nomogram: the Theory and Practical Construction of Computation Charts (*Review*), 785
- Jones (J. Stinton), appointed consultant engineer for heating, etc., in connexion with the new buildings of London University, 408
- Jones (Phyllis), [A. J. Bradley and], X-Ray Investigation of the Copper-Aluminium Alloys, 589
- Jones (Sir Robert), [death], 86
- Jones (Tudor), The Neuro-Muscular Junction and Curare, 693



- Jones (W. J.), Recent Developments on Electric Lighting, 302
- Joos (Prof. G.), Lehrbuch der theoretischen Physik (*Review*), 221
- Jouast (R.), [N. Stoyko and], Apparent Velocity of Short Radio-Electric Waves, 887
- Jouquet (Prof. É.), The Work of the late Prof. A. C. E. Rateau, 650
- Juliard (A.), Retarding Action of Glass on Landolt's Reaction, 338
- Junquera (M.), Combined Influence of pH and Glucose on the Permeability of Yeast to Methylene Blue, 411; [F. Chodat and], Reduction of Methylene Blue by an *Endomyces* at the Expense of its Endocellular Hydrogen Donators, 815
- Kahane (E.), [L. Lematte and], Silica in the Organism and the Siliceous Particles of the Blood, 523
- Kahn (R. F.), appointed university lecturer in economics and politics in Cambridge University, 848
- Kailan (A.), and O. Stuber, Velocity of Catalysed Hydrogenations, 251
- Kamienski (Prof.), Photoconductive Effect in Carborundum Crystals, 475
- Kanda (Dr. S.), Comets of A.D. 868 and 1366, 31
- Kanga (Prof. D. D.), Is Man Ethically Fit for the Bounties of Science? 233
- Karl (A.), Analysis of Primary Radioactive Minerals, 143; Preparation of the Metallic Tungstates, 923
- Karrer (Prof. P.), H. Salomon and K. Schöpp, Constitution of Dehydro-Ascorbic Acid, 800
- Katino (S.), [K. Oguma and], Chromosome Numbers in Vertebrates, 403
- Kautter (Dr. C. T.), Origin of the Chile Saltpetre, 556
- Kay (Prof. H. D.), and Dr. B. L. Guyatt, Experimental Rickets as a Phosphorus Deficiency Disease, 468
- Kaye (Dr. G. W. C.), and G. E. Bell, Measurement of X-Ray Tube Current and Voltage, 552; and G. C. Sherratt, Velocity of Sound in Gases in Tubes, 338
- Kayser (Prof. H.), und Prof. H. Konen, Handbuch der Spectroscopie. Band 8, Lief. 1 (*Review*), 824
- Keeler (C. E.), [W. E. Castle and], Blood Group Inheritance in the Rabbit; Tests for Linkage between the Blood-Group Genes and other known Genes of the Rabbit, 775
- Keeley (T. C.), [Prof. F. A. Lindemann and], Helium Liquefaction Plant at the Clarendon Laboratory, Oxford, 191
- Keesom (Prof.), Low Temperature Research, 768
- Keggin (J. F.), Structure of the Molecule of 12-Phosphotungstic Acid, 908
- Kellogg (E. S.), The California Ground Squirrel Control Program, 721
- Kemp (G. S.), [death], 50
- Kemp (Dr. S.), [J. M. Wordie and], Ice in the Weddell Sea, 916
- Kemula (W.), and S. Mrazek, Measurements of the Absorption of Ultra-Violet Rays by Methane, Ethane and Normal Butane in the Gaseous condition, 106
- Kendall (Prof. J.), W. W. Smith and T. Tait, Calcium Isotope with Mass 41 and the Radioactive Half-period of Potassium, 688
- Kendall (Prof. P. F.), and Prof. H. Briggs, Formation of Rock Joints and the Cleat of Coal, 922
- Kennaway (N. M.), [H. Burrows, Prof. E. C. Dodds and], Some Effects Observed in Mice under continued Treatment with Oestrin, 801
- Kennedy (J. M.), and Miss D. M. Noakes, Cost of Electricity Supply and Distribution, 358
- Kennedy and Thorndike, Relativity of Time, 136
- Kennelly (Prof. A. E.), Conference of the Symbols, Units and Nomenclature, etc., 775; elected president of the International Scientific Radio Union, 55
- Kerr (T.), The Pituitary in *Lepidosiren* and its Development, 523
- Kershaw (J. W.), resignation of the lectureship in mechanical engineering in Sheffield University, 884
- Keynes (J. M.), The Means to Prosperity (*Review*), 451
- Khan (M. A. R.), Disintegrating Action of Roots of Trees, 844
- Khouvine (Mme. Y.), and G. Nitzberg, Identification and Biochemical Oxidation of  $\alpha$ -Glucoheptulite, 339
- Kikoin (Dr. I.), and Dr. M. Noskov, A New Type of Photoelectric Effect in Cuprous Oxide in a Magnetic Field, 725
- King (A. J.), [B. G. Churcher and], Scales of Loudness, 760
- King (G. W.), [Dr. L. Harris, W. S. Benedict and], Form and Vibrational Frequencies of the NO<sub>2</sub> Molecule, 621
- King (J. J. F.-X.), [obituary], 298
- King (L. A. L.), and Miss Agnes A. Meikle, A Fly Pest of Timothy Grass, 837
- King (R. O.), Oxidation and the Lubricating Properties of Oil, 476
- King (W. W.), Downtonian and Dittonian of Great Britain and North-West Europe, 738
- Kinnersley (H. W.), [R. D. Heard, J. R. O'Brien, Prof. R. A. Peters, V. Reader and], Vitamin B<sub>4</sub> and Adenine, 617
- Kinoshita (M.), and K. Uchiyama, Size of Fog Droplets, 99
- Kirkbride and Norrish, Photochemical Decomposition of Diazomethane, 404
- Kirsch (G.), and R. Trattner, Atomic Disintegration with Emission of Neutrons, 852
- Kisser (J.), and R. Furtauer, Influence of certain Chemical Agents on the Carbon Dioxide Output of Germinating Seeds of *Pisum sativum* and *Triticum vulgare*, 251; and J. Schubert, Influence of Treatment of Seeds with Chemical Stimulants on the Cell Growth of the Rootlets, 251
- Klatzow (L.), [Dr. S. P. McCallum and], Conductivity of Mixtures of Gases, 841
- Kleeman (Prof. R. D.), The Atomic and Molecular Forces of Chemical and Physical Interaction in Liquids and Gases, and their Effects (*Review*), 80
- Klemenz (K.), Archimedean Bodies in Spaces of Several Dimensions, 703
- Kling (A.), and A. Soulier, Accidental Ignition of Vapours of Petrols by Electric Sparks, 106
- Klingenheim (A.), Vai Script, 915
- Klima (J.), Chemistry of the Lichens (2), 888
- Knight (W. F. J.), Symbolism of the Maze, 98
- Knox (E. G. V.), elected a member of the Athenæum Club, 200
- Knox-Shaw (Dr. H.), The Extra-Galactic Nebulæ, 247
- Knudsen (Prof. V. O.), Architectural Acoustics (*Review*), 894
- Koblmuller (L. O.), and R. Vierthaler, Transferring Single-Cell Cultures to Solid Nutrient Media, 287
- Kodaira (T.), [I. Imamura, H. Imamura and], Earthquake Series at Nagusa, Japan, 136
- Koeing (Friedrich), Centenary of the death of, 51
- Koller (C.), and Thelma Townson, Spermatogenesis in *Drosophila obscura*, Fallen (1), 447; and G. Pfeiffer, Constitution of Pinastric Acid; Galabratric Acid, 411
- Koltzoff (Prof. N. K.), and V. N. Schröder, Artificial Control of Sex in the Progeny of Mammals, 329
- Konen (Prof. H.), [Prof. H. Kayser und], Handbuch der Spectroscopie. Band 8, Lief. 1 (*Review*), 824
- Kopper (H.), and A. Pongratz, Raman Effect (24), 251
- Koshy (Prof. T. K.), Structure and Division of Somatic Chromosomes in *Allium*, 362
- Kraft (K.), [Dr. F. Micheel and], Constitution of Vitamin C, 274
- Kramer (Mlle. A.), The Heterosides of *Philyrea latifolia*, 631
- Kramers (Prof. H. A.), [Prof. W. J. de Haas, E. C. Wiersma and], Temperature below 0.27° K., 719
- Kremann (R.), and L. Lammermayer, Electrolysis of Aluminium Alloys containing Iron as a Model of the Electrolytic Purification of Molten Aluminium from Iron, 251
- Krishna (S.), and S. Ramaswami, Calorific Values of some Indian Woods, 281



- Krishnan (K. S.), elected secretary of the Indian Association for the Cultivation of Science; appointed Mahendralal Sircar research professor in physics of the Indian Association, 907; and S. Banerjee, Orientations of Molecules in the *p*-Benzoquinone Crystal, 653; and S. M. Mitra, Negative Polarisation in Fluorescence, 204
- Kronman (Dr. E. S.), Rhenium (Opyt monografi elementa No. 75), (*Review*), 224
- Kropp (B.), The Crustacean Chromatophore Activator and the Gonads of the Rat, 631
- Kuhn (Dr. W.), Fundamental Laws of Optical Rotatory Power, 771; und K. Freudenberg, Drehung der Polarisationsenebene des Lichtes (*Review*), 677
- Kukarkin (Dr.), Nova of March 20, 590
- Kullenberg (B.), [T. Gustafson and], Inertia Currents in the Baltic, 586; [Dr. H. Pettersson and], Boundary Tides in the Kattegat, 586
- Kunhardt (Lieut.-Col. J. C. G.), [death], 231
- Kürti (G.), Magneto-Rotation in Coloured Glass and Rock Salt, 411
- Kutzelnigg [Beutel and], Fluorescence of Zinc Oxide, 917
- Kuznetsov (B. A.), Rodents of the Semipalatinsk District of Kazakstan, 516
- L. (W. W.), Ideas of 'Time' and 'Events', 727
- Labarthe (A.), and M. Demontvignier, Measuring and Recording Rapidly Variable Pressures, 179
- Labocchetta (L.), Effective Integration of Discontinuous Functions (2), 71
- Lacey (S.), Development of the Use of Gas, 478
- Lagatu (H.), and L. Maume, Comparative Composition, in the Vine, of Homologous Leaves, etc., 815
- Lagotala (H.), Borings in the Marly Limestones of Renève (French Congo); The Stratigraphic Scale of the Niari Limestones, 215; Continental Formation Subjacent to the Limestones of Niari, French Congo, 851; Geology of the Comba Region, 411; Stratigraphical Study of the Mindouli-Mines Region, 144
- Laignet (J.), [C. Nicolle, P. Giroud and], Passage of the Virus of Exanthematic Fevers by the Digestive Canal in the Rat, 375
- Lainé (P.), Magnetic Double Refraction of Liquid Oxygen, 850; Magnetic Properties of Liquid Ozone, 702
- Laing (Dr. B. M.), David Hume (*Review*), 321
- Laing (Dr. E. V.), Tree Roots, 176
- Lake (P.), A Photogrammetric Survey in the Pamir (*Review*), 744
- Lalande (A.), Freezing Points of Binary Mixtures of Ethyl Alcohol and Ethyl Ether, 447
- Lallemant (C.), The World Crisis and the Gold Standard, 70
- Lamb (Sir Horace), Hydrodynamics. Sixth edition (*Review*), 313
- Lamb (J. H.), Electrification of an Ice Factory, 833
- Lammermayer (L.), [R. Kremann and], Electrolysis of Aluminium Alloys containing Iron as a Model of the Electrolytic Purification of Molten Aluminium from Iron, 251
- Lancaster-Jones (E.), awarded the B.O.I.M.A. prize of the Institute of Physics, 467
- Lang (K. C.), [L. H. Martin and], Thermal Conductivity of Water, 813
- Langevin (A.), [L. Bagnard, P. Gley and], Recording and Measurement of the Blood Pressure, 375
- Lapage (G.), Cultivation of Parasitic Nematodes, 583
- Lapp (C.), Rotatory Power of Quinine Salts in Aqueous Solution, 703
- Larke (Sir William), The Iron and Steel Industry, 335
- Larmor (Sir Joseph), The Astronomical Radiative Stability, 805
- de Laszlo (Dr. H.), Electron Diffraction by Vapours, 803
- Latimer [Libby and], Radioactivity of some Rare Earth Elements, 368
- Latreille (Pierre André), centenary of the death of, 159
- de Laubenfels (M.), Californian Sponges, 588
- Laure (Y.), Combustion Pressures in Closed Vessels of Air-Benzene Mixtures, 447
- Leak (H.), and T. Priday, Migration from and to Great Britain, 125
- Leakey (Dr. L. S. B.), Fossiliferous Deposits in the Homa-Kendu Area, Kenya Colony, 886; Prof. H. Reck, Prof. P. G. H. Boswell, A. T. Hopwood and Dr. J. D. Solomon, The Oldoway Human Skeleton, 397
- Lecomte (J.), Infra-Red Absorption Spectra of some Halogen Derivatives of Methane, 738
- Lecoq (R.), Rôle of the B Vitamins in the Utilisation of the Glycides by the Organism of the Pigeon, 630
- Lee (C. E.), Hancock's Steam Omnibus, 647
- Lee (Dr. K.), Science and the Textile Industry, 162
- Lees (A.), Wave Equations and the Conservation of Energy, 402
- Leeson (H. S.), and K. Mellanby, Insects and Micro-Climates, 363
- Leeuw (Dr. J. J. van der), Inadequacy of Economic Sanctions, 867
- Le Fèvre (Dr. R. J. W.), Volumes of Alkyl Groups and their Orienting Powers, 655
- Legendre (Adrien Marie), Centenary of the death of, 18
- Leicester (P.), Geology of Rangoon, 916
- Leigh (Col. L.), Railway Electrification Experience, 649
- Lematte (L.), and E. Kahane, Silica in the Organism and the Siliceous Particles of the Blood, 523
- Leon (A. L.), bequest to London University, 408
- Leonard (Prof. A. G.), [death], 231
- Leprince-Ringuet (L.), [J. J. Trillat and], Molecular Phenomena at the Surface of Separation of Oil and Water, 850
- Leroux (L.), [R. Cambier and], Estimation of Organic Nitrogen in the Presence of Nitrates by Kjeldahl's Method, 179
- Le Roux (P.), Pleochroism of Iceland Spar in the Infra-Red Spectrum, 447
- Lespieau (R.), and Mlle. B. Gredy, Study of some  $\alpha$ -Ethylene Oxides, 447
- Lestouard (F.), [E. Sergent, A. Donatien, L. Parrot and], Experimental Suppression of Sexual Reproduction in *Theileria dispar*, 143
- Levaillant (R.), Action of Acid Chlorides on Orthoformic Esters, 36
- Lever (R. J. A. W.), Early History of the British Solomon Islands, 587
- Leverhulme (Viscount), elected president of the Institution of Chemical Engineers, 510
- Levi (G. R.), and D. Ghiron, Magnesium Chlorite and Double Chlorites of Copper with Magnesium, Barium, and Thallium, 775
- Levi-Civita (Prof. T.), Caratteristiche dei sistemi differenziali e propagazione ondosa. Lezioni raccolte dal Dr. G. Lampariello (*Review*), 45
- Levy (Prof. H.), The Irresponsibility of Science, 162
- Lewis (G. N.), Hydrogen Isotope, 590
- Lewis (Sir Thomas), appointed a member of the Medical Research Council, 581
- Lewis (W. V.), appointed university demonstrator in geography in Cambridge University, 628
- Liau (Ssu-Pin), [J. Dufay and], Absorption of Light in Interstellar Space, 923
- Libby and Latimer, Radioactivity of Some Rare Earth Elements, 368
- Libermann (D.), P. Carré and], Mechanism of the Reaction of Phosphorus Pentachloride on Neutral Alkyl Sulphites, 143; Reaction of Phosphorus Pentachloride on the Neutral Aryl Sulphites, 667
- Lien-Teh (Dr. Wu), [Dr. K. Chimin Wong and], History of Chinese Medicine: being a Chronicle of Medical Happenings in China from Ancient Times to the Present Period (*Review*), 527
- Lighthall (W. D.), Plan of Hochelaga, 64
- Lindemann (Prof. F. A.), and T. C. Keeley, Helium Liquefaction Plant at the Clarendon Laboratory, Oxford, 191
- Linehan (P. A.), and Prof. S. P. Mercer, Fluorescence in Rye-grasses, 474; Fluorescence of *Lolium* Seedlings in Ultra-Violet Light, 202



- Ling-Chao (Chien), [Ny Tsi-Ze and], Influence of Pressure on the Photographic Sensibility to various Monochromatic radiations, 286
- Lingood (F. L.), [S. G. Paine, Freda Schimmer, T. C. Thrupp and], Relationship of Micro-Organisms to the Decay of Stone, 178
- Link (F.), The Partial Eclipse of the Moon on Sept. 14, 1932, 179
- Linton (R.), Social Organisation and Marriage in Madagascar, 843
- Lipschütz (A.), Transplantation of Ovaries preserved outside the Organism, 143
- Lipscomb (A. G.), Cellulose Acetate: its Manufacture and Applications (*Review*), 454
- Littauer (S. B.), [M. Morse and], Fields in the Calculus of Variations, 631
- Little (J. E.), gift to Cambridge University, 700
- Lock (G.), Cannizzaro's Reaction (2), 560
- Lockyer (Dr. W. J. S.), Spectrum of  $\gamma$  Cassiopeiae, 134
- Lods (Prof. A.), translated by Prof. H. S. Hooke, Israel: from the Beginnings to the Middle of the Eighth Century (*Review*), 315
- Loeb (E. M.), Patwin and Maidu Cult Origins, 659
- Loewy (Maurice), centenary of the birth of, 497
- Lombard (A.), The Virgulian and the Stratigraphy of the Portlandian of the Col du Marchairuz Region, 815
- Longley (T. E.), Subsidence of London, 558
- Longley (Dr. W. H.), Taxonomy and Evolution, 863
- Lönngqvist (C.), Frequency of the Nova Phenomenon, 64
- Loofbourow (J. R.), [F. F. Heyroth and], Irradiation of Nucleic Acids and Uracil, 92
- Loomis (Dr. A. L.), [Dr. H. T. Stetson and], Tidal Shifts in the Earth's Crust, 137
- Loonam (A. C.), [G. H. Gleason and], Sewage Purification by a New Process, 697
- Loose (L.), and Dr. W. H. Pearsall, Synthesis of Protein by Green Plants, 362
- Loughnane (J. B.), Insect Transmission of Virus A of Potatoes, 838
- Lovat (Lord), [death], 266; [obituary article], 352
- Lowe (W. P.), The Trail that is always New (*Review*), 636
- Lowndes (A. G.), Sexual Reproduction in Copepods, 240
- Lowry (H. V.), [Dr. J. Prescott and], Elementary Trigonometry (*Review*), 420
- Lowry (Prof. T. M.), Modern Aspects of Chemistry in Space (*Review*), 563; and H. Hudson, Optical Rotatory Power (4), 374
- Lu [A. Travers and], Separation of Phosphoric, Arsenic and Vanadic Acids from Aluminium, 595; Volumetric Determination of Lead, 523
- Lucas (A.), Forensic Chemistry and Scientific Criminal Investigation. Second edition (*Review*), 115
- Lucas (R.), and M. Schwob, Anomalous Dispersion in Magnetic and Electric Double Refraction, 630
- Ludford (R. J.), Differences in the Growth of Transplantable Tumours in Plasma and Serum Culture Media, 250
- Ludlam [Ritchie and], A Gaseous Oxidation, 64
- Lugard (Lord), elected president of the Institut Colonial International, 683
- Lukaacs (L.), and J. Zellner, Chemistry of the Higher Fungi (22), 888
- Lundmark (Dr. K.), Mass of Eros, 31
- Luthi (R.), [Prof. J. Weigle and], Debye's Dispersion of Nitrobenzene, 327
- Luyten (W. J.), Faint Stars with Common Proper Motion, 625
- Lydall (F.), Electrification of Railways in Britain, 19
- Lynch (Col. A.), The Case Against Einstein (*Review*), 260; 622
- Lyons (Sir Henry), elected president of the Institute of Physics, 797
- Lyot (B.), Direct Observation of Solar Prominences at Meudon, 70; 332
- Lythgoe (R. J.), and Dorothy E. Corkill, Measurement of Visual Acuity, 98
- MacAdam (Dr. W.), elected professor of clinical medicine in Leeds University, 772
- McAlpine and Smyth, Polarity of Hydrocarbon Vapours, 517
- MacBride (Prof. E. W.), appointed chairman of the Advisory Committee on Fishery Research of the Development Commissioners, 871
- McCallien (W. J.), Preservation of Fossil Bones, 694
- McCallum (Dr. S. P.), and L. Klatzow, Conductivity of Mixtures of Gases, 841
- McCarthy (Isabella M.), [J. Algar, Eveline M. Dick and], Synthesis of Diflavones, 666
- McCoy (Elizabeth), [E. B. Fred, I. L. Baldwin and], Root Nodule Bacteria and Leguminous Plants, 99
- McClintock (Barbara), A Correlation of Ring-shaped Chromosomes with Variegation in *Zea mays*, 631
- Maccoll [Taylor and], Motion of a Cone at High Speeds in Air, 552
- McConnell (C. H.), Nerve-Net of Hydra, 207
- MacCulloch (Rev. Canon J. A.), Medieval Faith and Fable (*Review*), 80
- McCurdy (N. R.), [R. A. Watson and], Cyclone Season in the South Indian Ocean, 517; Pilot Balloon Observations at Mauritius, 626
- Macedougall (A. J.), appointed assistant lecturer in metallurgy in Sheffield University, 736
- Mace (C. A.), appointed reader in psychology at Bedford College, London, 772
- Macelwane (Rev. J. B.), and Rev. F. W. Sohon, Introduction to Theoretical Seismology. Part 2: Seismometry, by Rev. F. W. Sohon (*Review*), 824
- MacGregor (Dr. M. E.), [death], 86; [obituary article], 123
- Machebeuf (M. A.), [J. Basset and], Biological Effects of Ultra-Pressures, 251; [Mme. E. Woolman, M. Bardach and], Biological Effects of Ultra-Pressures, 774
- Machek (G.), Action of Gaseous Cyanogen on Phenols and Naphthols (2 and 3), 851
- McKenzie (D. B.), [T. E. Allibone, F. S. Edwards and], A New Impulse Generator for Three Million Volts, 129
- Mackenzie (J. E.), and H. W. Melville, Measurement of the Diffusion Coefficients of Bromine-Hydrogen and Bromine-Carbon Dioxide, 250
- Mackereth (J.), [death], 718
- Mackie (H. B.), Principles of Pharmacy (*Review*), 895
- Maclaren (N. H. W.), and Prof. T. H. Bryce, Early Stages in the Development of Cavia, 922
- McLaughlin (D. B.), Suggested Mechanism of Class *Be* Stars, 739
- McLennan (Prof. J. C.), and R. Turnbull, Ultra-Violet Absorption Bands of Xenon, 214
- Maclagan (D. S.), An Ecological Study of the Lucerne 'Flea', 556
- McNaughtan (F.), [V. A. Beckley and], Distribution of Nitrates in the Soil and Root Development in Coffee, 878
- McPetrie (J. S.), Production of Electronic Oscillations with a Two-Electrode Valve, 691
- Macrae (A.), Vocational Guidance and the Health of the Industrial Worker, 243
- Macrae (T. F.), [Dr. J. M. Gulland and], Action of Proteolytic Enzymes on the Oxytocic Principle of the Pituitary Gland, 470
- McVittie (Dr. G. C.), Milne's Theory of the Expansion of the Universe, 533
- McWhirter (W.), [obituary article], 427
- Maddocks (W. R.), appointed lecturer in metallurgy in Sheffield University, 736
- Magnan (A. and C.), Hot Wire Apparatus for the Study of the Air Movements produced by the Flapping Wing of a Bird or Insect, 923
- Magnan (Mlle. C.), [H. Bierry, B. Gouzon and], Application of the Iodometric Method to the Estimation of Sugar in the Blood, 667
- Mahanti (P. C.), Band Spectra of Barium Oxide (BaO), 402
- Mains (E. B.), Host Specialisation of *Erysiphe graminis Tritici*, 739



- Maire (R.), E. Foëx and G. Malençon, Etiology of 'Bayoud', a Disease of the Date Palm, 922
- Maulik (S. A.), Early Stages of Hispine Beetles, 171
- Maurain (C.), The Earthquake of March 2, 1933, 596
- Maiyabe (Prof. N.), [Prof. N. Nasu and], Landslide at Toge, Japan, 99
- Major (Prof. R. H.), Classical Descriptions of Disease: with Biographical sketches of the Authors (*Review*), 895
- Majorana (Q.), New Photoelectric Phenomenon Exhibited by Metallic Sheets, 559; Action of a Periodic Light Beam on Metallic Sheets, 447; A New Photoelectric Experiment, 71; A New Photoelectric Experiment, 107
- Malençon (G.), [R. Maire, E. Foëx and], Etiology of 'Bayoud', a Disease of the Date Palm, 922
- Malins (Majorie E.), [Prof. J. H. Priestley, Lorna I. Scott and], Cambial Activity, 375
- Malisoff (W. M.), Meet the Sciences (*Review*), 639
- de Malleman (R.), and P. Gabiano, Magnetic rotatory Power of Chlorine and of Hydrochloric Acid Gas, 286
- Mallock (R. M.), An Electrical Calculating Machine, 880
- Mankin (Winifred R.), Application of Optical Spectroscopy to Analysis of Tumour Tissue, 668
- Mann, An Optically Active Inorganic Salt, 808
- Mann (L. McL.), Preservation of Fossil Bones, 366
- Marconi (Marchese), Radio Communications by Very Short Electric Waves, 292
- Marinesco (N.), Preparation of Colloids by Ultra-Sonic Dispersion, 410
- Mark (Prof. H.), Structure of Cellulose, 591
- Markham (S. F.), [Sir Henry Miers and], The Museums and Art Galleries of British Africa, 430; Report on the Museums of Canada; Directory of Museums and Art Galleries in Canada, Newfoundland, Bermuda, British West Indies, British Guiana and the Falkland Islands, 84
- Marinesco (N.), and J. J. Trillat, Action of Ultra-Sounds on Photographic Plates, 667
- Marmite Food Extract Co., Ltd, The Medicinal and Dietetic Value of Marmite, 616
- Marett (Dr. R. R.), Faith, Hope and Charity in Primitive Religion (*Review*), 9
- Marsh (M. C.), Transmission of Heat through Fabrics, 558
- Marshall (A.), Chemical Examination of Explosives (*Review*), 186; Explosives: their History, Manufacture, Properties and Tests. Second edition. Vol 3 (*Review*), 452
- Marshall (C. F. D.), Hancock's Steam Omnibus, 647
- Marshall (Sir John), awarded the gold medal of the Royal Asiatic Society of Bombay, 683
- Marshall (J. F.), and J. Staley, A New British Record of *Orthopodomyia pulchripalpis*, Rondani (Diptera, Culicidae), 435
- Marshall (W. B.), and E. O. Bowles, New Fossil Fresh Water Molluscs from Ecuador, 589
- Martin (H.), Present Uses and Future Development of Spray Spreaders, 768
- Martin (Dr. A. R.), Rôle of the Solvent in Electrolytic Dissociation, 584
- Martin (L. H.), and K. C. Lang, Thermal Conductivity of Water, 813
- Martindale (Dr. W. H.), The Extra Pharmacopœia of Martindale and Westcott. Twentieth edition. In 2 vols. Vol. 1: (*Review*), 6
- Marvin (Prof. F. S.), A Symposium on Science (*Review*), 674
- Mason (T. N.), and F. V. Tidswell, Gob Fires, 521
- Massee (A. M.), Some Injurious and Beneficial Mites on Top and Soft Fruits, 136
- Massey and Mohr, Electron Scattering by Atoms, 368
- Mathias (E.), Study of Fulminating Material, 482
- Mathieu (J. P.), Compounds of Tartaric Acid and Chromium, 106
- Matignon (C.), H. Moureu and M. Dodé, Causes of the Simultaneous Production of 1-butene and 2-butene, 738; and J. Calvet, Ageing of the Aluminium-Beryllium Alloys after Tempering, 886; and M. Séon, Action of Steam on Hexane, 286; Action of Steam on Heavy Petroleum Oils and on certain Cyclic Hydrocarbons, 523; Action of Steam on Methane, 215
- Matuyama (E.), Band Spectra which Appear near Visible Triplet Lines of Mercury, 58
- Maulik (S.), Antennal Secretion in Insecta, 516
- Maume (L.), [H. Lagatu and], Comparative Composition, in the Vine, of Homologous Leaves, etc., 815
- Maunder (Mrs. A. S. D.), The Sothic Cycle, 332
- Maurain (C.), and J. Devaux, Electrical Conductivity and Atmospheric Condensation Nuclei during a Voyage to Greenland, 35; Total Calorific Radiation in Greenland, 106
- Mawson (Dr. C. A.), appointed for biochemical investigations at the Research Institute of the Cancer Hospital, 500
- Mawson (Sir Douglas), Geology and Glaciation of some Islands of the Southern Ocean, etc., 847
- Maxwell (Sir George), Case for a Colonial Educational Conference, 812
- Maxwell, Bt. (Sir Herbert), The Borrowed Days, 515
- Maxwell (E. A.), awarded a Smith's prize of Cambridge University, 408
- Mayr (K.), Definite Integrals with Bessel's Functions, 703
- Mead (A.), [Dr. C. H. Johnson and], Line Absorption of Chromic Salts in Relation to Co-ordination, 399
- Mead (Dr. Margaret), The Changing Culture of an Indian Tribe (*Review*), 711
- Megaw (E. C. S.), Ultra-Short-Wave Radio Research, 269
- Mégroz (R. L.), Ronald Ross: Discoverer and Creator (*Review*), 40
- Meikle (Miss Agnes A.), [L. A. L. King and], A Fly Pest of Timothy Grass, 837
- Meksyn (Dr. D.), Neutrons, 366
- Melchett (Lord), acceptance of presidency of the British Science Guild, 798
- Meldrum (Dr. A. N.), Priestley as a Practical Chemist, 801; the Scientific Work of Priestley, 555
- Meldrum (late Dr. N. U.), and Dr. F. J. W. Roughton, Carbonic Anhydrase and the State of Carbon Dioxide in Blood, 874
- Mellanby (Prof. E.), resignation of the chair of pharmacology in Sheffield University, 884
- Mellanby (K.), [H. S. Leeson and], Insects and Micro-Climates, 363
- Melland (F. H.), Witchcraft in Africa, 195
- Mellor (D. P.), [F. P. Dwyer and], Occurrence of  $\beta$ -Cristobalite in Australian Opals, 524
- Mellor (Dr. J. W.), A Comprehensive Treatise on Inorganic and Theoretical Chemistry. Vol. 12 (*Review*), 638
- Melton (Prof. F. A.), and W. Schriever, Meteor Craters, 100; Probable Meteorite Scars in Carolina, 624
- Melville (H. W.), and H. L. Roxburgh, Upper Limit in Explosive Chain Reactions, 690; [J. E. Mackenzie and], Measurement of the Diffusion Coefficients of Bromine-Hydrogen and Bromine-Carbon Dioxide, 250
- Mémery (H.), L'Influence Solaire et les Progrès de la Météorologie, 591; Remarkable Epoch of Solar Activity, 559
- Menzel (D. H.), a Simple Derivation of the Dissociation Formula, 739
- Mercier (F.), [L. J. Mercier and], New Method of Preparing Marrubiine, 143
- Mercer (Lineham and], Fluorescence in Rye-grasses, 474
- Mercer (Prof. S. P.), [P. A. Lineham and], Fluorescence of *Lolium* Seedlings in Ultra-Violet Light, 202
- Merck (Dr. W.), [obituary article], 298
- Mercier (L. J.), and F. Mercier, New Method of Preparing Marrubiine, 143
- Mercier (R.), Paramagnetism of the Ion of Dissolved Cobalt, 338
- Merrill (Dr. E. D.), elected a foreign member of the Linnean Society of London, 759
- Merrill (Dr. P. W.), Radial Velocities of Variable Stars, 917
- van der Merwe (D. S.), Vanished Races in South Africa, 392
- Merwin (H. E.), [J. W. Greig, E. S. Shepherd and], Volatile Transport of Silica, 768
- Messer (M.), An Agricultural Atlas of England and Wales. Second edition (*Review*), 420



- Metropolitan-Vickers Electrical Co., Ltd., Research Work of the, 126; 649
- Metz (K.), A Fauna from the Hochwipfel Strata of the Carinthian Alps; the Nassfeld Strata from Schulterkofel Westwards, 287
- Meyer (A.), and M. Tuot, Dehydration of some Tertiary Alcohols by Anhydrous Copper Sulphate, 851
- Meyer (F.), [E. Cherbuliez and], New Researches on Casein, 215
- Meyer (M.), [G. Darzens and], New General Method for the Synthesis of Aldehydes, 483
- Mezincesco (P.), [E. F. Terroine, Mlle. Simone Valla and], Utilisation of Sulphur and Nitrogen from Cystine at the Level of Endogenous Protein Metabolism, 483
- Mezzadrolì (G.), and A. Amati, Action of certain Alkaloids on the Development of *Aspergillus niger*, 339
- Micheel (Dr. F.), and K. Kraft, Constitution of Vitamin C, 274
- Michels (Dr. W. C.), [Dr. W. R. Smythe and], Advanced Electrical Measurements (*Review*), 322
- Middleton (A.), [W. E. Williams and], Fine Structure of the Resonance Ag I Lines, 692
- Middleton (A. D.), The Grey Squirrel (*Review*), 45
- Miers (Sir Henry), and S. F. Markham, The Museums and Art Galleries of British Africa, 430; Report on the Museums of Canada; Directory of Museums and Art Galleries in Canada, Newfoundland, Bermuda, British West Indies, British Guiana, and the Falkland Islands, 84
- Mihul (C.), [T. V. Ionescu and], Ionised Gases in the Magnetic Field, 106
- Mihul (Mme. Irène), [T. V. Ionescu and], High-Frequency Discharge in Gases, 887
- Mikkelsen (Capt. E.), Spread of Eskimo in Greenland, 367
- Miles (Dr. G. H.), [H. J. Welch and], Industrial Psychology in Practice (*Review*), 567; The Problem of Incentives in Industry (*Review*), 321
- Mill (Dr. H. R.), An Approach to Geography, 68
- Milford (M.), [A. Egerton and], Fusion of Carbon, 169
- Miller (Dr. D.), Chilean Insect Parasites for New Zealand, 283
- Miller (Dr. J. L.), and J. E. L. Robinson, awarded the Institute of Physics prize, 467
- Millis (C. T.), Education for Trades and Industries: a Historical Survey (*Review*), 44
- Mitchell (A. Crichton), Diurnal Incidence of Disturbance in the Terrestrial Magnetic Field, 446
- Mitchell (Dr. A. D.), and Dr. A. M. Ward, Modern Methods in Quantitative Chemical Analysis (*Review*), 531
- Mitchell (Dr. C. A.), [Dr. B. Dyer and], The Society of Public Analysts and other Analytical Chemists (*Review*), 822
- Mitchell (J. H.), Pit-Head Baths, 207
- Mitolo (M.), Avitaminosis and Intoxication (1), 411; (2), 284
- Mitra (Kalipada), Mother Goddess in India, 207
- Mitra (Prof. S. K.), and H. Rakshit, Recording Wireless Echoes at the Transmitting Station, 657
- Mitra (S. M.), [K. S. Krishnan and], Negative Polarisation in Fluorescence, 204
- Mittasch (Dr. A.), and Dr. E. Theis, Von Davy und Döbereiner bis Deacon: ein halbes Jahrhundert Grenzflächenkatalyse (*Review*), 150
- Modi (Sir Jivanji Jamshedji), [obituary article], 645
- Moelwyn-Hughes (E. A.), [C. N. Hinshelwood, A. C. Rolfe and], Combination of Hydrogen and Oxygen in a Silver Vessel, 142
- Mohr (C. B. O.), and F. H. Nicoll, Inelastic Electron Scattering in Gases; Large Angle Scattering of Electrons in Gases, 143; [Massey and], Electron Scattering by Atoms, 368
- Mohr (Dr. O. L.), Woolly Hair in a Nordic Pedigree, 695
- Moir, Bt. (Sir Ernest), [obituary article], 901
- Mollard (M.), Attenuation of the Chlorophyll shown by Parasitic Green Plants, 178
- Moll (Dr. W. J. H.), [Dr. L. S. Ornstein, Dr. H. C. Burger and], Objektive Spektrophotometrie (*Review*), 824
- Monchal (Mlle. S.), [J. Beauverie and], Life of Green Plants in a Confined Atmosphere, 36
- Mondain-Monval (P.), and R. Wellard, Direct Oxidation of Acetylene by Air, 851
- Monod (J.), Axial Gradient in the Ciliated Infusoria, 339
- Monier, Jr. (J. A.), [C. Dufraisse and], Dissociable Organic Oxides, 887
- Monier-Williams (G. W.), Freezing-Point of Milk, 702
- Monnier (R.), [G. Gutzeit and], Utilisation of some Azo Derivatives of Oxyquinoline as Reagents in Qualitative Analysis, 144
- Monod (Dr. T.), Saharan Rock-Engravings, 551
- Moody (A. F.), Water-Fowl and Game-Birds in Captivity: some Notes on Habits and Management (*Review*), 316
- Moon (C. H.), [Prof. W. E. Garner and], Acceleration of the Decomposition of Crystals of Barium Azide by the Emission from Radium Emanation, 513
- Moore (Prof. E. H.), [death], 195
- Moore (Prof. J. P.), Land Leeches, 63
- Moore (T.), [Dr. P. Bowden and], Absorption Spectrum of the Vitamin E Fraction of Wheat-Germ Oil, 512
- Moppett (W.), Experiments in which the Allantoic Membrane of the Chick is Exposed to X-Radiation, 667
- Morand (M.), and A. Hautot, Fine Structure of the Carbon Line  $K_{\alpha}$ , 143
- Morgan (Prof. T. H.), The Scientific Basis of Evolution (*Review*), 380
- Morgan (William), Centenary of the death of, the work of, 612
- Morita [Obata, Yosida and], Aeroplane Noises, 208
- Morris (Sir Daniel), [death], 231; [obituary article], 266
- Morris (S. D. D.), [Dr. F. P. Bowden, Dr. C. P. Snow and], Absorption Spectrum of Vitamin A at Low Temperatures, 582
- Morrison (Prof. J. T. J.), [death], 718
- Morse (M.), and S. B. Littauer, Fields in the Calculus of Variations, 631
- Morton (Dr. R. A.), and J. R. Edisbury, Absorption Spectrum of the Unsaponifiable Matter from Wheat-Germ Oil, 618
- Moshinsky (Pearl), [J. L. Gray and], Genetic Psychology (1), 922
- Mott [Ellis and], Internal Conversion of  $\gamma$ -Rays, 517
- Mott [H. M. Taylor and], Internal Conversion of  $\gamma$ -Rays, 99
- Mourant (A. E.), Dehydration of Thomsonite, 630
- Moureu (H.), [C. Matignon, M. Dodé and], Causes of the Simultaneous Production of 1-butene and 2-butene, 738
- Mrazek (S.), [W. Kemula and], Measurements of the Absorption of Ultra-Violet Rays by Methane, Ethane and Normal Butane in the Gaseous Condition, 106
- Mukerji (B. L.), [Prof. N. R. Dhar, A. K. Bhattacharya and], Kinetics of the Iodine-Oxalate Reaction, 840
- Müller (Dr. A.), Crystal Structure of the Normal Paraffins, 100
- Muller and Desmarez, Differential Microscopic Characters of the Bone of Adult *Cynocephalus* and of Human Bone, 739
- Muller (J. A.), and Mlle. Eglantine Peytral, The Sudden Pyrogenation of Ketene, 375
- Müller (W. J.), Theory of Passivity Phenomena (18), 888
- Munn (L.), Prehistoric Gold-Mining in South India, 730
- Munro (G. H.), and L. G. H. Huxley, Atmospheric in Australia, 592
- Munro (Prof. J. W.), Infestation of Stored Products by Insects, 82
- Murison (C. A.), [Prof. G. P. Thomson and], Electron Diffraction by Films of Grease, 237; N. Stuart and], Crystalline State of Thin Splattered Films of Platinum, 522
- Murphy (Prof. P. A.), awarded the Boyle medal of the Royal Dublin Society, 683
- Murray (Sir Hubert), and others, Depopulation in Papua, 519
- Muskett (A. E.), [H. Cairns and], *Phytophthora megasperma* causing Pink Rot of the Potato, 277



- Myers (Dr. C. S.), Business Rationalisation, its Dangers and Advantages considered from the Psychological and Social Standpoints (*Review*), 567; The Absurdity of any Mind-Body Relation, 579
- Myrbach (Dr. O.), Wanderers Wetterbuch: Einführung in das Verständnis der Wettervorgänge (*Review*), 786
- Nádai (Dr. A.), assisted by A. M. Wahl, Plasticity: a Mechanics of the Plastic State of Matter (*Review*), 383
- Naimsmith (R.), [Prof. E. V. Appleton and], Kennelly-Heaviside Layer, 808; Weekly Measurements of Upper Atmospheric Ionisation, 522
- Nall (G. H.), The Life of the Sea Trout, especially in Scottish Waters: with Chapters on the Reading and Measuring of Scales (*Review*), 42
- Nancarrow (H. A.), Determination of the Thermal Conductivities of Rocks, 702
- Narlikar (Prof. V. V.), The Constant of Gravitation, G, 134
- Nasu (Prof. N.), and Prof. N. Miyabe, Landslide at Toge, Japan, 99
- Natta (G.), and R. Pirani, Solid Solutions by Precipitation, etc. (2), 107
- Naudé (S. M.), and J. E. C. Coventry, Intensity of Cosmic Radiation in South Africa, 411
- Naumann (Prof. E.), Grundzüge der regionalen Limnologie (*Review*), 223
- Navashin (M.), Origin of Spontaneous Mutations, 436
- Neave (Dr. S. A.), assisted by F. J. Griffin, The History of the Entomological Society of London, 1833-1933 (*Review*), 678
- Needham (Dr. N. J. T. M.), appointed Sir William Dunn reader in biochemistry in Cambridge University, 408
- Nef (Prof. J. U.), The Rise of the British Coal Industry. 2 vols. (*Review*), 311
- Negretti and Zambra, Humidity Tables, 589
- Némec (Prof. B.), sixtieth birthday of, 355
- Neville (G. H. J.), [Dr. R. G. W. Norrish and], Photosensitised Decomposition of Ozone by Chlorine, 544
- Newbigin (Dr. Marion I.), Southern Europe: a Regional and Economic Geography of the Mediterranean Lands (Italy, Spain, Portugal, Greece, Albania and Switzerland, (*Review*), 317
- Newitt (D. M.), and A. M. Bloch, Slow Combustion of Ethane at High Pressures, 214
- Newman (Sir George), The Debt of Preventive Medicine to Harvey and the College of Physicians (Harveian Oration), 407
- Newton (J. D.), [W. E. Bowser and], Effect of Weed-Killers on the Soil, 880
- Nicholetts (Flight-Lieut. G. E.), [Squadron-Leader O. R. Gayford and], New Record for Non-Stop Flight, 232; awarded the British silver medal of the Royal Aeronautical Society, 685
- Nichols (H. W.), and P. C. Orr, Bakelite Impregnation of Fossil Bones, 127
- Nichols (Dr. J. E.), Origin of Curls and Twists in Wool Fibres, 201
- Nicoll (F. H.), [C. B. O. Mohr and], Inelastic Electron Scattering in Gases; Large Angle Scattering of Electrons in Gases, 143
- Nicolle (Dr. C.), 'Diffusion' and Disease, 879; J. Laigret and P. Giroud, Passage of the Virus of Exanthematic Fevers by the Digestive Canal in the Rat, 375
- Niebuhr (Carsten), bicentenary of the birth of, 354
- Nielsen (E.), The Biology of Spiders: with especial Reference to the Danish Fauna. 2 vols. (*Review*), 149
- Nierenstein (Dr. M.), Incunabula of Tannin Chemistry (*Review*), 823; and P. F. Chapman, The Authorship of the "Ordinal of Alchemy", 520
- Niggli (Prof. P.), The Process of Metamorphism in Rocks (*Review*), 310
- Nightingale (E.), [F. Fairbrother and], General Science. Part 1 (*Review*), 420
- Nisbet (R. H.), Fourier Analysis and Vowel Curves, 401
- Nitzberg (G.), [Mme. Y. Khouvine and], Identification and Biochemical Oxidation of  $\alpha$ -Glucosylulose, 339
- Noakes (Miss D. M.), [J. M. Kennedy and], Costs of Electricity Supply and Distribution, 358
- Nolan (J. J.), and J. G. O'Keefe, Multiply-charged Large Ions, 106
- Nolan (P. J.), Influence of Condensation Nuclei and Dust Particles on Atmospheric Ionisation, 922
- Norman (Dr. A. G.), and S. H. Jenkins, Lignin Content of Cellulose Products, 729
- Norrish [Kirkbride and], Photochemical Decomposition of Diazomethane, 404
- Norrish (Dr. R. G. W.), and G. H. J. Neville, Photosensitised Decomposition of Ozone by Chlorine, 544
- Norwood (Dr. C.), Use of the English Language, 197; 741
- Noskov (Dr. M.), [Dr. I. Kikoin and], A New Type of Photoelectric Effect in Cuprous Oxide in a Magnetic Field, 725
- du Noüy (Dr. P. Lecomte), Improvements to the Hydrogen Electrode for the Measurement of Hydrogen Ion Concentration in Solutions, 179; Surface Tension of Colloidal Solutions, and the Action of Light on Soap Solutions, 689
- Novi (Prof. I.), Influence of Sodium and Potassium Ions in Yeast Growth, 63
- Nowakowski (A.), [K. Boratynski and], Modifications of Phosphoric Anhydride, 595
- Nuttall (Mrs. Zelia), [death], 830
- Obata, Morita and Yosida, Aeroplane Noises, 208
- Oberholser (H. C.), Birds of the Natuna Islands, 207
- O'Brien (J. R.), [R. D. Heard, H. W. Kinnersley, Prof. R. A. Peters, V. Reader and], Vitamin B<sub>4</sub> and Adenine, 617
- Occhialini (G.), [P. M. S. Blackett and], Wilson Photographs of Cosmic Ray Phenomena, 589; [Dr. J. Chadwick, P. M. S. Blackett and], New Evidence for the Positive Electron, 473; [P. M. S. Blackett and], Photography of the Tracks of Penetrating Radiation, 286
- Odelstierna (Prof. E. G.), [death], 538
- Offord (J. M.), elected president of the Quekett Microscopical Club, 272
- Öfverholm, Electrification of the Swedish State Railways, 199
- Ogden (C. K.), Bentham's Theory of Fictions (*Review*), 152
- Oguma (K.), and S. Kakino, Chromosome Numbers in Vertebrates, 403
- Ohlsson (J.), Tables for Galactic Co-ordinates, 100
- Okada (Dr. Yaichiro), Sponges from the North-Western Pacific, 279
- O'Keefe (J. G.), [J. J. Nolan and], Multiply-charged Large Ions, 106
- Oldenbach (Rev. F. L.), [obituary], 830
- O'Malley (L. S. S.), Indian Caste Customs (*Review*), 638
- Opik (E.), Perturbations of Comets by the Stars, 209
- Orchard (O. B.), [W. H. Read and], Disinfection of Glass-houses with Sulphur, 844
- Ornstein (Dr. L. S.), Dr. W. J. H. Moll und Dr. H. C. Burger, Objektive Spektralphotometrie (*Review*), 824
- Orr (P. C.), [H. W. Nichols and], Bakelite Impregnation of Fossil Bones, 127
- Orr (Dr. W.), and Dr. F. F. Darling, Sterility in Domesticated Animals, 200
- Orton (Prof. J. H.), Some Limiting Factors in the Environment of the Common Limpet, *P. vulgata*, 693; Strange Spatfall of the Common Mussel on the Common Cockle, 513; Miss M. W. Parke and W. C. Smith, Breeding of Oysters (*O. edulis*) at Port Erin, 26
- Osawa (S.), Abnormal Movability of the Heart, 241
- Osborn (Prof. H. F.), Aristogenesis, 768; Biological Inductions from the Evolution of the Proboscidea, 775; China and American Scientific Expeditions, 87; elected honorary president of the American Museum of Natural History, 236



- Osborn (T. G. B.), J. G. Wood and T. B. Paltridge, Growth and Reaction to Grazing of the Perennial Saltbush, *Atriplex vesicarium*, 631
- Osborne (N. S.), and others, Steam Tables, 624
- Osborne (Prof. W. A.), 'Raw' Weather, 515
- Osgood (Dr. C. M.), Great Bear Lake Indians, 623
- Pagden (H. T.), appointed entomologist of the British Solomon Islands Protectorate, 687
- Pahl (Dr. M.), [Prof. G. Hevesy and], Range of Radiation from Samarium, 434
- Paillard (H.), and R. Duckert, Catalytic Oxidation of Acenaphthene, 815; and P. Favarger, Chlorination of Acenaphthene, 815
- Paine (S. G.), F. L. Lingood, Freda Schimmer, and T. C. Thrupp, Relationship of Micro-Organisms to the Decay of Stone, 178
- Paltridge (T. B.), [T. G. B. Osborn, J. G. Wood and], Growth and Reaction to Grazing of the Perennial Saltbush, *Atriplex vesicarium*, 631
- Panay (T. N.), Integral Radiator (Black Body) of Electrically Heated Carbon, 179
- Pandalai (Madhusudan), [G. Gopala Rao and], Sodium Sulphite in Photographic Developing Solutions, 100
- Paneth (Prof. F. A.), and P. L. Günther, Chemical Detection of Artificial Transmutation of Elements, 652
- Pariselle, Change of Sign of the Rotatory Power and of Mutarotation, 702
- Parisi (E.), and G. De Vito, Distribution of Nitrates and 'Organisation' of Nitrogen in the Leaves of Green Plants, 107
- Park (Dr. W. H.), awarded the Public Welfare medal of the U.S. National Academy of Sciences, 754
- Parke (Miss M. W.), [Prof. J. H. Orton, W. C. Smith and] Breeding of Oysters (*O. edulis*) at Port Erin, 26
- Parker (G. H.), Cellular Transmission of Neurohumoral Substances in Melanophore Reactions, 776
- Parkinson (Dr. J.), Central African Volcanoes (*Review*), 821
- Parr (late Prof. S. W.), The Analysis of Fuel, Gas, Water and Lubricants. Fourth edition (*Review*), 860
- Parravano (N.), and O. D'Agostino, Velocity of Dissolution of Industrial Aluminas in Fused Cryolite, 107
- Parrington (F. R.), awarded the Balfour studentship in biology of Cambridge University, 336
- Parrot (L.), [E. Sergent, A. Donatien, F. Lestoquard and], Experimental Suppression of Sexual Reproduction in *Theileria dispar*, 143
- Parsons (C. W.), Penguin Embryos, 695
- Partington (Prof. J. R.), The Scientific Work of Joseph Priestley, 348
- Pascal (P.), and Mme. Réchid, Preparation of the Dimetaphosphates, 666
- Pascher (Prof. A.), elected a foreign member of the Linnean Society of London, 759
- Patterson (H. S.), [Dr. W. Cawood and], A New Temperature Recorder, 332
- Patterson (Prof. T. S.), Priestley as a Practical Chemist, 690
- Patton (R. T.), Ecological Studies in Victoria (1), 703
- Paul (Dr. J. Harland), The Last Cruise of the *Carnegie* (*Review*), 114
- Pauling (L.), [L. O. Brockway and], Determination of the Structures of the Hexafluorides of Sulphur, Selenium and Tellurium by the Electron Diffraction Method, 739
- Payman (Dr. W.), Recent Developments in Coal-Mining Explosives, 846
- Payne-Scott (Miss R.), Relative Intensity of Spectral Lines in Indium and Gallium, 365
- Pearl (Prof. R.), Influence of Density of Population upon Egg Production in *Drosophila*, 176
- Pearson (Dr. J.), Marine Biology in Ceylon, 54
- Pearson (Dr. T. G.), Carbonyls of Lithium, Rubidium and Caesium, 166; [E. E. Aynsley, Dr. P. L. Robinson and], New Experimental Evidence in the Sulphur-Hydrogen Reaction, 471
- Pearsall (Dr. W. H.), [L. Loose and], Synthesis of Protein by Green Plants, 362; and P. Ulyott, Measurement of Light for Biological Purposes, 694
- Pearson (Dr. J.), Whale Shark in the Waters around Ceylon, 729
- Peck (B. M.), Illumination of Nebulosity surrounding a Nova, 808
- Peddle (Prof. W.), Phenomenal Regression to the Real Object, 544
- Peers (Sir Charles Reed), appointed a trustee of the British Museum, 164; awarded the Royal gold medal of the Royal Institute of British Architects, 236; presented with the Royal gold medal of the Royal Institute of British Architects; the work of, 497; The Ancient Monuments of England, 253
- Penfold (A. R.), [A. E. Bradfield, J. L. Simonsen and], Essential Oil from the Wood of *Eremophila Mitchellii*, 667
- Penlington (H. N.), Unemployment and the Schools, 578
- Penrose (H. J.), World's Record for a Two-Seater Aircraft, 160
- Pepys (Samuel), and Christ's Hospital, 267; Tercentenary of; and Royal Society, 299; Tercentenary of, 354
- Perakis (N.), and L. Capatos, Constant Paramagnetism of Metallic Rhenium, 559
- Pérard (A.), and M. Romanowski, First Comparisons of the National Standards of Electrical Resistance, 887
- Percival (Prof. E.), Trout Fishing in New Zealand, 163
- Percival (E. G. V.), [Dr. E. L. Hirst, F. Smith and], Constitution of Ascorbic Acid, 617
- Perier (A.), Influence, in a Homogeneous Ethnic Group, of the Variation of the Cephalic Index on that of the Alveolo-Palatinal and Superior Facial Indices, 815
- Perret (A.), [R. Perrot and], The Cyanide-Cyanamide Equilibrium, 375
- Perrot (R.), [A. Perret and], The Cyanide-Cyanamide Equilibrium, 375
- Perry (E. V. V.), [M. E. F. Crawford, Dr. S. S. Silva and], Vitamin Content of Australian, New Zealand and English Butters, 770
- Petermann (B.), translated by M. Fortes, The Gestalt Theory and the Problem of Configuration (*Review*), 604
- Peters (Prof. R. A.), [R. D. Heard, H. W. Kinnersley, J. R. O'Brien, V. Reader and], Vitamin B<sub>4</sub> and Adenine, 617
- Petit (G.), [G. Grandidier et], Zoologie der Madagascar (*Review*), 748
- Petrie (Sir Flinders), Old Gaza, 868
- Pettersson (Dr. H.), and B. Kullenberg, Boundary Tides in the Kattegat, 586
- Peytral (Mlle. Eglantine), [J. A. Muller and], The Sudden Pyrogenation of Ketene, 375
- Pfeiffer (G.), [G. Koller and], Constitution of Pinastic Acid; Galabratric Acid, 411
- Philips Industrial, Philips Sodium Lamp, 440
- Phillips (H.), [F. E. Humphreys and], Examination of Leather for the Presence of Extractable Chromium Compounds, 813
- Philp (J.), [Dr. F. W. Sansome and], Recent Advances in Plant Genetics (*Review*), 185
- Piaggio (Prof. H. T. H.), Ambiguity in Sign of Spearman's General Factor, 170; Cantor: the Mathematician of the Infinite (*Review*), 418
- Picard (M.), and A. Stampa, A New Form of Silver Voltmeter, 666
- Picard (Prof. J.), [death], 646
- Pickett (Lucy W.), Crystal Structure of Diphenyl Series, 513
- Pickles (Dr. S. S.), Rubber Research, 273
- Picon, Preparation and Properties of Thallous Thio-carbonate, 179; Thorium Sulphide, 70
- Pierson (R. K.), Fusion of Pycniospores with Filamentous Hyphae in the Pycnium of the White Pine Blister Rust, 728
- Pietschmann (V.), Three New Fish Species (Cyprinides) from Asia Minor, 704
- Pignol (Dr. R.), Rainfall in Dahomey, 208



- Pilgrim (Dr. G. E.), British Museum (Natural History) Catalogue of the Pontian Carnivora of Europe in the Department of Geology (*Review*), 454
- Piper (Dr. S. H.), Laboratory Vacuum Technique, 65
- Pippard (Prof. A. J. S.), appointed professor of civil engineering at the Imperial College—City and Guilds College, 480
- Pippard (Prof. S.), Contribution of Science in the Development of Aeronautics, 65
- Pirani (R.), [G. Natta and], Solid Solutions by Precipitation, etc. (2), 107
- Pirie (Dr. N. W.), appointed university demonstrator in biochemistry in Cambridge University, 628
- Pitt-Rivers (Capt. G.), Ethnogenics, 89
- Plaskett (Prof. H. H.), Observational and Theoretical Astronomy, 648
- Plasmann (Dr. J.), Variable Star Delta Orionis, 661
- Player (E. S.), Be Your Own Weather Prophet: a Book for the Holidays and After (*Review*), 712
- Pluvinel (A. de La Baume), and D. Barbier, Total Eclipse of the Sun on August 31, 1932, 922
- Podhradsky (Dr. J.), Influence of Living-Space upon Growth, 29
- Pohl (Prof. R. W.), Einführung in die Mechanik und Akustik. Zweite Auflage (*Review*), 568; translated by Winifred M. Deans, Physical Principles of Mechanics and Acoustics (*Review*), 320
- Polanyi (Dr. M.), appointed professor of physical chemistry in Manchester University; the work of, 902
- Pollard (E. C.), Entry of the Disintegrating Alpha Particle into the Nitrogen Nucleus, etc., 375; Heights of Nuclear Potential Barriers, 97; Heights of Nuclear Potential Barriers and Nuclear Structure, 398; Law of Force between Neutron and Proton, 814; Protons Produced in the Artificial Disintegration of the Nitrogen Nucleus, 482
- Pongratz (A.), [H. Kopper and], Raman Effect (24), 251
- Ponte (G.), Volcanic Fumaroles, 923
- Poole (Dr. H. H.), and Dr. W. R. G. Atkins, Photocells of the Dry Rectifier Type for the Measurement of Daylight, 850; Reversal of Current in Rectifier Photocells, 547; Reversal of the Current from a Cuprous Oxide Photocell in Red Light, 133
- Poole (Dr. J. H. J.), Behaviour of Neon Discharge Tubes in a Flashing Capacity Circuit by means of a Cathode Ray Oscillograph, 35; Radioactivity of Samarium and the Formation of Hibernium Halos, 654
- Porter (Prof. J. G.), [death], 830
- Porter (Dr. T. C.), [death], 496
- Posejpal (V.), Atomic Radius of Carbon in the Diamond, 410
- Potts (F. A.), [L. A. Borradaile and], The Invertebrata: a Manual for the use of Students. With chapters by Prof. L. E. S. Eastham and J. T. Saunders (*Review*), 76
- Poultney (F. C.), [Prof. R. Whiddington and], Energy of the Beams in Electron Diffraction, 814
- Powell (Dr. C. F.), and Luang Brata, Positive Ion Emission from Oxide Catalysts, 168
- Praeger (Dr. R. Lloyd), Origin of the Irish Flora and Fauna, 279, 579; Some Noteworthy Irish Plants, 172
- Prashad (Dr. B.), the late Lieut.-Col. A. W. Alcock, 906
- Pratesi (P.), Action of Alkaline Hypoiodites on the Pyrrolic Aldehydes, 924; Thiocyno- and Thiopyrroles and Pyrrole Disulphides, 411
- Prescott (Dr. J.), and H. V. Lowry, Elementary Trigonometry (*Review*), 420
- Prévost (C.), An Iodo-silver-benzoic Complex and its Application to the Oxidation of Ethylene Compounds into  $\alpha$ -Glycols, 774
- Prévot (E.), Influence of the Daily Oscillations of the Vertical on the Results of High Precision Levelling, 559
- Price (E. W.), Trematodes of Marine Mammals, 243
- Price (H.), An Account of some Further Experiments with Rudi Schneider; a Minute-by-Minute Record of 27 Séances (*Review*), 489; Further Light on the Schneider Mediumship, 658
- Price (J. B.), Winter Territory amongst Birds, 730
- Friday (T.), [H. Leak and], Migration from and to Great Britain, 125
- Priestley (Joseph), bicentenary of the birth of, 354; 498
- Priestley (Prof. J. H.), Lorna I. Scott and Marjorie E. Malins, Cambial Activity, 375
- Prince (Major C. E.), The Practical Applications of Light-Sensitive Apparatus, 430
- Prins (J. A.), Diffraction of Electrons in Amorphous and in Crystalline Antimony, 760
- Prosad (Prof. K.), and S. Sharan, Supersonic Vibrations set up in a Zinc Bar undergoing Transverse Vibrations, 803
- Proudman (Prof. J.), elected professor of oceanography in Liverpool University; the work of, 391
- Pryde (J.), and R. T. Williams, A New Unsaturated Derivative of Glucuronic Acid, 57
- Przibram (Prof. K.), Recrystallisation and Blue Rock-Salt (1, 2, 3), 287; Recrystallisation and Coloration (3); Plasticity and Hardness of Crystals of Alkali Metal Halides, 560
- Pugsley (H. W.), Daffodils, Narcissi and their Hybrids, 517
- Pull (J. H.), The Flint Miners of Blackpatch (*Review*), 677
- Purser (J.), appointed professor of civil engineering in Dublin University, 772
- Pyne (G. T.), and J. J. Ryan, Colloidal Calcium Phosphate of Milk, 35
- Quagliariello (G.), Presence in the Bile of an Enzyme which dehydrogenates Stearic Acid, 411
- Quarrell (A. G.), [Prof. G. I. Finch and], Crystal Structure and Orientation in Thin Films, 877; Determination of Crystal Lattice Constants by Electron Diffraction, 842; Structure of Magnesium, Zinc and Aluminium Films, 482
- Quastel (Dr. J. H.), Glutathione, Iodoacetic Acid and Glucose Metabolism, 206
- Quileo (A), and A. di Capua, Aspergillin, the Pigment of the Spores of *Aspergillus niger* (1), 851; (2), 924
- Quill (L. L.), [B. S. Hopkins and], Use of Non-Aqueous Solvents in the Study of the Rare Earth Group, 739
- Quintin (Mlle. M.), Application of Debye's Theory to Solutions of Copper Sulphate, 630; The Electromotive Force of the Chain, 482
- Radin (Dr. P.), Social Anthropology (*Review*), 315
- Rae (Prof. R.), appointed professor of agriculture in Reading University, 772
- Raghavan (Dr. M. D.), The Malabar House, 29
- Rahimullah (M.), and Prof. B. K. Das, Making Whole Mounts of Vertebrate Skeletons, 171
- Rakshit (H.), [Prof. S. K. Mitra and], Recording Wireless Echoes at the Transmitting Station, 657
- Ram (Atma), [Prof. N. R. Dhar and], Presence of Formaldehyde in Dew, 800
- Ramachandran (T. N.), [Dr. F. H. Gravely and], Hindu Metal Images, 279
- Ramage (G. R.), and Prof. R. Robinson, Synthesis of Chrysene and certain Derivatives, 205
- Ramage (H.), Applications of the Spectroscope to Biology, 919
- Ramart-Lucas (Mme.), and Mme. M. Grumez, Colour and Structure of Oximes and Semi-carbazones, 70; and Mlle. Wohl, Colour and Structure of Amides, 286
- Ramaswami (S.), [S. Krishna and], Calorific Values of some Indian Woods, 281
- Rambaud (R.), Trans  $\gamma$ -oxyerotic Acid, 483
- Ramsey (C. G.), and H. R. Sleeper, Architectural Graphic Standards: for Architects, Engineers, Decorators, Builders and Draftsmen (*Review*), 224
- Ramsey (G. B.), and Alice A. Bailey, Tomato Late-Blight Rot, 440
- Randoin (Mme. Lucie), et H. Simonnet, Les vitamines (*Review*), 258
- Rankine (Prof. A. O.), elected president of the Physical Society, 510
- Rao (A. S.), Spectra of Bromine: Br V, VII and IV, 170



- Rao (G. Gopala), and Madhusudan Pandalai, Sodium Sulphite in Photographic Developing Solutions, 100
- Rao (Dr. K. R.), Spectra of Bromine. Br V, VII and IV, 170
- Ratcliffe (J. A.), appointed university lecturer in the department of physics of Cambridge University, 811; and E. L. C. White, Fine-Structure of the Ionosphere, 873; Heaviside Layer, 807; [C. T. R. Wilson, E. L. C. White and], An Automatic Recording Method for Wireless Investigations of the Ionosphere, 522
- Rateau (late Prof. A. C. E.), the work of, 650
- Rây (Sir Prafulla Chandra), Life and Experiences of a Bengali Chemist (*Review*), 672; Seventieth Birthday Commemoration Volume, 866
- Ray (S. N.), [T. W. Birch, Dr. L. J. Harris and], Hexuronic (Ascorbic) Acid as the Antiscorbic Factor, and its Chemical Determination, 273
- Rayleigh (Lord), Beryllium and Helium, 724
- Rayner (Dr. M. C.), Mycorrhiza in the Genus *Citrus*, 399
- Read (Prof. J.), Growth of Space Chemistry (*Review*), 783; Humour and Humanism in Baeyer's Laboratory, 294
- Read (J.), Elementary Textile Design and Fabric Structure (*Review*), 187
- Read (W. H.), and O. B. Orchard, Disinfection of Glass-houses with Sulphur, 844
- Reader (V.), [R. D. Heard, H. W. Kinnersley, J. R. O'Brien, Prof. R. A. Peters and], Vitamin B<sub>4</sub> and Adenine, 617
- Réchid (Mme.), [P. Pascal and], Preparation of the Dimetaphosphates, 666
- Reck (Prof. H.), [Dr. L. S. B. Leakey, Prof. P. G. H. Boswell, A. T. Hopwood, Dr. J. D. Solomon and], The Oldway Human Skeleton, 397
- Redman (Dr. R. O.), appointed university lecturer in the department of astrophysics of Cambridge University, 811
- Rée (Dr. A.), [obituary article], 425
- Rees (H. G.), Iron and Copper in Liver and Liver Extracts, 702
- Rees (W. J.), appointed temporary assistant lecturer in botany in Birmingham University, 248
- Regan (Dr. C. Tate), elected a foreign member of the Royal Danish Academy, 650
- Regener (Prof. E.), Absorption of Penetrating Radiation, 880; Energy of Cosmic Rays, 130
- Reh (Miss Emma), Archæological Exploration in Oaxaca, Mexico, 509
- Reich (W. S.), Glycogen Triacetate, 106
- Reid (D. M.), [J. T. Cunningham and], Pelvic Filaments of Lepidosiren, 913
- Reid (F. H.), Technical Education, 883
- Renshaw (G.), The Dodo and the Aphanapteryx, 728
- Reynolds (Dr. Doris L.), appointed lecturer in geology in Durham University, 811
- Reynolds (Prof. S. H.), Geology of the Bristol District, 65
- Ribaud (Prof. G.), Solution of the Problem of Heterochrome Photometry of Incandescent Lamps, 667; *Traité de pyrométrie optique* (*Review*), 151
- Richard (J.), Use of the Cattaneo Wave Pump for Utilising the Movements of the Sea, 179
- Richards (H. W. H.), Steam, Electric and Diesel-Electric Traction, 302
- Richardson (Dr. L. F.), Photography of Faint Transient Light-Spots, 401
- Richardson (T. N.), and Dr. K. C. Bailey, Supersaturation of Liquids with Gases, 762
- Richter (C. F.), [H. O. Wood and], Californian Earthquake of March 10, 686
- Rickard (Dr. T. A.), Man and Metals: a History of Mining in Relation to the Development of Civilisation. 2 vols. (*Review*), 743
- Rideal (Prof. E. K.), [A. H. Hughes and], Rate of Oxidation of Monolayers of Unsaturated Fatty Acids, 446
- Rigg (Sir Edward), [death], 576
- Riiser-Larsen (Capt. H.), Norwegian Antarctic Expedition, 301
- Rinne (Prof. F.), [death], 462
- Ripper (Elizabeth A.), Stromatoporoids of the Lilydale Limestone (1), 106
- Risteen (Dr. A. D.), [death], 266
- Ritchie (Prof. J.), Sir J. Arthur Thomson, 296; The Muskrat in Britain, 385
- Ritchie and Ludlam, A Gaseous Oxidation, 64
- Ritschel (R.), Hyperfine Structure in Aluminium, 58
- Ritt (Prof. J. F.), Differential Equations from the Algebraic Standpoint (*Review*), 456
- Ritter (Dr. E.), Die Sprache im internationalen Verkehr. Second edition; Die Weltverkehrssprache, 102
- Roach (Dr. W. A.), Distribution of Molybdenum, 202
- Robb (W.), Inheritance of Grain Colour in Oats, 517
- Robbins (F.), Dr. R. T. A. Innes, 461
- Roberts (H. A.), [obituary article], 49
- Roberts (O. F. T.), Eddy Diffusion, 916
- Robertson (Sir Charles Grant), Training the University Graduate, 268
- Robertson (Dr. D.), [A. H. H. Fraser and], Nutritional Condition of Sheep and Susceptibility to Stomach Worm, 94
- Robertson (Dr. T. Brailsford), edited by Jane W. Robertson, The Spirit of Research (*Review*), 111
- Robin (Dr. P. A.), Animal Lore in English Literature (*Review*), 257
- Robinson (Dr. B. W.), Electrometer Triode in the X-Ray Ionisation Spectrometer, 546
- Robinson (I. V.), The Battersea Power Station, 720
- Robinson (J. E. L.), [Dr. J. L. Miller and], awarded the Institute of Physics prize, 467
- Robinson (Dr. P. L.), [E. E. Aynsley, Dr. T. G. Pearson and], New Experimental Evidence in the Sulphur-Hydrogen Reaction, 471
- Robinson (Prof. R.), [G. R. Ramage and], Synthesis of Chrysene and certain Derivatives, 205
- Robison (Dr. R.), [Dr. H. B. Fell and], Glycogen in Cartilage, 62
- Roebuck (Dr. John), the work of, 196
- Rogers (Dr. A. W.), elected president of the Royal Society of South Africa, 22; 687
- Rogers (M. J.), Know Your San Diego, 903
- Rogers (W. S.), Root Studies, III, 695
- Roget (S. R.), A Dictionary of Electrical Terms: including Telegraphy, Telephony and Wireless. Second edition (*Review*), 322
- Rolf (Dr. B.), Temperature of the Stratosphere, 280
- Rolfe (A. C.), [C. N. Hinshelwood, E. A. Moelwyn-Hughes and], Combination of Hydrogen and Oxygen in a Silver Vessel, 142; Reaction between Hydrogen and Oxygen, 625
- Rolt and Barrell, Sources of Light for Interferometer Work, 244
- Romanowski (M.), [A. Péard and], First Comparisons of the National Standards of Electrical Resistance, 887
- Roscoe (Sir Henry Enfield), Centenary of the birth of, 18
- Rosenhain and Stott, Energy absorbed in the Cold Working of Metals, 769
- Rosenhead (Dr. L.), Instability of Liquid Surfaces, 175
- Ross (Dr. T. A.), An Introduction to Analytical Psychotherapy (*Review*), 639
- Rossi (A.), Crystalline Structure of the Compound LaAl<sub>4</sub>, 924
- Rossier (P.), Diameter of some Stars of the Cluster M7, 888; Influence of the Absolute Magnitude of a Star on the Width of the Lines of Stellar Hydrogen, 483
- Rossman (Dr. J.), The Law of Patents for Chemists (*Review*), 115
- Roth (W. E.), [obituary], 612
- Rouard (P.), Reflecting Power of Metals in very Thin Plates, 36; Variations of Phase by Reflection on very Thin Metallic Films, 410
- Roubaud (E.), Desert Anhydrobiosis and its Influence on the Animal Cycle of *Schistocerca peregriana*, 774
- Roughton (Dr. F. J. W.), [late Dr. N. U. Meldrum and], Carbonic Anhydrase and the State of Carbon Dioxide in Blood, 874
- Rowan (Prof. W.), Bird Migration (3), 288



- Rowland (Rev. J. P.), Recent Magnetic Disturbances, 764; Wensleydale Earthquake, 128
- Roxburgh (H. L.), [H. W. Melville and], Upper Limit in Explosive Chain Reactions, 690
- Roy (Mlle. Madeleine), [A. Boutaric and], Influence of Radioactive Radiations on the Flocculation of Colloids, 738
- Royer (L.), Orientation of certain Crystals by Hydrargillite, 596
- Ruedemann (R.), Palæozoic Planktonic Faunas of North America, 775
- Rupe (Prof. H.), Adolf von Baeyer als Lehrer und Forscher, 294
- Rupp (E.), Polarisation Phenomena in Electron Scattering, 209
- Ruse (H. S.), Measurement of Spatial Distance in a Curved Space-Time, 250
- Russ (Prof. S.), 'Raw' Weather, 131
- Russell (Prof. H. N.), Composition of the Stars (Halley Lecture), 832; elected president of the American Association, 164, 304
- Ruszkowski (J. S.), Development of *Gyrocotyle*, 243
- Rutgers (J. J.), [A. Girard, G. Sandulesco, A. Fridenson and], A New Crystallised Sex Hormone, 71
- Rutherford (Lord), Artificial Transmutation of the Elements (Boyle Lecture), 832; Recent Researches on the Transmutation of the Elements, 388; Scientific Problems of the Pacific, 831
- Rutzler, Jr. (J. E.), [W. D. Bancroft and], Agglomeration Theory of Sleep, 739
- Ryan (J. J.), [C. Boyle and], Grass Silage, 410; [G. T. Pyne and], Colloidal Calcium Phosphate of Milk, 35
- Rydberg (R.), [Prof. E. Hulthén and], Predissociation and Pressure Effects in the Band Spectrum of Aluminium Hydride, 470
- Saal (R. N. J.), and C. G. Verver, Measurement of Volatility Range of Lubricating Oils, 661
- Sabatier (Dr. P.), awarded the Franklin medal of the Franklin Institute, 871
- Sabatucci (N.), Toxic Action and Elimination of Nicotine (1, 2), 483
- Sakai (Dr. Tsune), Spider Crabs from Japan, 551
- Salaman (Dr. R. N.), Protective Inoculation against a Plant Virus, 468
- Salisbury (Prof. E. J.), Influence of Man on Vegetation, 919; Intensive Natural History (*Review*), 343; The East Anglian Flora, 336
- Salisbury (F. O.), Offer to St. Andrews University of a replica of a portrait of Dr. E. Harkness, 372
- Salmon (late C. E.), edited by W. H. Pearsall, Flora of Surrey (*Review*), 77
- Salomon (H.), [Prof. P. Karrer, K. Schöpp and], Constitution of Dehydro-Ascorbic Acid, 800
- Salt (Dr. G.), elected Stringer fellow of King's College, Cambridge, 141
- Salt (Lieut. J. S. A.), A Simple Method of Surveying from Air Photographs, 650
- Salvatori (A.), Nature and Value of Bezssonoff's Reaction for the *C* Factor, 339
- Sanderson (I. T.), awarded a grant from the Balfour Fund of Cambridge University, 736
- Sandulesco (G.), [A. Girard, A. Fridenson, J. J. Rutgers and], A New Crystallised Sex Hormone, 71
- Sandford (Dr. K. S.), Volcanic Craters in the Libyan Desert, 46
- Sansome (Dr. F. W.), and J. Philp, Recent Advances in Plant Genetics (*Review*), 185
- Santon (L.), Some Results Obtained with a Supersonic Flower, 523
- Sarasin (Dr. F.), Prehistory of South-East Asia, 879
- Sargent (Sir Percy), [death], 158
- Sarrant (A.), France and Great Britain in Africa, 831
- Sassoon (Sir Philip), Aeronautics and the Royal Air Force, 428
- Satterly (Prof. J.), [W. R. Bower and], Practical Physics. Third edition (*Review*), 491
- Savage (R. M.), Factors controlling Date of Spawning in Frogs, 587
- Sayce (Prof. A. H.), [death], 195; [obituary article], 296
- Sayce (R.), and F. Hanley, Kilm-dried Poultry Manure, 198
- Scattergood (B.), gift to Leeds University Observatory, 665
- Schaarschmidt (Prof. A.), [death], 195
- Schafer (J. P.), and W. M. Goodall, Characteristics of the Ionosphere, 804
- Schaffer (J.), Tissue Structure of Homologous Organs (Prepuce Glands) in Mice and Rats, 703
- Schaffert (R.), Form and Vibrational Frequencies of the Nitrogen Dioxide Molecule, 911
- Scharff (Dr. R. F.), Past Wanderings in Europe of Two African Animals, 922
- Scheibe and Adelsberger, Oscillating Quartz Crystal as an Accurate Clock, 281
- Schérer (M.), The Circular Magnetic Dichroism and Abnormal Magnetic Rotatory Dispersion of Solutions of Cobalt Chloride, 70; [A. Cotton and], Magnetic Rotatory Dispersion of a Coloured Diamagnetic Compound, Thiobenzophenone, 215
- Scheuchzer (Johann Jacob), bicentenary of the death of, 902
- Schimmer (Freda), [S. G. Paine, F. L. Lingood, T. C. Thrupp and], Relationship of Micro-Organisms to the Decay of Stone, 178
- Schintlmeister (J.), Ionisation of H-Rays in Different Gases, 251
- Schmid (H.), [E. Abel and], Flow Kinetics: Model of Photolysis, 251
- Schmidt (Prof. J.), English edition by Dr. H. G. Rule, A Text-Book of Organic Chemistry. Second edition (*Review*), 116
- Schmidt (Prof. Johannes), [death], 298; [obituary article], 424
- Schmidt (Dr. Julius), [obituary article], 718
- Schober (H.), Spectra of Rhenium (3), 411; (4), 851
- Schofield (Dr. R. K.), Capacitance Hygroscopy and some of its Applications, 96
- Schokalsky (J.), The Circumnavigation of the François Joseph Archipelago by the North, 70
- Schonbeck (A.), [G. Gorbach and], Influence of Hydrocyanic Acid on Bacterial Proteases, 287
- Schonland (Dr. B. F. J.), Atmospheric Electricity (*Review*), 785; and Viljoen, Penetrating Rays from Thunderclouds, 916
- Schopfer (W.), Biometric Researches on the Spores of *Mucor*, 483
- Schöpp (K.), [Prof. P. Karrer, H. Salomon and], Constitution of Dehydro-Ascorbic Acid, 800
- Schriever (W.), [Prof. F. A. Melton and], Meteor Craters, 100; Probable Meteorite Scars in Carolina, 624
- Schröder (V. N.), [Prof. N. K. Koltzoff and], Artificial Control of Sex in the Progeny of Mammals, 329
- Schubert (J.), [J. Kisser and], Influence of Treatment of Seeds with Chemical Stimulants on the Cell Growth of the Rootlets, 251
- Schuchert (Prof. C.), Gondwana Land Bridges, 696; and G. A. Cooper, Brachiopod Genera of the Sub-orders Orthoidea and Pentamerioidea, 244
- Schuster (Sir Arthur), Biographical Fragments (*Review*), 75
- Schweidler (Prof. E.), Die Aufrechterhaltung der elektrischen Ladung der Erde (*Review*), 785
- Schweitzer (A.), translated by C. T. Champion, My Life and Thought: an Autobiography (*Review*), 785
- Schweitzer (Dr. E.), [Dr. W. Gerlach and], Foundations and Methods of Chemical Analysis by the Emission Spectrum (*Translation*), 420
- Schweizer (Jean), Periodicity in Tree Growth in the Tropics, 624
- Schwinner (R.), Geology of Eastern Styria: the Rocks and their Inter-Relationships, 560
- Schwob (M.), [R. Lucas and], Anomalous Dispersion in Magnetic and Electric Double Refraction, 630
- Seofield (N. B.), Legal Size Limits and their Effect upon Fisheries, 832



- Scott (Dr. A.), Preservation of Metallic Objects in Museums, 906
- Scott (Lorna I.), [Prof. J. H. Priestley, Marjorie E. Malins and], Cambial Activity, 375
- Scott-Hill (Rear-Admiral W.), Coal for Sea Transport, 479
- Scourfield (D. J.), New Species of *Cyclops* at Tenby, 135
- Seaber (W. M.), Barium as a Normal Constituent of Brazil Nuts, 814
- Searle (V. H. L.), The Electrical Age: being further Everyday Marvels of Science (*Review*), 491
- Sears (J. E.), and H. Barrell, A New Apparatus for Determining the Relationship between Wave-Lengths of Light and the Fundamental Standards of Length, 192
- Segrè (E.), Quadrupole Lines in X-Ray Spectra (2) 411
- von Seidlitz (Prof. W.), Der Bau der Erde und die Bewegungen ihrer Oberfläche: eine Einführung in die Grundfragen der allgemeinen Geologie (*Review*), 318
- Seligman (Brenda Z.), [Prof. C. G. Seligman and], Pagan Tribes of the Nilotic Sudan (*Review*), 345
- Seligman (Prof. C. G.), and Brenda Z. Seligman, Pagan Tribes of the Nilotic Sudan (*Review*), 345
- Selwood (P. W.), Influence of Light on Paramagnetic Susceptibility, 761
- Selye (H.), [Prof. J. B. Collip, Prof. D. L. Thomson and], Gonad-stimulating Hormones in Hypophysectomised Animals, 56
- Semerano (Dr. G.), Il polarografo: sua teoria e applicazioni (*Review*), 260
- Semple (Prof. Ellen Churchill), The Geography of the Mediterranean Region: its Relation to Ancient History (*Review*), 317
- Semple (Dr. J. E.), awarded the Raymond Horton-Smith prize of Cambridge University, 772
- Semple (Prof. J. G.), Composite Surfaces in Higher Space, 886
- Séon (M.), [C. Matignon and], Action of Steam on Heavy Petroleum Oils and on certain Cyclic Hydrocarbons, 523; Action of Steam on Hexane, 215, 286
- Sergent (E.), A. Donatien, L. Parrot and F. Lestoquard, Experimental Suppression of Sexual Reproduction in *Theileria dispar*, 143
- Servigne, Existence of a Polonium Acetylacetonate, 375
- Seshaiya (R. V.), Style-Sac of Gastropods, 30
- Sexton (Mrs. E. W.), and Miss A. R. Clark, Further Mutations in the Amphipod *Gammarus chevreuxi*, Sexton, 201
- Seymour (A. B.), [death], 830
- Sezawa (Prof. Katsutada), Viscous Damping of Vibrating Metal Bars, 803
- Shapera (Dr. I.), Chastity in Bechuanaland, 516
- Shapiro (H. A.), The Kitchen middens at Gordon's Bay, 411
- Shapley (Dr. H.), awarded the Rumford medal of the American Academy of Arts and Sciences, 871; Galactic Dimensions, 739
- Sharan (S.), [Prof. K. Prosad and], Supersonic Vibrations set up in a Zinc Bar undergoing Transverse Vibrations, 803
- Sharpe (Sir Montagu), Middlesex in British, Roman and Saxon Times. Second edition (*Review*), 677
- Sharpey-Schafer (Sir Edward), impending retirement and work of, 86
- Shaw (Dr. Knox), Motion of the Spiral Nebulae, 697
- Sheehy (E. J.), Nutritive Value of Pastures, 30
- Sheffield (Dr. F. M. L.), Virus Diseases and Intracellular Inclusions in Plants, 325
- Shepard (Prof. F. P.), Submarine Valleys, 331
- Shepherd (E. S.), [J. W. Greig, H. E. Merwin and], Volatile Transport of Silica, 768
- Sheppard (T.), retirement from editorship of the *Naturalist*, 304
- Sherratt (G. C.), [Dr. G. W. C. Kaye and], Velocity of Sound in Gases in Tubes, 338
- Shield (late A. M.), proposed foundation of a studentship and a readership in Cambridge University, 811
- Shire (E. S.), elected a fellow of King's College, Cambridge, 593
- Shrubsall (Dr. F. C.), and Dr. A. C. Williams, Mental Deficiency Practice: the Procedure for the Ascertainment and Disposal of the Mentally Defective (*Review*), 456
- Shull (A. F.), Time of Embryonic Segregation in Aphids as Determined from Intermediate Types, 775
- Sibaiya (L.), [Prof. B. Venkatesachar and], Hyperfine Structure and Nuclear Moments, 844
- Sidgwick (Dr. N. V.), elected a member of the Athenæum Club, 200
- Siegbahn (Prof. M.), Extreme Ultra-Violet and the Very Soft X-Ray Region (Guthrie Lecture), 901
- Sigerist (Dr. H. E.), translated by Margaret Galt Boise, Man and Medicine: an Introduction to Medical Knowledge (*Review*), 894
- Silberstein (L.), [G. Bertrand and], Importance of Sulphates as Manure, 215
- Silvestri (Prof. F.), elected a foreign member of the Linnean Society of London, 759
- Simmons (W. C.), [A. D. Combe and], The Volcanic Area of Bufumbira. Part 1: The Geology of the Volcanic Area of Bufumbira, South-West Uganda; with Notes on the Petrology and Economic Geology (*Review*), 821
- Simonds (Col. G.), Safety of Life from Fire, 269
- Simonnet (H.), [Mme. Lucie Randoin et], Les vitamines (*Review*), 258
- Simonsen (J. L.), [A. E. Bradfield, A. R. Penfold and], Essential Oil from the Wood of *Eremophila Mitchellii*, 667
- Simpson (Dr. G. C.), Low Auroras and Auroral Sounds, 828; The Astronomical Radiative Stability, 875
- Simpson (J. B.), The Late-Glacial Re-advance Moraines of the Highland Border West of the River Tay, 522
- Simpson (J. C. E.), [Prof. I. M. Heilbron and], Hydroxyl Group in Ergosterol and Cholesterol, 438
- Singleton (W.), and Brindley Jones, Effects of the Addition of Tellurium to Lead, 696
- de Sitter (Prof. W.), Kosmos (*Review*), 487
- Skarżyński (Dr. B.), An Oestrogenic Substance from Plant Material, 766
- Skene (Dr. MacGregor), Charles and Erasmus, 66
- Skorko (E.), Absorption Bands of Iodine Vapour at High Temperatures, 366
- Sleeper (H. R.), [C. G. Ramsey and], Architectural Graphic Standards: for Architects, Engineers, Decorators, Builders and Draftsmen (*Review*), 224
- Slipher (Dr. V. M.), awarded the Gold medal of the Royal Astronomical Society, 91; awarded the Henry Draper medal of the U.S. National Academy of Sciences, 754; Spectra of the Planets (George Darwin Lecture), 734
- Smith (Dr. C. J.), Intermediate Physics (*Review*), 532
- Smith (Eng.-Capt. E. C.), Scientific Centenaries in 1933, 14
- Smith (E. Lester), Systems of Four Immiscible Liquid Layers, 167
- Smith (Dr. E. W.), Submarine Telephone Cables at Carrier Frequencies, 431
- Smith (Sir Frank), The Travel of Wireless Waves (Kelvin lecture), 642
- Smith (F.), [Dr. E. L. Hirst, E. G. V. Percival and], Constitution of Ascorbic Acid, 617
- Smith (F. Ll.), [A. Egerton and], Hydrocarbon Combustion in an Engine, 725
- Smith (Dr. J. C.), Chlorination of Sodium Benzoate, 28
- Smith (Dr. J. Henderson), appointed head of the department of plant pathology at Rothamsted, 303
- Smith (late J. Perrin), Phylogeny of Ammonites, 368
- Smith (Dr. Kenneth M.), awarded the Snell Memorial medal of the National Institute of Agricultural Botany, 164; Plant Virus Research, 915
- Smith (S.), with notes on fossils by C. J. Stubblefield, Tremadoc Shales in the Tortworth Inlier, Gloucestershire, 214
- Smith (W. C.), [Prof. J. H. Orton, Miss M. W. Parke and], Breeding of Oysters (*O. edulis*) at Port Erin, 26
- Smith (W. W.), [Prof. J. Kendall, T. Tait and], Calcium Isotope with Mass 41 and the Radioactive Half-Period of Potassium, 688



- Smith-Rose (Dr. R. L.), *Electrical Properties of Soil for Alternating Currents: with particular reference to Radio-Frequencies*, 142
- Smoluchowski (R.), *Magnetic Quenching of Tellurium Fluorescence*, 914
- Smyth (Corisande) and M. Young, *Facial Growth in Children*, 29
- Smyth [McAlpine and], *Polarity of Hydrocarbon Vapours*, 517
- Smythe (F. S.), *Kamet Conquered* (Review), 224
- Smythe (Dr. W. R.), and Dr. W. C. Michels, *Advanced Electrical Measurements* (Review), 322
- Snape (Dr. H. L.), [death], 353
- Snow (Dr. C. P.), [Dr. F. P. Bowden, S. D. D. Morris and], *Absorption Spectrum of Vitamin A at Low Temperatures*, 582
- Snyder [Buckley and], *Spreading of Liquids on Solid Surfaces*, 407
- Soddy (Prof. F.), *The Interpretation of the Atom* (Review), 4
- Sohon (Rev. F. W.), *Seismometry* (Introduction to Theoretical Seismology, Revs. J. B. Macelwane and F. W. Sohon, Part 2), (Review), 824
- Sohoni (K. N.), [Prof. S. K. Banerji and], *Hydraulic Seismographs*, 547
- Sokolowski (J.), *Stork in Western Europe*, 403
- Solomon (Dr. J. D.), awarded the Daniel-Pidgeon fund of the Geological Society of London, 616; [Dr. L. S. B. Leakey, Prof. H. Reck, Prof. P. G. H. Boswell, A. T. Hopwood and], *The Oldoway Human Skeleton*, 397
- Sommerfeld (Prof. A.), presented with the James Scott prize of the Royal Society of Edinburgh, 687
- Sorel (R.), *Tincture of Iodine and Asepsis*, 596
- Sørensen (late Dr. W.), revised by Dr. C. With and K. L. Henriksen, *The Arachnid Group, Opiliones-Laniatores*, 843
- Sorge (Dr. E.), *Thickness of the Greenland Ice*, 807
- Soulié (J.), [L. Gay and], *A Boiling Point Apparatus for the Determination of the Dew Points and Boiling Points of Mixtures of Volatile Liquids*, 630
- Soulier (A.), [A. Kling and], *Accidental Ignition of Vapours of Petrols by Electric Sparks*, 106
- Soulsby (B. H.), [death], 86; [obituary article], 230
- Spärek (R.), [T. Gaarder and], *Norwegian Oyster Pools*, 806
- Sparks (C. H.), [C. H. Davy and], *High Pressure Boilers*, 90
- Späth (W.), *Spectroscopic Detection of Small Quantities of Elements*, 30
- Speiser (Dr. E. A.), *Tell-Billa*, 806
- Spence (H. S.), *Pitchblende at Great Bear Lake, Canada*, 208
- Spencer (C. J.), *Electric Trolley Omnibuses*, 869
- Spencer (H. S.), *Radium in Canada*, 55
- Spencer (Dr. L. J.), *Meteorite Craters*, 172; *Meteorite Irons and Silica-Glass from the Meteorite Craters of Henbury (Central Australia) and Wabar (Arabia)*, 250; *Origin of Tektites*, 117; 596; 876
- Spielmann (Dr. P. E.), *Bitumen in Embalming*, 588
- Spurrell (W. R.), appointed reader in physiology at Guy's Hospital Medical School, 480
- Squire (C.), and D. W. Herdman, *The Museums of Malta, Cyprus and Gibraltar*, 430
- Stace (Dr. W. T.), *The Theory of Knowledge and Existence* (Review), 455
- Stagg (J. M.), *Report of British Polar Year Expedition*, 464
- Staley (J.), [J. F. Marshall and], *A new British Record of *Orthopodomyia pulchripalpis*, Rondani (Diptera, Culicidae)*, 435
- Stalker (Prof. A. M.), [obituary article], 85
- Stamp (Dr. L. D.), *Annual Conference of the Geographical Association*, 68; *Geology in the Life of a Nation*, 226; *The Trinkler Expedition to Central Asia* (Review), 600
- Stampa (A.), [M. Picard and], *A New Form of Silver Voltmeter*, 666
- Stansfield (Prof. H.), *Dimensions of Fundamental Units*, 59
- Starkey (J. L.), *Excavations at Tell Duweir, Southern Palestine, 1932-33*, 897
- Starks (Prof. E. C.), [death], 462; [obituary article], 576
- Statham (Col. J. C. B.), [death], 830
- Stead (E. F.), *The Life Histories of New Zealand Birds* (Review), 603
- Stead (G.), *Elementary Physics. Fourth edition* (Review), 748
- Stebbing (Prof. E. P.), *Lord Lovat*, 352
- Stebbing (Dr. L. S.), title of professor conferred upon, by London University, 811
- Stebbins (Prof. J.), and Dr. C. M. Huffer, *Absorption of Light in the Galaxy*, 769
- Steele (Dr. S.), *A Theory of Fuel-Knock*, 724
- Steggall (Prof. J. E. A.), retirement from University College, Dundee, 628
- Stein (Sir Aurel), *On Ancient Central-Asian Tracks: Brief Narrative of Three Expeditions in Innermost Asia and North-Western China* (Review), 415
- Steinburg (Prof.), *Developments in Highway Engineering*, 334
- Stephen (A. C.), *Scottish Marine Fauna*, 446
- Stephenson (G.), [obituary article], 50
- Stephenson (Mrs. G.), gift to Cambridge University, 848
- Stephenson (Lieut.-Col. J.), [obituary article], 193
- Stephenson (Prof. T. A.), *Lunar Periodicity in Reproduction*, 622
- Sterki (Dr. V.), [death], 353
- Stetson (Prof. H. T.), *Variation Effect in Latitude, Correlatable with the Moon*, 437; and Dr. A. L. Loomis, *Tidal Shifts in the Earth's Crust*, 137
- Stewardson (E. A.), *Dissociation of Nitrous Oxide in the Glow Discharge*, 364
- Stewart (Dr. T. D.), *Anomalous Eskimo Vertebrae*, 125
- Stiles (W. S.), and B. H. Crawford, *The Luminous Efficiency of Rays entering the Eye Pupil at Different Points*, 250
- Stock (A.), and E. Wiborg, *Electrolysis of Boron Hydrides*, 212
- Stockmair (W.), [F. Holzl and], *Complex Anion of Buff's Compound and of Bunsen's Salt*, 251
- Stoll (Prof. A.), *Researches in Biochemistry*, 541
- Stone (Prof. O.), [death], 231
- Stone (Dr. W.), elected an honorary member of the British Ornithologists' Union, 723
- Stonehaven (Lord), nominated as president of the Institution of Naval Architects, 432
- Stoner (Dr. E. C.), *Atomic Moments of Ferromagnetics*, 433; *Interatomic Distances and Ferromagnetism*, 814
- Stott (V. H.), *Measurement of the Viscosity of a Molten Metal by means of an Oscillating Disc*, 850; [Rosenhain and], *Energy Absorbed in the Cold Working of Metals*, 769
- Stoughton (Dr. R. H.), appointed professor of horticulture in Reading University, 248
- Stoy (R. H.), awarded a Smith's prize of Cambridge University, 408
- Stoyko (N.), and R. Jouast, *Apparent Velocity of Short Radio-Electric Waves*, 887
- Strachan (C.), awarded a Rayleigh prize of Cambridge University, 408
- Stracke (Dr. G.), *The Reimnuth Planet, 1932HA*, 369
- Stratton (Prof. F. J. M.), elected president of the Royal Astronomical Society, 236
- Strong (Dr. W. M.), *Nutritional Aspects of Depopulation and Disease*, 519
- Stuart (C. M.), [obituary article], 194
- Stuart (N.), [Prof. G. P. Thomson, C. A. Murison and], *Crystalline State of Thin Spluttered Films of Platinum*, 522
- Stuber (O.), [A. Kailan and], *Velocity of Catalysed Hydrogenations*, 251
- Sturt (Mary), *Francis Bacon: a Biography* (Review), 490
- Sturtevant (Prof. A. H.), *Chromosome Mechanics* (Review), 5; and T. Dobzhansky, *Genetics of certain Chromosome Anomalies in *Drosophila melanogaster**, 627
- Subbaraya (T. S.), [Prof. B. Venkatesachar and], *Predictions of Nuclear Moments*, 552



- Subov (Prof. N. N.), Voyage around Franz Joseph Land, 359
- Süe (P.), Determination of Niobium by Orthoxyquinoline, 738
- Suga (T.), [Dr. T. Takamine, A. Yamagihara and], Anode Spot in a Neon Tube, 584
- Sugden (J. W.), Restriction in Range of the Long-Billed Curlew, 439
- Sullivan (J. W. N.), and others, The Outline Series. 11 vols. (*Review*), 8
- Sushkin (late P.), Distribution of Birds in the Russian Altai and North-West Mongolia, 551
- Sussmilch (C. A.), Association of the Tertiary Alkaline Rocks of N.S.W. with late Tertiary Tectonic Lines, 667
- Sutton (Dr. L. E.), presented with the Meldola medal of the Institute of Chemistry, 357
- Sutton (R. W.), [Prof. G. I. Finch and], Control of Ignition-Coil Discharge Characteristics, 374
- Sutton (T. C.), [H. R. Ambler and], Detection of Traces of Carbon Monoxide in Air, 766
- Svedberg (Prof. The), and Astrid Hedenius, Molecular Weights of the Blood Pigments of the Invertebrates, 325; and Eriksson, Hæmocyamin of *Octopus vulgaris*, 137
- Svensson (E.), Isotope Effect in the Spectrum of Cadmium Hydride, 28
- Swietoslawski (W.), and E. Wardzinski, The Ternary Heteroazeotrope, 887
- Szent-Györgyi (Prof. A.), Chemical and Biological Effects of Ultra-Sonic Radiation, 278; Identification of Vitamin C, 225; and Prof. W. N. Haworth, 'Hexuronic Acid' (Ascorbic Acid) as the Antiscorbutic Factor, 24
- Tait (T.), [Prof. J. Kendall, W. W. Smith and], Calcium Isotope with Mass 41 and the Radioactive Half-Period of Potassium, 688
- Takamine (Dr. T.), T. Suga and A. Yanagihara, Anode Spot in a Neon Tube, 584
- Taki (I.), Abnormal Chitons, 367
- Takvorian (S.), [M. Curie and], Radioactivity of a Neodymium-Samarium Fractionation, 702
- Talley (S. K.), [Grinnell Jones and], Viscosity of Aqueous Solutions, 475
- Talman (C. F.), Minimum Climatic Temperature, 431
- Tamura (T.), and Y. Hada, Growth of Corals, 172
- Taverner (E.), and others, Salmon Fishing (*Review*), 42
- Tawney (Prof. R. H.), Land and Labour in China (*Review*), 712
- Taylor (Prof. H. S.), presented with the Mendel medal of Villanova College, 759
- Taylor (H. McC.), elected a research fellow of Clare College, Cambridge, 736
- Taylor (H. M.), and Mott (N. F.), Internal Conversion of  $\gamma$ -Rays, 99
- Taylor (J. E.), [Prof. R. Whiddington and], Inelastic Scattering of Electrons in Helium at Zero Angle, 814
- Taylor (Dr. Monica), Sir Bertram Windle: a Memoir (*Review*), 307
- Taylor (Sir William), [death], 195
- Taylor and Maccoll, Motion of a Cone at High Speeds in Air, 552
- Tekekirian (A.), [J. Cantacuzène and], Presence of Vanadium in certain Tunicates, 35
- Teegan (J. A. C.), Amplification of the Ionisation produced by Radioactive Sources, 277
- Teissié-Solier (M.), [P. Dupin and], Vortices produced by Obstacles revolving round an Axis Parallel to the General Direction of Flow, 179
- Tellegen (B. D. H.), Interaction between Radio-Waves? 840
- Terada (Torahiko), Image of the Physical World in Cinematography, 358; and T. Utigasaki, Forest Fires and Weather, 161
- Terbea (E.), Vox Naturæ (*Review*), 491
- de Terra (Dr. H.), Geologische Forschungen im westlichen K'unlun und Karakorum-Himalaya (*Review*), 600
- Terroine (E. F.), P. Mezincesco and Mlle. Simone Valla, Utilisation of Sulphur and Nitrogen from Cystine at the Level of Endogenous Protein Metabolism, 483; and Mlle. Simone Valla, Comparative Value of various Protein Foods in Growth, 375
- Thackeray (A. D.), elected to the Sheepshanks exhibition of Cambridge University, 665
- Thayer (Prof. W. S.), Osler and other Papers (*Review*), 40
- Theis (Dr. E.), [Dr. A. Mittasch und], Von Davy und Döbereiner bis Deacon: ein halbes Jahrhundert Grenzflächenkatalyse (*Review*), 150
- Thimann (K. V.), and J. Bonner, Growth Hormone of Plants (2), 631
- Thomas (C. W.), Patents, Trade Marks and Designs: their Commercial Aspect and Development (*Review*), 79
- Thomas (Dr. H. Hamshaw), The Old Morphology and the New, 47
- Thomas (Dr. John), [death], 158; [obituary article], 194
- Thomas (P. E.), [R. Fosse, P. de Graeve and], A New Plant Principle: Uric Acid, 179; Allantoic Acid in the Higher Plants, 702
- Thommen (H.), Heavy Current Circuit-Breakers, 103
- Thompson (Prof. C. M.), [death], 86; [obituary article], 158; bequest to University College, Cardiff, 372
- Thompson (John), the work of, 232
- Thompson (J. E.), Gods of Maya and Aztec, 171
- Thompson (Dr. J. J.), Logarithmetica Britannica: being a Standard Table of Logarithms to Twenty Decimal Places. Part 5: Numbers 50,000 to 60,000 (*Review*), 785
- Thompson (Miss Laura Maud), Archæology of the Marianas Islands, 623
- Thomson (Prof. D. L.), [Prof. J. B. Collop, H. Selye and], Gonad-Stimulating Hormones in Hypophysectomised Animals, 56
- Thomson (Prof. G. P.), and C. A. Murison, Electron Diffraction by Films of Grease, 237; N. Stuart, and C. A. Murison, Crystalline State of Thin Spluttered Films of Platinum, 522
- Thomson (Sir J. Arthur), [death], 231; [obituary article], 296; Scientific Riddles (*Review*), 315
- Thomson (Prof. J. Millar), [death], 462; [obituary article], 610
- Thomson (Dr. J. P.), Australian Water Supply, 797
- Thomson (late Dr. J. Stuart), Anatomy of the Tortoise, 396
- Thomson (N.), Direct Recording of Relative Intensities by Means of a Microphotometer, 558
- Thon (Dr. N.), Neutron, Proton and Positron, 878
- Thornton (J. W. de Witt G.), appointed lecturer in pharmacology in Bristol University, 848
- Thorndike [Kennedy and], Relativity of Time, 136
- Thorpe (Prof. J. F.), elected president of the Institute of Chemistry, 357; extension of appointment to the Safety in Mines Research Board, 91
- Thorpe (Dr. W. H.), Tracheal and Blood Gills in Aquatic Insect Larvæ, 549
- Thouless (Dr. R. H.), Phenomenal Regression to the Real Object, 261; 544
- Thrupp (T. C.), [S. G. Paine, F. L. Lingood, Freda Schimmer and], Relationship of Micro-Organisms to the Decay of Stone, 178
- Thurnwald (Prof. R.), Economics in Primitive Communities (*Review*), 315
- Ticehurst (Dr. C. B.), A History of the Birds of Suffolk (*Review*), 568
- Tideswell (F. V.), [T. N. Mason and], Gob Fires, 521
- Tiercy (G.), Mean Absorption Coefficient in a Variable Star of the Cepheid Type, 888; Respective Phases of Ionisation Maxima and Light Maxima in a Cepheid, 483; Respective Phases of Minimum Ionisation and Light Minimum in the Cepheids, 815; Variation of Ionisation and the Spectrum Variation of some Cepheids, 215; and P. Berger, Aerological Soundings and the Wind Gradient in Switzerland, 143; and A. Grosrey, Width of a Photographic Stellar Spectrum for Stars of Type A5, 888



- Todd, (Dr. C.), The Presence of a Bacteriophage for *B. salmonicida* in River Waters, 360
- Tomaschek (Prof. R.), and O. Deutschbein, Fluorescence of Pure Salts of the Rare Earths, 473
- Tompion (Thomas), Memorial to, 497
- Tompkins (F. C.), Annual Meeting of the Science Masters' Association, 65
- Townson (Thelma), [C. Koller and], Spermatogenesis in *Drosophila obscura*, Fallen (1), 447
- Trampetti (G.), [A. Ferrari and], Behaviour of Mixtures of Zinc Oxide and Anhydrous Zinc Chloride at High Temperature, 339
- Trattner (R.), [G. Kirsch and], Atomic Disintegration with Emission of Neutrons, 852
- Travers (A.), and Lu, Separation of Phosphoric, Arsenic and Vanadic Acids from Aluminium, 595; Volumetric Determination of Lead, 523
- Travers (Prof. M. W.), Discovery of the Rare Gases, 65
- Tredre (W. H. F.), Lightning Investigation in South Africa, 19
- Trehin (R.), Influence of Temperature on the Adsorption of Aqueous Solutions of Hydrochloric Acid in the Extreme Ultra-Violet, 179
- Tremblot (R.), A Variable Star with Eclipses of Short Period, 815
- Trescher (M. O.), [J. J. Enright, H. E. Friesell and], Cause and Nature of Dental Caries, 918
- Trevithick (Richard), Centenary of the death of, 577; Memorial Exhibition at the Science Museum, 497
- Trillat (J. J.), and L. Leprince-Ringuet, Molecular Phenomena at the Surface of Separation of Oil and Water, 850; [N. Marinesco and], Action of Ultra-Sounds on Photographic Plates, 667
- Trinkler (Dr. E.), Geographische Forschungen im westlichen Zentralasien und Karakorum-Himalaya (*Review*), 600
- Trojan (Prof. E.), Light-Producing Powers of Sponges, 728
- Trombe (F.), Preparation of Metallic Neodymium Free from Iron and Silicon, 595
- Troup (Prof. R. S.), Problems of British Forestry, 900
- Truchet (R.), Oxidation of the True Acetylenic Hydrocarbons by Selenious Oxide, 595
- Trueman (Prof. A. E.), appointed professor of geology in Bristol University, 848
- Tschermak (E.), Petaloid Formation of the Calyx in *Phaseolus multiflorus*, 560
- Tsi-Ze (Ny), and Chien Ling-Chao, Influence of Pressure on the Photographic Sensibility to various Monochromatic Radiations, 286
- Tsuya (Prof. H.), Lowering of the Japan Sea Floor, 368
- Tubangui (M. A.), Schistosomiasis in the Philippines, 99
- Tuot (M.), [A. Meyer and], Dehydration of some Tertiary Alcohols by Anhydrous Copper Sulphate, 851
- Turnbull (C.), Early Days of the Turbine, 20
- Turnbull (Prof. H. W.), Matrices and Continued Fractions, 922
- Turnbull (R.), [Prof. J. C. McLennan and], Ultra-Violet Absorption Bands of Xenon, 214
- Turner (Dr. Dorothy), concerning the review of Badcock and Holmyard's "Electricity and Magnetism for Beginners", 686
- Turner (F. J.), Piedmontite in Quartz-Muscovite-Schist from the Shotover Valley, Western Otago, New Zealand, 630
- Tutton (Dr. A. E. H.), Diamonds (*Review*), 255; Prof. V. Goldschmidt, 791
- Tyndall (Prof. A. M.), Gaseous Ions, 65
- Ubbelohde (A. R.), Reaction Cells in Chain Reactions, 328
- Uchiyama (K.), [M. Kinoshita and], Size of Fog Droplets, 99
- Ulyyott (P.), [Dr. W. H. Pearsall and], Measurement of Light for Biological Purposes, 694
- Unwin (Prof. W. C.), [death], 427; [obituary article], 681
- Urban (P.), Relative Impermeability of the Plastic Sediments towards Rain Water, Spring Water and various Alkaline Solutions, 739
- Ure (S. G. M.), presented with the Osborne Reynolds medal of the Institution of Chemical Engineers, 510
- Utigasaki (T.), [T. Terada and], Forest Fires and Weather, 161
- Uvarov (B. P.), Phases in South African Locusts, 423
- Uwins (Capt. C. F.), awarded the British silver medal of the Royal Aeronautical Society, 685
- Valla (Mlle. Simone), [E. F. Terroine and], Comparative Value of various Protein Foods in Growth, 375; [E. F. Terroine, P. Mezincesco and], Utilisation of Sulphur and Nitrogen from Cystine at the level of Endogenous Protein Metabolism, 483
- Vallet (P.), Decomposition of some Complex Platinum Compounds at Progressively Increasing Temperatures, 143
- Vargha (L.), Triphenylmethyl Derivative of Vitamin C, 363
- Vaufrey (H.), [E. G. Gobert and], 'Iberomarusan', 367
- Vaufrey (R.), Pleistocene Dating of Gafsa Hills, Tunisia, 659
- Vène (R.), Sadi Carnot, 303
- Venkatesachar (Prof. B.), and L. Sibaiya, Hyperfine Structure and Nuclear Moments, 844; and T. S. Subbaraya, Predictions of Nuclear Moments, 552
- Verhaeghe (J.), Faraday Effect of a Camphor Derivative, 666
- Vernon (H. M.), Estimation of Solar Radiation in Relation to its Warming Effect on the Human Body, 737
- Vernotte (P.), Natural Convection of Heat in Air when the Heating is very Small, 179
- Verver (C. G.), [R. N. J. Saal and], Measurement of Volatility Range of Lubricating Oils, 661
- Vick (C.), New Proper Motions of Stars from Bergedorf Observatory, 625
- Vierthaler (R.), [L. O. Koblmüller and], Transferring Single-Cell Cultures to Solid Nutrient Media, 287
- Vigoureux (P.), and S. Watts, Temperature Coefficient of the Weston Standard Cell, 374
- Viljoen [Schonland and], Penetrating Rays from Thunderclouds, 916
- de Villiers (Prof. C. G. S.), The 'Tail' of the Male American Toad, *Ascaphus*, 692
- Virtanen (Prof. A. I.), Nitrogen-Uptake of Plants, 534
- Vogel (Dr. A. I.), Substituted  $\beta\gamma$ -Diphenyladipic Acids and Derivatives of Chrysene, 402; G. H. Jeffery, Limiting Mobilities of some Monovalent Ions and the Dissociation Constant of Acetic Acid at 25°, 27
- Volmar and Betz, Emetic Derivatives of Lactic Acid, 410
- Volterra (E.), 'Linked' Elasticity and its Mathematical Representation, 107
- Vonwiller (O. U.), Diffraction Gratings Used with Grazing Incidence, 668
- Vossler (K.), translated by O. Oeser, The Spirit of Language in Civilization (*Review*), 152
- Waddington (C. H.), Heterogony and the Chemical Ground-Plan of Animal Growth, 134; Induction by Coagulated Organisers in the Chick Embryo, 275
- van der Waerden (Prof. B. L.), Die gruppentheoretische Methode in der Quantenmechanik (*Review*), 531
- Wagler (E.), [G. Grimpe und], Herausgegeben von G. Grimpe, Die Tierwelt der Nord- und Ostsee. Lief. 21. Teil 1.d<sub>2</sub> und Teil 2.g (*Review*), 116
- Wahl (A. M.), [Dr. A. Nádai and], Plasticity: a Mechanics of the Plastic State of Matter (*Review*), 383
- Wakker, Gold-bearing Strata of the Region of St.-Yrieix (Haute-Vienne), 483
- Waksman (Prof. S. A.), Principles of Soil Microbiology. Second edition (*Review*), 316
- Walker (Dr. F.), Differentiated Sills in Skye, 440
- Walker (Sir Gilbert), Correlation of Meteorological Data, 284
- Walker (Sir James), awarded the Gunning Victoria Jubilee prize of the Royal Society of Edinburgh, 359



- Walker (W. C.), The "Leeds Portrait" of Joseph Priestley, 876
- Walsh (Dr. J. W. T.), Everyday Photometry with Photoelectric Cells, 660
- Walters (M. H. H.), awarded a Rayleigh prize of Cambridge University, 408
- Walton (Dr. E. T. S.), [Dr. J. D. Cockcroft and], Disintegration of Light Elements by Fast Protons, 23
- Wambacher (Hertha), [Marietta Blau and], Photographic Detection of Protons Liberated by Neutrons (2), 287
- Warburg (E. F.), [Sir Oscar Warburg and], Cultivated Oaks, 905
- Warburg (Sir Oscar), and E. F. Warburg, Cultivated Oaks, 905
- Ward (Dr. A. M.), [Dr. A. D. Mitchell and], Modern Methods in Quantitative Chemical Analysis (*Review*), 531
- Ward (Prof. H. B.), elected permanent secretary of the American Association, 304
- Wardzinski (E.), [W. Swietoslowski and], The Ternary Heteroazeotrope, 887
- Warren (A. E.), Xanthophores in *Fundulus*, 287
- Waterfield (Dr. R. L.), Recent Observations of Mars, 845
- Waterhouse (G. A.), Australian Hesperiidæ (3), 631
- Watkins (A.), Archaic Tracts Round Cambridge (*Review*), 491
- Watson (A. G. D.), elected a fellow of King's College, Cambridge, 593
- Watson (E. L. G.), The Common Earth (*Review*), 636
- Watson (F. R. B.), Production of a Vacuum in an Air Tank by means of a Steam Jet, 369
- Watson (Prof. G. N.), The Marquis and the Land Agent: a Tale of the Eighteenth Century, 67
- Watson (R. A.), and N. R. McCurdy, Cyclone Season in the South Indian Ocean, 517; Pilot Balloon Observations at Mauritius, 626
- Watson (W.), Textile Design and Colour: Elementary Weaves and Figured Fabrics. Third edition (*Review*), 187
- Watt (R. A. Watson), appointed superintendent of the Radio Department of the National Physical Laboratory, 720; Cathode Ray Oscillography, 66; and L. Bainbridge-Bell, Recording Wireless Echoes at the Transmitting Station, 657
- Watts (Dr. J.), [death], 266
- Watts (S.), [P. Vigoureux and], Temperature Coefficient of the Weston Standard Cell, 374
- Wayland (E. J.), Archaeological Discoveries in Uganda, 439; and M. C. Burkitt, Stone Age Culture in Uganda, 730
- Wayling (H. G.), Priestley's Associations with London, 350
- Webb (Beatrice), [Sidney Webb and], Methods of Social Study (*Review*), 748
- Webb (Sidney), and Beatrice Webb, Methods of Social Study (*Review*), 748
- Wegscheider (R.), Photochemical Kinetics; Photochemical Transformation of *O*-Nitrobenzaldehyde (II), 287
- Wehmeyer (L. E.), The Genus *Diaporthe*, Nits, 880
- Weigle (Prof. J.), Dispersion in the Hertzian Domain, 144; and R. Luthi, Debye's Dispersion of Nitrobenzene, 327
- Weir (Dr. J.), [Prof. E. B. Bailey and], Submarine Faulting in Kimmeridgian Times, 244
- Weiss (Prof. F. E.), elected president of the Linnean Society of London, 798
- Welch (H. J.), and Dr. G. H. Miles, Industrial Psychology in Practice (*Review*), 567
- Welch (M. B.), Daily Shrinkage and Swelling of Wood; Longitudinal Variation of Timber during Seasoning, 667; Moisture Content of Wood, 524
- Wellard (R.), [P. Mondain-Monval and], Direct Oxidation of Acetylene by Air, 851
- Wells (A. L.), The Shrimp Industry of Leigh-on-Sea, 270
- Wells (G. P.), [D. I. Clements, N. H. Howes and], Is Plasticine Edible?, 330
- Wells (H. G.), After Democracy: Addresses and Papers on the Present World Situation (*Review*), 183
- Wenckebach (K. F.), Mechanism of Sudden Heart-Failure in cases of Beriberi, 251
- Went (Prof. F. A. F. C.), elected a foreign member of the Royal Society, 798
- Werner (F.), A New Snake from the Cyclades Islands, 287; and R. Ebner, Results of a Zoological Expedition to Morocco (1930): (5) Scorpions, 287
- Werner (Dr. S.), Elastic Electron Scattering in Gases, 726
- Westcott (G. F.), Science Museum Handbook of Pumping Machinery, 542
- Westphal (Prof. W. H.), Physik: ein Lehrbuch für Studierende an den Universitäten und technischen Hochschulen. Dritte Auflage (*Review*), 895
- Weston (W. A. R. Dillon), Sporulation of *Helminthosporium avenae* in Artificial Culture, 435
- Wheeler (Dr. R. E. M.), Verulanium, 1932, 300
- Whiddington (Prof. R.), Electron Polarisation?, 908; and T. Emmerson, Scattering of Electrons in Helium, 814; and F. C. Poultney, Energy of the Beams in Electron Diffraction, 814; and J. E. Taylor, Inelastic Scattering of Electrons in Helium at Zero Angle, 814
- Whipple (Dr. F. J. W.), Air Waves from Experimental Explosions, 138; Relations between the Combination Coefficients of Atmospheric Ions, 522; The Wet-and-Dry Bulb Hygrometer, 374
- Whipple (R. S.), Evolution of the Microscope (*Review*), 219
- White (Dr. C. M.), awarded the Moulton medal of the Institution of Chemical Engineers, 510
- White (E. L. C.), [J. A. Ratcliffe and], Fine-Structure of the Ionosphere, 872; Heaviside Layer, 807; [C. T. R. Wilson, J. A. Ratcliffe and], An Automatic Recording Method for Wireless Investigations of the Ionosphere, 522
- White (J. W.), bequest to Bristol University, 299
- White (Dr. J. H.), The History of the Phlogiston Theory (*Review*), 531
- Whitehead (Prof. A. N.), Adventures of Ideas (*Review*), 746
- Whitehead (S.), edited, with a preface, by E. B. Wedmore, Dielectric Phenomena. 3: Breakdown of Solid Dielectrics (*Review*), 384
- Whitelegge (Sir Arthur), [death], 646
- Whittaker (Prof. E. T.), Variation Problems for a Symmetrical Region, 472
- Whytlaw-Gray (Prof. R.), [K. G. Denbigh and], Higher Homologues of Sulphur Hexafluoride, 763
- Wiborg (E.), [A. Stock and], Electrolysis of Boron Hydrides, 212
- Wick (G. C.), Motion of an Electron in a Crystalline Lattice, 71
- Wickes (W. H. V.), [death], 231
- Wieland (Prof. G. R.), Origin of Angiosperms, 360
- Wiersma (E. C.), [Prof. W. J. de Haas, Prof. H. A. Kramers and], Temperature below 0.27° K., 719
- Willding-Jones (C. L.), appointed assistant superintendent of agriculture, Gold Coast, 871
- Willems (Dr. W. A.), Constitution-Types in Delinquency: Practical Applications and Bio-physiological Foundations of Kretschmer's Types (*Review*), 188
- Williams (Dr. A. C.), [Dr. F. C. Shrubbsall and], Mental Deficiency Practice: the Procedure for the Ascertainment and Disposal of the Mentally Defective (*Review*), 456
- Williams (A. F.), The Genesis of the Diamond. 2 vols. (*Review*), 255
- Williams (A. S.), Seasonal Changes on Jupiter, 808
- Williams (Prof. B.), Great Britain and the Conferences of the Institut Colonial International, 683
- Williams (D. L. H.), awarded a silver medal of the Royal Aeronautical Society, 510
- Williams (Dr. E. J.), Spectrum and Latitude Variation of Penetrating Radiation, 511
- Williams (F. E.), Depopulation in Papua, 519
- Williams (R. T.), [J. Pryde and], A New Unsaturated Derivative of Glucuronic Acid, 57
- Williams (W. E.), and A. Middleton, Fine Structure of the Resonance Ag I Lines, 692
- Williamson (A. V.), elected reader in geography in Leeds University, 372



- Williamson (E. B.), [death], 646  
 Willmott (S. G.), Solanine Poisoning, 813  
 Willis (Prof. Bailey), Earthquakes in the Holy Land : a Correction, 550; Isthmian Links, 696  
 Wilson (A. H.), appointed a university lecturer in mathematics in Cambridge University, 848; awarded the Adams prize of Cambridge University, 736  
 Wilson (Dr. C. B.), The Copepods of the Woods Hole Region, Mass., 698  
 Wilson (C. T. R.), J. A. Ratcliffe and E. L. C. White, An Automatic Recording Method for Wireless Investigations of the Ionosphere, 522  
 Wilson (Dr. E. D.), [Dr. V. K. Zworykin and], Photocells and their Application. Second edition (*Review*), 860  
 Wilson (G. F.), Pollination in Orchards, 659  
 Wilson (J. C.), High-Frequency Electric Discharge in Gases, 546  
 Wilson (P. A.), [Prof. A. M. Carr-Saunders and], The Professions (*Review*), 863  
 Wilson (V.), The Corallian Rocks of Yorkshire (1), 595  
 Winckworth (R.), The British Marine Mollusca, 334  
 Wingfield-Stratford (Dr. E.), They That Take the Sword (*Review*), 635  
 Winton (Dr. A. L.), and Dr. Kate Barber Winton, The Structure and Composition of Foods. Vol. 1 (*Review*), 316  
 Winton (Dr. F. R.), recommended as reader in physiology in Cambridge University, 736  
 Winton (Dr. Kate Barber), [Dr. A. L. Winton and], The Structure and Composition of Foods. Vol. 1 (*Review*), 316  
 Wodlinger (M. H.), Bibliographical Survey of Vitamins, 1650-1930: with a section on Patents (*Review*), 568  
 Wohl (Mlle.), [Mme. Ramart-Lucas and], Colour and Structure of Amides, 286  
 Wojtusiak (R. J.), Antagonistic Action of Ultra-Violet Rays on the Phototaxy of *Daphnia magna* Straus, 703  
 Wolf (Prof. Max), [obituary article], 353  
 Wolff (Prof. G.), *Leben und Erkennen: Vorarbeiten zu einer biologischen Philosophie* (*Review*), 529  
 Wollman (Mme. E.), [J. Basset, M. A. Macheboeuf, M. Bardach and], Biological Effects of Ultra-Pressures, 774  
 Wong (Dr. K. Chimin), and Dr. Wu Lien-Teh, History of Chinese Medicine: being a Chronicle of Medical Happenings in China from Ancient Times to the Present Period (*Review*), 527  
 Wood (H. O.), and C. F. Richter, Californian Earthquake of March 10, 1907, 686  
 Wood (J. G.), [T. G. B. Osborn, T. B. Paltridge and], Growth and Reaction to Grazing of the Perennial Saltbush, *Atriplex vesicarium*, 631  
 Wood (Prof. R. W.), Remarkable Optical Properties of the Alkali Metals, 582  
 Wood (W. A.), Selective Lattice Distortion in Wires under Torsion, 842  
 Woodward (Sir Arthur Smith), The Second Piltown Skull, 242  
 Woolf (Arthur), A Cornish Engineer, Rhys Jenkins, 124  
 Woolley (C. L.), Ritual at Ur, 356  
 Woolley (Dr. R. v. d. R.), Microphotometry of the Solar Spectrum from 4040 to 4390 Å., 917  
 Wooster (Dr. W. A.), Electrometer Triode in the X-Ray Ionisation Spectrometer, 545  
 Worcester (Marquis of), work of, 267  
 Wordie (J. M.), and Dr. S. Kemp, Ice in the Weddell Sea, 916  
 Worley (Prof. F. P.), Forest Fires in Relation to Soil Fertility, 787  
 Wright (A. R.), [obituary article], 49  
 Wright (E. E.), The Kerr Cell, 702  
 Wright (Dr. Orville), awarded the Franklin medal of the Franklin Institute, 870  
 Wright (Prof. W.), Sir Bertram Windle (*Review*), 307  
 Wynne-Jones (W. F. K.), Acid Strength and its Dependence upon the Nature of the Solvent, 374  
 Xavier (R. P.), retirement from the directorship of the Brazilian Meteorological Service, 581  
 Yanagihara (A.), [Dr. T. Takamine, T. Suga and], Anode Spot in a Neon Tube, 584  
 Yapp (W. B.), Teaching of Biology, 203  
 Yetts (W. P.), appointed professor of Chinese art and archaeology at the Courtauld Institute of Art, 336  
 Yonge (Prof. C. M.), Crystalline Style in Gastropods, 915  
 Yosida [Obata, Morita and], Aeroplane Noises, 208  
 Younge (J. Z.), Physiology of the Iris (1), 178  
 Young (L.), presented with the Sir Edward Frankland medal and prize of the Institute of Chemistry, 357  
 Young (M.), [Corisande Smyth and], Facial Growth in Children, 29  
 Zagar (F.), Increase in Mass of a Planet by the Effect of Cosmic Dust (1), 775  
 Zeiss (Carl), New Lens of High Rapidity for Cinematography, 475  
 Zellner (J.), [E. Fraenkel and], Comparative Plant Chemistry (24), 888; [L. Lukacs and], Chemistry of the Higher Fungi (22), 888  
 Zworykin (Dr. V. K.), and Dr. E. D. Wilson, Photocells and their Application. Second edition (*Review*), 860  
 Zilva (Dr. S. S.), Indophenol Reducing Capacity of Lemon Juice and its Fractions in Relation to Vitamin C Activity, 363; [M. E. F. Crawford, E. O. V. Perry and], Vitamin Content of Australian, New Zealand and English Butters, 770  
 Zirkle (Dr. C.), Discovery of Sexuality in Plants, 392  
 Zuckerman (Dr. S.), Ancient and Modern Man, 367



## TITLE INDEX

- Academic: Assistance Council, Formation of an, 793; Freedom, Nationalism and, 853
- Accidents, The Causes of, E. Farmer (*Review*), 895
- Acenaphthene: Catalytic Oxidation of, H. Paillard and R. Duckert, 815; Chlorination of, H. Paillard and P. Favarger, 815
- Acetic Acid: at 25°, Dissociation Constant of, Limiting Mobilities of some Monovalent Ions and the, Dr. A. I. Vogel and G. H. Jeffery, 27; in Water, Dissociation of, Dr. C. W. Davies and W. H. Banks, 328
- Acetylated Aldonic Nitriles, A Rule for the Rotatory Direction of the, Dr. V. Deulofeu, 548
- Acetylene: Direct Oxidation of, by Air, P. Mondain-Monval and R. Wellard, 851; Linkage, Mlle. B. Greedy, 774
- Acetylenic Hydrocarbons, Oxidation of the true, by Selenious Oxide, R. Truchet, 595
- Acid Strength and its Dependence upon the Nature of the Solvent, W. F. K. Wynne-Jones, 374
- Acoustics, Architectural, Prof. V. O. Knudsen (*Review*), 894
- Acquired Characters, Inheritance of, Dr. R. L. Jenkins, 95
- Actinomycetales, The, H. L. Jensen (4), 631
- Adenine: Hydrochloride, Crystal Structure of Vitamin B<sub>1</sub>, and of, J. D. Bernal and D. Crowfoot, 911; Vitamin B<sub>4</sub> and, R. D. Heard, H. W. Kinnersley, J. R. O'Brien, Prof. R. A. Peters, and V. Reader, 617
- Adiabatic Lapse-Rate for Dry and Saturated Air, D. Brunt, 814
- Adrenal Gland, Vitamin C in the, G. Bourne, 874
- Advanced Study, Institute of: Appointments at the, 88; Work of the, 89
- Ægiceras majus*, Gaertn., Embryology and Seedling Development of, Gladys Carey and Lilian Fraser, 287
- Aerological Soundings and the Wind Gradient in Switzerland, G. Tiercy and P. Berger, 143
- Aeronautics: and the Royal Air Force, Sir Philip Sassoon, 428; Contribution of Science in the Development of, Prof. S. Pippard, 65
- Aeroplane Noises, Obata, Morita and Yosida, 208
- Africa, France and Great Britain in, A. Sarraut, 831
- African Animals, Two, Past Wanderings in Europe of, Dr. R. F. Scharff, 922
- Agricultural: Atlas of England and Wales, An, M. Messer. Second edition (*Review*), 420; Botany, National Institute of, 430; Crops, Varieties of, 594; History in Germany, 721; Research, Farmers' Guide to, 1931, 163; in Great Britain, 90; Science, Economic Value of, Lord Bledisloe, 197; Seeds, Sowing, 248; Societies, 869
- Agriculture and Milk Supply, Prof. H. E. Armstrong, 605
- Ailsa Craig, Bird Life on, 903
- Akron, Loss of the, 499
- Air-Benzene Mixtures, The Combustion Pressures in Closed Vessels of, Y. Laure, 447
- Aircraft: in relation to Petroleum Technology, 160; Two-seater, Height Record, H. J. Penrose, 160
- Air: -Map, An Experimental, 357; Movements produced by the Flapping Wing of a Bird or Insect, A Hot Wire Apparatus for the Study of the, A. Magnan and C. Magnan, 922; Speed Record, New, Warrant-Officer F. Agello, 580; Waves from Experimental Explosions, Dr. F. J. W. Whipple, 138
- Alai-Pamir Expedition 1928, Wissenschaftliche Ergebnisse der, Herausgegeben von Dr. H. v. Ficker und Dr. W. R. Rickmers. Teil 1: Geodätische, Topographische und Glaziologische Ergebnisse. Von Dr. R. Finsterwalder. Band 1: Geodätischer und glaziologischer Teil. Band 2: Kartenbeilagen. Teil 2: Geologische Untersuchungen im nordwestlichen Pamir-Gebiet und mittleren Transalai. Von Dr. L. Nöth. Band 1: Stratigraphie (ausschliesslich Quartär), Tektonik. Band 2: Quartäre Ablagerungen, Morphologie. Teil 3: Beiträge zur Faunistik des Pamir-Gebietes. Von Dr. W. F. Reinig. Band 1: Ökologie und Tiergeographie. Band 2: Systematischer Teil (*Review*), 744
- Alaska: Destruction of Predatory Animals in, 695; Excavation in, 161
- Alchimy", "Ordinal of: The Authorship of the, Dr. M. Nierenstein and P. F. Chapman, 520; Thomas Norton and the, Dr. E. J. Holmyard, 520
- Alcohol: In Chase of Truth of, Prof. H. E. Armstrong, 53; -Petrol as a Motor Fuel, 464; Power, 341; through the Ages, Dr. E. F. Armstrong, 810
- Alcoholic Fermentation, Prof. A. Harden, 756
- Aldehydes, Synthesis of, G. Darzens and M. Meyer, 483
- Algebra, Advanced, C. V. Durell. Vol. 1 (*Review*), 319
- Algebraic Surface, Certain Invariant Series of Groups of Points on an, F. Enriques, 559
- $\alpha$ -Alkyladipic Acids, A Synthesis of, A. Franke, A. Kroupa and S. Hadzidimitriu, 287
- Alkylanilines with Tertiary Alkyl Groups, Dr. W. J. Hickinbottom, 762
- Alkyl Groups, Volumes of, and their Orienting Powers, Dr. R. J. W. Le Fèvre, 655
- Alkylmagnesium Iodides, Action of, on (1:9)-Benzanthrone-(10), G. Charrier and Elisa Ghiga, 107
- Alkali: - and Barium-Silver Chlorides, J. Hoffmann, 704; Metal Halides, Crystals of, Plasticity and Hardness of, Prof. K. Przibram, 560; Metals: Examination of Minerals for the, R. Bossuet, 923; Remarkable Optical Properties of the, Prof. R. W. Wood, 582; in the Oxyacetylene flame, Photographic Sensibility of the Lines of the, R. Bossuet, 482
- Allantoic Acid in the Higher Plants, Rôle of, R. Fosse, P. de Graeve and P. E. Thomas, 702
- Allantonic Membrane of the Chick Exposed to X-Radiation, W. Moppett, 667
- Allium*, Structure and Division of Somatic Chromosomes in, Prof. T. K. Koshy, 362
- Alloys, Structure of, Prof. W. L. Bragg, 749
- Alpha Particle, The Entry of the Disintegrating, into the Nitrogen Nucleus, etc., E. C. Pollard, 375
- Aluminium: Alloys at High Temperatures, Fatigue-Resisting Properties of, J. W. Cuthbertson, 660; Alloys Containing Iron as a Model of the Electrolytic Purification of Molten Aluminium from Iron, Electrolysis of, R. Kremann and L. Lammermayer, 251; -Beryllium Alloys, Ageing of the, after Tempering, C. Matignon and J. Calvet, 886; Hydride, Band Spectrum of, Predissociation and Pressure Effects in the, Prof. E. Hulthén and R. Rydberg, 470; Hyperfine Structure in, R. Ritschl, 58; in Food-Stuffs, Dr. Beal, 432; Separation of Phosphoric, Arsenic and Vanadic Acids from, A. Travers and Lu, 595; Single Crystals, Recrystallisation Power and Shear Hardening in, Dr. W. G. Burgers, 326
- American: Academy of Arts and Sciences, Award of the Rumford medal to Dr. H. Shapley, 871; Association, Election of Officers, 164; Prof. H. N. Russell elected president, and Prof. H. B. Ward elected permanent secretary; award of the American Association prize to Dr. H. Eyring, 304; Pronghorn increasing in numbers, 849
- Amides, Colour and Structure of, Mme. Ramart-Lucas and Mlle. Wohl, 286
- Amino-Acids, Proteins and Proteolytic Enzymes, Prof. M. Bergmann, 662; 698
- Aminoazo-Compounds, Chemical Changes Involved in the Formation of the, J. C. Earl and N. F. Hall (2), 667



- Ammonia, Aqueous Solution of, Photolysis of, L. Gion, 410  
 Ammonites, Phylogeny of, late J. Perrin Smith, 368  
 Amor, The Minor Planet, 476  
 Amphibia, Internal Ear of, C. Guareschi, 659  
 Amphibians and Fishes, Chromosomes of, Dr. S. Iriki, 659  
*Amphioxus*, Nephridia of, Prof. E. S. Goodrich, 439  
 Analysts: Public, and the Food Industry, Dr. J. T. Dunn (Review), 822; Society of Public, and other Analytical Chemists, Dr. B. Dyer and Dr. C. A. Mitchell (Review), 822  
 Ancestor Spirits among the Nuba, D. Hawksworth, 403  
 Ancient Monuments of England, The, Sir Charles Peers, 253  
 Andalusite Twin, An, P. Aloisi, 851  
 Andaman and Nicobar Islands, Census Report, 199  
 Andes in Ecuador, Age of the, 589  
 Angiosperms, Origin of, Prof. G. R. Wieland, 360  
 Animal: Growth, Heterogony and the Chemical Ground-Plan of, C. H. Waddington, 134; Life, Components of the Atmosphere, and Synthetic Gases in Relation to, Prof. J. W. Hershey, 238; Lore in English Literature, Dr. P. A. Robin (Review), 257; Myths (Review), 257  
 Animals, Vertebrate, Collecting and Preserving, Methods of, R. M. Anderson, 906  
 Ankle, South-West, and Adjacent Territories, Geology of, A. D. Combe, A. W. Groves and W. C. Simmons, 172  
 Annuaire Astronomique Camille Flammarion, 1933, 369  
 Annual Register, The, 1932, Edited by Dr. M. Epstein (Review), 824  
 Anuario del Observatorio Astronomico de Madrid, 1933, 405  
 Anode Spot in a Neon Tube, Dr. T. Takamine, T. Suga and A. Yanagihara, 584  
 Antarctic: Australian Sector in the, 577; British Claims in the, 270; Geology and Glaciation, 847  
 Antennal Secretion in Insecta, S. Maulik, 516  
 Anthropological: and Ethnological Sciences, International Congress of, 719; Fieldwork, Aeroplane and Camera in (Review), 599; Research, Aims of, Prof. F. Boas, 196; Teaching and Research in, Prof. R. Firth, 540  
 Anthropology, Early Publication in, 53  
 Anticyclones, Intrusion of Air into, C. S. Durst, 737  
 Antimony: Iodide, Precipitation of, and its Hydrolysis, F. Francois, 923; Molecular Fluorescence of, Jean Genard, 132; Poisoning from Enamelled Vessels, 915  
 Anti-Veterinary Propaganda, 90  
 Aphanapteryx, The Dodo and the, G. Renshaw, 728  
 Aphids, Time of Embryonic Segregation in, A. F. Shull, 775  
 Apples, Colour of, Improvement of, H. Goude, 331  
 April Showers, 481  
 Aquaria, 270  
 Aquatic Insect Larvæ, Tracheal and Blood Gills in, Dr. W. H. Thorpe, 549  
 Aqueous: Electrolytes, Determination of the Dielectric Constants of, Application of the Resonance Method to the, M. Jezewski, 448; Solutions, Viscosity of, Grinnell Jones and S. K. Talley, 475  
 Archaic Tracks Round Cambridge, A. Watkins (Review), 491  
 Archaeological Exploration in Oaxaca, Mexico, Miss Emma Reh, 509  
 Archaeology: and Folk-Tradition, Prof. H. J. Fleure, 431; Ethics and, 561  
 Archimedean Bodies in Spaces of Several Dimensions, K. Klemenz, 703  
 Architectural Graphic Standards: for Architects, Engineers, Decorators, Builders and Draftsmen, C. G. Ramsey and H. R. Sleeper (Review), 224  
 Arctic Ice passes Cape Farewell, 105  
 Argentine, Archaeological Researches in the, late Dr. E. Boman, 63  
 Aristogenesis, Prof. H. F. Osborn, 768  
 Armstrong College, Report for 1931-32 of the Standing Committee for Research, 920  
 Arsenic, Nuclear Moment of, M. F. Crawford and A. M. Crooker, 655  
 Arsenolite and Senarmontite, Orientation of, by Mica, R. Hocart, 851  
 Arts in Industry, The, 73  
*Ascaphus*, The 'Tail' of the Male American Toad, Prof. C. G. S. de Villiers, 692  
 Ascorbic Acid: Prof. A. Szent-Györgyi and Prof. W. N. Haworth, 24; Constitution of, Dr. E. L. Hirst, E. G. V. Percival and F. Smith, 617; Vitamin C and, A. L. Bacharach, 364; Estimation and Distribution of, and Glutathione in Animal Tissues, T. W. Birch and Dr. W. J. Dann, 469  
 Asia: Central, Research in, 705; Innermost (Review), 415; South-East, Prehistory of, Dr. F. Sarasin, 879  
 Ashmolean, The Old: Oxford, T. E. James, 716; The 250th Anniversary of, 793  
 Asparagus Growing, Bulletin on, 722  
 Aspergillin: The Pigment of the Spores of *Aspergillus niger*, A. Quilico and A. di Capua, (1), 851, (2), 924  
*Aspergillus niger*, Action of Certain Alkaloids on the Development of, G. Mezzadrola and A. Amati, 339  
 Astrolabes: (Review), 819; of the World, The, Dr. R. T. Gunther, 2 vols. (Review), 819  
 Astronomical: Notes for January, 31; February, 137; March, 281; April, 476; May, 625; June, 769; Radiative Stability, The: Sir Joseph Larmor, 805; Dr. G. C. Simpson, 875  
 Astronomy, Observational and Theoretical, Prof. H. H. Plaskett, 648  
 Athenæum Club, Election to: Dr. S. Courtauld, E. G. V. Knox and Dr. N. V. Sidgwick, 200; Wing-Commdr. the Hon. Maurice Baring, Prof. W. Langdon Brown and Prof. H. H. Dodwell, 510  
 Äthiopen des Westens: Forschungsreisen in Portugiesisch-Guinea, Dr. H. A. Bernatzik. Band 1 und 2 (Review), 599  
 Atlantic Ocean: Southern, Life in the, 34; South-West Influence of the Pacific on the Circulation in the, A. J. Clowes, 189  
 Atmosphere: Components of the, and Synthetic Gases in Relation to Animal Life, Prof. J. W. Hershey, 238; in the Lyons Region, Transparency of the, P. Flagolet, 339  
 Atmospheric: Ionisation, Influence of Condensation Nuclei and Dust Particles on, Prof. P. J. Nolan, 922; Ions, Relations between the Combination Coefficients of, F. J. W. Whipple, 522; Ozone, Estimation of, by Visual Photometry, J. Gauzit, 36; Pollution, Investigation of, 758  
 Atmospherics in Australia, G. H. Munro and L. G. H. Huxley, 592  
 Atom: The Interpretation of the, Prof. F. Soddy (Review), 4; Properties of the, Prof. G. Hevesy (Review), 4  
 Atomic: and Molecular Forces of Chemical and Physical Interaction in Liquids and Gases, and their Effects, Prof. R. D. Kleeman (Review), 80; Charge, Determination of, Early History of the, 569; Disintegration with Emission of Neutrons, G. Kirsch and R. Trattner, 852; Number Zero, The New Element of, the Neutron and Neutron, Prof. W. D. Harkins, 23; Physics, Recent Advances in, Prof. G. Castelfranchi. Translated by Dr. W. S. Stiles and Dr. J. W. T. Walsh. 2 vols. (Review), 319; Weights, International, 405  
 Atoms, Molecules and the Atmosphere, Prof. S. Chapman, 271  
*Atriplex vesicarium*, Growth and Reaction to Grazing of the Perennial Saltbush, T. G. B. Osborn, J. G. Wood and T. B. Paltridge, 631  
 Audio Frequency Atmospherics, Effects of Solar Eclipse on, E. T. Burton and E. M. Boardman, 81  
 Auroras, Low, Dr. G. C. Simpson, 828  
 Australia: Anthropological Teaching and Research in, Prof. R. Firth, 540; Atmospherics in, G. H. Munro and L. G. H. Huxley, 592; The Cultural and Racial Clash in, Dr. A. P. Elkin, 520; Improvement of Beef Cattle in, 576; Possible Correlation of Certain Pre-Cambrian Granites of, W. R. Browne, 667; Prickly Pear in, Eradication of, 613



- Australian : Dairy Cattle Research Council, 356 ; Entomology, Bibliography of, 1775-1930, 466 ; Hesperidae, G. A. Waterhouse (3), 631 ; Opals,  $\beta$ -Cristobalite in, Occurrence of, F. P. Dwyer and D. P. Mellor, 524 ; Timbers, Chemistry of, 333 ; Water Supply, Dr. J. P. Thomson, 797
- Autogiro, New, 646
- Avitaminosis and Intoxication, M. Mitolo (1), 411 ; (2), 484
- $\beta$ -Rays : Relation between the Absorption of, by Organic Compounds and the Molecular Structure of the Latter, G. Fournier and M. Guillot, 447 ; Absorption of the, by Matter, G. Fournier and M. Guillot, 179
- B. salmonicida* in River Waters, Presence of a Bacteriophage for, Dr. C. Todd, 360
- Bacon : Francis, a Biography, Mary Sturt (*Review*), 490
- Bacterial : Detoxification, R. S. Harris and J. W. M. Bunker, 244 ; Growth Curve, The, and the History of Species, Dr. A. S. Corbet, 61 ; Proteases, Influence of Hydrocyanic Acid on, G. Gorbach and A. Schonbeck, 287
- von Baeyer, Adolf, als Lehrer und Forscher, Prof. H. Rupe, 294
- Bananas, Hybrid, E. E. Cheeseman, 552
- Band Spectra which appear near Visible Triplet Lines of Mercury, E. Matuyama, 58
- Baltic, Inertia Currents in the, T. Gustafson and B. Kullenberg, 586
- Bari Rain-Maker, Burial of a, A. C. Barton, 29
- B Vitamins, Rôle of the, in the Utilisation of the Glycides by the Organism of the Pigeon, R. Lecoq, 630
- Barium : Azide, Acceleration of the Decomposition of Crystals of, by the Emission from Radium Emanation, Prof. W. E. Garner and C. H. Moon, 513 ; Oxide (BaO), Band Spectra of, P. C. Mahanti, 402
- Barley : 409 ; Egyptian Neolithic, A. Jackson, 652
- Barnacles, Young, Change their Coats, 594
- Barracuda Fisheries, 773
- Bast-Sap, Prof. H. H. Dixon, 367
- Batholiths and Ore Deposits, Prof. W. H. Emmons, 730
- Bathysphere, Deep Sea Dives in the, Dr. W. Beebe, 776
- Battersea Power Station, I. V. Robinson, 720
- Bau der Erde, Der, und die Bewegungen ihrer Oberfläche : eine Einführung in der Grundfragen der allgemeinen Geologie, Prof. W. von Seidlitz (*Review*), 318
- Bauxite and Aluminous Laterite, Dr. C. S. Fox. Second edition (*Review*), 347
- 'Bayoud', a Disease of the Date Palm, Etiology of, R. Maire, E. Foëx and G. Malençon, 922
- Bechuanaland, Chastity in, Dr. I. Shapera, 516
- B.D.H. : Guide to the B.P. 1932, 128 ; Products, 834
- Belfast University, Dr. K. G. Emelëus appointed professor of experimental physics, 628
- Belgrade, University of, Observatory of the, *Annuaire* of the, for 1933, 518
- Bengali Chemist, Life and Experiences of a, Sir Prafulla Chandra Rây (*Review*), 672
- Bentham's Theory of Fictions, C. K. Ogden (*Review*), 152
- Benzene, Slow Combustion of, J. Amiel, 774
- p*-Benzoquinone Crystal, Orientations of Molecules in the, K. S. Krishnan and S. Banerjee, 653
- Beriberi, Mechanism of Sudden Heart-Failure in Cases of, K. F. Wenckebach, 251
- Berkeley, Prof. G. Dawes Hicks (*Review*), 322
- Bërûni, Das Vorwort zur Drogenkunde des. Eingeleitet, übersetzt und erläutert von M. Meyerhof (*Review*), 491
- Beryllium and Helium, Lord Rayleigh, 724
- Bessemer gold medal of the Iron and Steel Institute, Award of the, to Dr. W. H. Hatfield, 236
- Bezssonoff's Reaction for the *C* Factor, Nature and Value of, A. Salvatori, 339
- Bildtelegraphie und des Fernsehens, Handbuch der : Grundlagen, Entwicklungsziele und Grenzen der elektrischen Bildfernübertragung. Bearbeitet und herausgegeben von Prof. F. Schröter (*Review*), 781
- Binary Alloys, Constitution of, at Room Temperature, Prof. A. N. Campbell, 438
- Biochemistry, Researches in, Prof. A. Stoll, 541
- Biographical Fragments, Sir Arthur Schuster (*Review*), 75
- Biology : and Philosophy (*Review*), 529 ; Teaching of, W. B. Yapp, 203
- Biology's Message for Civilisation, Prof. H. B. Fantham, 197
- Biotechnology, 597
- Bird : Life on Ailsa Craig, 903 ; Migration, Prof. W. Rowan (3), 288 ; in Tropical Africa, J. P. Chapin, 331
- Birds : Courtship of, 392 ; Frequency of, 885 ; Migration and Plumage Coloration of, 921 ; Movements of Winter Flocks of, 69 ; New Zealand, The Life Histories of, E. F. Stead (*Review*), 603 ; of Suffolk, A History of the, Dr. C. B. Ticehurst (*Review*), 568 ; of the Indian Empire, The Nidification of, E. C. Stuart Baker. Vol. 1 (*Review*), 384 ; of the Russian Altai and North-West Mongolia, Distribution of, late P. Sushkin, 551 ; Summer Visiting, Immigration of, 481 ; Wild, Protection of, 337 ; Winter Congregations of, 69 ; Winter Territory Amongst, J. B. Price, 730
- Birmingham University : appointment of Dr. J. F. Brailsford as radiological demonstrator in anatomy and W. J. Rees as temporary assistant lecturer in botany, 248 ; W. Barrow elected pro-chancellor ; conferment of title of emeritus professor on Prof. W. S. Boulton and Prof. J. T. J. Morrison, 336 ; Foundation of a Poynting lecture, 736
- Birthday Honours, King's, 830
- Birth Control Association, National, Annual Report of the, 271
- Bitumen in Embalming, Dr. P. E. Spielmann, 588
- Bituminous Schists, A New Method of Analysis of, J. Barlot, 774
- Blackboard Coloured Diagrams : Biological Series, *Rana temporaria*, 3 parts (*Review*), 786
- Blackthorn Winter, The, 445
- Blood : Pigments of the Invertebrates, Molecular Weights of the, Prof. The Svedberg and Astrid Hedenius, 325 ; Pressure, Recording and Measurement of the, L. Bugnard, P. Gley and A. Langevin, 375 ; -Vessels, Disposal of Debris by, Drs. E. R. and E. L. Clark, 880
- Botany in Russia, 554
- Bond's Numerical Examples in Physics, concerning the review of, Lord Holden, 467
- Boric Acid in Sea Water and its Effect on the Carbon Dioxide Equilibrium, K. Buch, 688
- Boron : Hydrides, Electrolysis of, A. Stock and E. Wiborg, 212 ; Structure of the *K* Line of, A. Hautot, 595
- 'Borrowed Days', The : 445 ; Sir Herbert Maxwell, Bt., 515
- Botanical Analyses of Grasslands, Two Forms of Sampler used in Estimating the number of Plants per Acre in, M. J. Gorman, 410
- Brachiopod Genera of the Sub-Orders Orthoidea and Pentameroidea, Dr. C. Schuchert and G. A. Cooper, 244
- Brazil Nuts, Barium as a Normal Constituent of, W. M. Seaber, 814
- Brazilian Meteorological Service, Retirement of R. P. Xavier as director ; Appointment of C. de A. Martins Costa, 581
- Bridges, Early American, Evolution of, Capt. L. N. Edwards, 429
- Bristol : District, Geology of the, Prof. S. H. Reynolds, 65 ; University : bequest to, by J. W. White, 299 ; Report for 1931-32, 665 ; Dr. R. W. Gurney appointed a research fellow, 772 ; Dr. J. F. Baker appointed professor of civil engineering, Prof. A. E. Trueman professor of geology, Prof. G. Hadfield professor of pathology, J. W. de Witt G. Thornton lecturer in pharmacology, J. D. A. Gray senior pathological officer, and J. W. Edgell dairy bacteriologist, 848



- British: Architects, Royal Institute of: award of the Royal gold medal of the, to Sir Charles Peers, 236; 497; Army, Health of the, during 1931, Lieut.-Gen. Fawcus, 509; Association: Installation of Sir Frederick Gowland Hopkins as president, 50; Leicester meeting of the, 680; Mathematical Tables. Vol. 1: Circular and Hyperbolic Functions, Exponential Sine and Cosine Integrals, Factorial (Gamma) and Derived Functions, Integrals of Probability Integral. Prepared by the Committee for the Calculation of Mathematical Tables. Vol. 2: Emden Functions: Being Solutions of Emden's Equation, together with Certain Associated Functions (*Review*), 318; Coals, A. L. Curtis, 580; County Flora (*Review*), 309; Electrical and Allied Industries Association, Annual Report of the, 267; Forestry, Problems of, Prof. R. S. Troup, 900; Geographers, Institute of, Election of officers, 51; Industries Fair: 87; Scientific Instrument Section, 139; Marine Mollusca, The, R. Winckworth, 334; Museum: Sir Charles Reed Peers appointed a trustee of the, 164; (Natural History): Acquisitions at the, 163; 301; 464, 465; 795; Catalogue of the Pontian Carnivora of Europe in the Department of Geology, Dr. G. E. Pilgrim (*Review*), 454; Ornithologists' Union, Dr. W. Stone elected an honorary member of the, 723; Polar Year Expedition, Report of, J. M. Stagg, 464; Science Guild Research and Development Lecture, 124; Solomon Islands: Early History of the, R. J. A. W. Lever, 587; Protectorate, H. T. Pagden appointed entomologist to the, 687; Zoologists, Association of, Annual Meeting of the, 88
- Broadcasting, Empire, 16; 160
- Bromine: -Hydrogen and Bromine-Carbon Dioxide, Measurement of the Diffusion Coefficients of, J. E. Mackenzie and H. W. Melville, 250; Spectra of, Br V, VII and IV, A. S. Rao and Dr. K. R. Rao, 170
- Brush-Turkeys, Nest-Building of, 233
- 'Buchan Cold-Spell': The First, 177; Second, 521; Third, the Ice Saints, 665; Fourth, 921
- Buff's Compound, Complex Anion of, and of Bunsen's Salt, F. Holzl and W. Stockmair, 251
- Bufumbira, The Volcanic Area of, Part 1: The Geology of the Volcanic Area of Bufumbira, South-West Uganda; with notes on the Petrology and Economic Geology, A. D. Combe and W. C. Simmons (*Review*), 821
- 'Bull-Dog' Calf in African Cattle, J. Carmichael, 878
- Bull Frogs Calling, 629
- Bunsen Society, Prof. F. G. Donnan elected an honorary member of the, 871
- Burmese Spirit-World, Maung Htin Aung, 767
- Business Rationalisation, its Dangers and Advantages considered from the Psychological and Social Standpoints, Dr. C. S. Myers (*Review*), 567
- Butterflies, Preying of Birds on, Effect of, C. L. Collenette, 200
- Butters, Australian, New Zealand and English, Vitamin Content of, M. E. F. Crawford, E. O. V. Perry and Dr. S. S. Zilva, 770
- Butyl Alcohol, Catalytic Dehydration of, by Alumina, Causes of the Simultaneous Production of 1-Butene and 2-Butene in the Course of the, C. Matignon, H. Moureu and M. Dodé, 738
- Cabbages and related Green Crops, 21
- Cacao Research at the Imperial College of Tropical Agriculture, 580
- Cadmium Hydride, Isotope Effect in the Spectrum of, E. Svensson, 28
- Cahn Hill-Improvement Scheme, Wales, M. Griffiths appointed lands director, 720
- Calanus: finmarchicus*, Life History of, 843; Metamorphosis of, 105
- Calcite, Periodicity in the Solarisation of, S. Iimori, 619
- Calcium: Isotope with Mass 41 and the Radioactive Half-Period of Potassium, Prof. J. Kendall, W. W. Smith and T. Tait, 688; Phosphate, Palaeozoic Deposits of, Rôle of the Trilobites in the Genesis of the, L. Cayeux, 850
- Calculating Machine, An Electrical, R. M. Mallock, 880
- Calculus of Variations, Characterisation of Fields in the, M. Morse and S. B. Littauer, 631
- Calendar: of Nature Topics, 17, 34, 69, 105, 141, 177, 213, 248, 284, 337, 373, 409, 445, 481, 521, 557, 594, 629, 665, 701, 737, 773, 812, 849, 885, 921; The, and its Reform, F. A. Black (*Review*), 859
- California Ground Squirrel Control Program, E. S. Kellogg, 721
- Californian Earthquake of March 10, H. O. Wood and C. F. Richter, 686
- Cambial Activity, Prof. J. H. Priestley, Lorna I. Scott and Marjorie E. Malins, 375
- Cambridge University: Dr. G. Salt elected Stringer fellow at King's College, 141; Opening of the Royal Society Mond Laboratory, 210; Dr. H. Spencer Jones elected an honorary fellow of Jesus College, 213; gift to the Molteno Institute of Parasitology by the Rockefeller Foundation; gift by the Goldsmiths' Company; award of the Gordon Wigan prize for chemistry to T. P. Hoar, 284; award of the Balfour studentship in biology to F. R. Parrington, 336; Dr. N. J. T. M. Needham appointed Sir William Dunn reader in biochemistry; V. J. Chapman elected Frank Smart student in botany; E. A. Maxwell and R. H. Stoy awarded Smith's prizes; W. E. Candler, C. Strachan and M. H. H. Walters awarded Rayleigh prizes, 408; gift by W. J. Courtauld, 444; A. G. D. Watson and E. S. Shire elected fellows of King's College, 593; W. V. Lewis appointed University demonstrator in geography, and Dr. N. W. Pirie University demonstrator in biochemistry, 628; Dr. M. Dixon appointed University lecturer in biochemistry; Dr. E. G. Holmes University lecturer in place of Dr. M. Dixon; A. D. Thackeray elected Sheepshanks exhibitioner, 665; bequest by F. E. Elmore; gift by J. E. Little, 700; award of the Adams prize to A. H. Wilson; grants made from the Balfour fund to C. Forster Cooper and I. T. Sanderson; Dr. F. R. Winton recommended for the readership in physiology; H. McC. Taylor elected a research fellow of Clare College, 736; award of the Raymond Horton-Smith prize to Dr. J. E. Semple, 772; Dr. R. O. Redman appointed University lecturer in astrophysics; J. A. Ratcliffe University lecturer in physics; Dr. N. Feather and P. I. Dee University demonstrators in physics; proposed foundation of a studentship in human anatomy and a readership in pharmacology under the Shield bequest, 811; R. F. Kahn appointed University lecturer in economics and politics, A. H. Wilson, W. V. D. Hodge and P. Hall University lecturers in mathematics; gift by Mrs. G. Stephenson, 848; bequest by S. H. Bickham; Prof. D. B. Copland appointed Alfred Marshall lecturer for 1933-34; award of the Wyse studentship to Miss M. M. Hunter, 884; Dr. G. D. H. Bell appointed University demonstrator in agricultural biology; Dr. K. A. C. Elliott elected a fellow of Selwyn College, 920
- Canada: National Research Council of: Report of the, for 1931-32, 869; Work of the, 648; Newfoundland, Bermuda, British West Indies, British Guiana and the Falkland Islands, Directory of Museums and Art Galleries in, Sir Henry A. Miers and S. F. Markham, 84; Radium in, Assays of, H. S. Spencer, 55; The Museums of, Sir Henry A. Miers and S. F. Markham, 84
- Canadian: Minerals of the Rare Elements, H. V. Ellsworth, 660; Water Power Development in 1932, Dr. Brysson Cunningham, 788
- Cancer: Hospital (Free) London, Research Grant for the; Appointment of Research Workers, 500, 509; -Producing Compounds, Sex Hormones and, Dr. J. W. Cook and Prof. E. C. Dodds, 205
- Candles and Candle-Making, D. Allan, 269



- Cannizzaro's Reaction, G. Lock (2), 560
- Cantor : Georg, Gesammelte Abhandlungen : Mathematischen und Philosophischen Inhalts mit erläuternden Anmerkungen sowie mit Ergänzungen aus dem Briefwechsel Cantor-Dedekind, Herausgegeben von E. Zermelo (*Review*), 418; The Mathematician of the Infinite, Prof. H. T. H. Piaggio (*Review*), 418
- Carbon : Dioxide in the Sea, 282; Fusion of, A. Egerton and M. Milford, 169; in the Diamond, Atomic Radius of, V. Posejpal, 410; Line  $K\alpha$ , Fine-Structure of the, M. Morand and A. Hautot, 143; Monoxide : Heats of Combustion of, in Oxygen, and of Nitrous Oxide in Carbon Monoxide at Constant Pressure, J. H. Awbery and Dr. E. Griffiths, 446; in Air, Detection of Traces of, Prof. H. Hartridge, 654; Dr. W. Ackermann, 441; H. R. Ambler and T. C. Sutton, 766
- Carbonic Anhydrase and the State of Carbon Dioxide in Blood, late Dr. N. U. Meldrum and Dr. F. J. W. Roughton, 874
- Carboniferous Molluscs of the Donetz Basin, D. M. Fedotov, 404
- Carbonyls of Lithium, Rubidium and Cæsium, Dr. T. G. Pearson, 166
- Carborundum Crystals, Photoconductive Effect in, Prof. Kamienski, 475
- Caribou in Canada, Migration of, 373
- Carnegie Institution, Central American Research by the, 809
- Carnegie, The Last Cruise of the, Dr. J. H. Paul (*Review*), 114
- Carotene Derivative, A, giving with Antimony Trichloride an Absorption Band at 610-630  $\mu$ , M. van Eekelen and A. Emmerie, 275
- Cartilage, Glycogen in, Dr. H. B. Fell and Dr. R. Robinson, 62
- Casein, New Researches on, E. Cherbuliez and F. Meyer, 215
- Cassiopeia,  $\gamma$ , Spectrum of, Dr. W. J. S. Lockyer, 134
- Catfish, Impulses from Sensory Nerves of, H. Hoagland, 631
- Cathode Ray : Oscillography, R. A. Watson Watt, 66; Oscillograph, New Applications of the, 103; Photography of Random Electrical Transients, F. W. Chapman, 620; Tube, A Method of Extending the Frequency Range of the, Prof. H. Hartridge, 95
- 'Catkin' Radio Valve, The, 735
- Cattle : Beef, Improvement of, in Australia, 576; Blood-Sucking Habit of a Bug, W. E. China, 806
- Cave Paintings in the Pyrenees, N. Casterat, 19
- Cavia, Early Stages in the Development of, N. H. W. Maclaren and Prof. T. H. Bryce, 922
- Cellulose : Acetate : its Manufacture and Applications, A. G. Lipscomb (*Review*), 454; Products, Lignin Content of, Dr. A. G. Norman and S. H. Jenkins, 729; Structure of : Prof. H. Mark, 591; Prof. M. J. Duclaux, 553
- Cenco News Chats, 200
- Central-Asian Tracks : On Ancient, Brief Narrative of Three Expeditions in Innermost Asia and North-Western China, Sir Aurel Stein (*Review*), 415
- Cephalic Index, Influence of the Variation of the, on that of the Alveolo-Palatinal and Superior Facial Indices, A. Perier, 815
- Cepheid, The Respective Phases of Ionisation Maxima and Light Maxima in a, G. Tiercy, 483
- Cepheids : Respective Phases of Minimum Ionisation and Light Minimum in the, G. Tiercy, 815; Variation of Ionisation and the Spectrum Variation of Some, G. Tiercy, 215
- Cerebral Cortex, Functions of the Olfactory Parts of the, C. J. Herrick, 739
- Cerebro-Spinal Meningitis, 128
- Cetacea, Worms Parasitic in, Dr. H. A. Baylis, 551
- Ceylon, Marine Biology in, Dr. J. Pearson, 54
- Chain : Reactions, Reaction Cells in, A. R. Ubbelohde, 328; The Electromotive Force of the, Mlle. Quintin, 482
- Charles and Erasmus, Dr. MacGregor Skene, 66
- Chemical : Analysis : by the Emission Spectrum, Foundations and Methods of, Dr. W. Gerlach and Dr. E. Schweitzer (translated) (*Review*), 420; by X-Rays and its Applications, Prof. G. von Hevesy (*Review*), 39; Quantitative, Modern Methods in, Dr. A. D. Mitchell and Dr. A. M. Ward (*Review*), 531; Disarmament, 413; Engineers, Institution of, election of officers; award of the Osborne Reynolds medal to S. G. M. Ure, the Moulton medal to Dr. C. M. White, and the Junior Moulton medal and prize to Dr. W. B. Hawes, 510; Incendiary and Bacterial Weapons Special Committee, Report of, 413; Industry : Petroleum Technology and, 145; Society of : Dr. J. T. Dunn elected president of the, 432; Prof. W. A. Bone awarded the medal of the, 793; *Physics, Journal of*, No. 1, 271; Society, Present Position and Future of the, Prof. G. G. Henderson, 498; Subjects, The Elder Pliny's Chapters on, Part 2. Edited, with translation and notes, by Dr. K. C. Bailey (*Review*), 305
- Chemistry : and our Idiosyncrasies, Dr. E. F. Armstrong (*Review*), 314; and the Art of Living, Prof. H. E. Armstrong (Sir Jesse Boot Foundation Lecture), 795; Applied, Reports of the Progress of, Vol. 17, 1932 (*Review*), 786; Federal Council for, 300; Forensic and Scientific Criminal Investigation, A. Lucas. Second edition (*Review*), 115; Inorganic and Theoretical, A Comprehensive Treatise on, Dr. J. W. Mellor. Vol. 12 (Part 1), (*Review*), 638; in Space, Modern Aspects of, Prof. T. M. Lowry (*Review*), 563; Institute of, Address by Dr. G. C. Clayton; presentation of the Meldola medal to Dr. L. E. Sutton, and the Sir Edward Frankland medal and prize to L. Young, 357; of the Higher Fungi, L. Lukacs and J. Zellner (22), 888; of the Lichens, J. Klima (2), 888; Organic : An Introduction to, Prof. I. D. Garard (*Review*), 420; A Text-Book of, Prof. J. Schmidt. English edition by Dr. H. G. Rule. Second edition (*Review*), 116; Laboratory Methods of, L. Gattermann. Revised by H. Wieland. Translated by Dr. W. McCartney (*Review*), 78; Practical (*Review*), 78; Physical, Prof. J. Eggert. Translated by Dr. S. J. Gregg (*Review*), 419; A Text-Book of, Dr. J. Newton Friend. Vol. 1 (*Review*), 417; International Congress of, 53; Plant, Comparative, E. Fraenkel and J. Zellner (24), 888; Progress of, vol. 29, for 1932, Annual Reports on the (*Review*), 676; Raman Spectra and, 263; Space, Growth of, Prof. J. Read (*Review*), 783; Tannin, Incunabula of, Dr. M. Nierenstein (*Review*), 823; The A.B.C. of, J. G. Crowther (*Review*), 895
- Chick Embryo, Induction by Coagulated Organisers in the, C. H. Waddington, 275
- Chile Saltpetre, Origin of the, Dr. C. T. Kautter, 556
- Chilean Insect Parasites for New Zealand, Dr. D. Miller, 283
- Chimie, anorganischen, Handbuch der, Herausgegeben von Prof. R. Abegg, Dr. F. Auerbach und Prof. I. Koppel. Band 4, Abt. 3, Teil 2B, Lief. 2 (*Review*), 491
- Chimney : Emissions, Reduction of, 234; Smoke, Measurement of, 430
- China, Ancient : Copper Age in, Tsurumatsu Dono, 243; 917; Festivals and Songs of, Prof. M. Granet. Translated by Dr. E. D. Edwards (*Review*), 346; and American Scientific Expeditions, Dr. H. F. Osborn, 87; An Imperial City of (*Review*), 184; Land and Labour in, Prof. R. H. Tawney (*Review*), 712
- Chinese : Chemical Society, Journal of the, No. 1,907; Medicine : History of, being a Chronicle of Medical Happenings in China from Ancient Times to the Present Period, Dr. K. Chimin Wong and Dr. Wu Lien-Teh (*Review*), 527
- Chitons, Abnormal, I. Taki, 367
- Chlorine : Hydrogen and, Photochemical Reaction of : Prof. H. B. Baker, 27; Prof. A. J. Allmand, 656; Magnetic Rotatory Power of, and of Hydrochloric Acid Gas, R. de Malleman and P. Gabiano, 286



- Chlorophyll, Attenuation of the, shown by Parasitic Green Plants, M. Molliard, 178
- Chlorophylls, Structural Formulae of the, Prof. J. B. Conant and Emma M. Dietz, 131
- Cholera Vibrion, Transmissible Lysis of the, P. N. Bernard and J. Guillermin, 887
- Cholesterol: Chemical Constitution of, and a New Isomeride of Cholesterol, R. de Fazi, 924; of the Human Brain, C. Antoniani and F. Zanelli, 71
- Christening, Caution in, Prof. H. E. Armstrong, 330
- Christian Church: Phases of the, a Short View of its History, Rev. A. C. Bouquet (*Review*), 677
- Chromic Salts, Line Absorption of, in Relation to Coordination, Dr. C. H. Johnson and A. Mead, 399
- Chromosome: Mechanics, Prof. A. H. Sturtevant (*Review*), 5; Numbers in Vertebrates, K. Oguma and S. Kakino, 403
- Chromosomes and Plant-Breeding, Dr. C. D. Darlington (*Review*), 5
- Chronophotographic Method, A Modification of the, and Some Applications, E. Crause and J. Baubiach, 482
- Chrysene: Substituted  $\beta\gamma$ -Diphenyladipic Acids and Derivations of, Dr. A. I. Vogel, 402; Synthesis of, and Certain Derivatives, G. R. Ramage and Prof. R. Robinson, 205
- Cinematography, New Lens of High Rapidity for, Carl Zeiss, 475
- Circuit-Breakers, Heavy Current, H. Thommen, 103
- Circular Magnetic Dichroism and Magnetic Rotatory Dispersion, A. Cotton, 70
- Citrus*, Mycorrhiza in the Genus, Dr. M. C. Rayner, 399
- Civilisation and War (*Review*), 635
- Clarendon Laboratory, Oxford, Helium Liquefaction Plant at the, Prof. F. A. Lindemann and T. C. Keeley, 191
- Climate: a Handbook for Business Men, Students and Travellers, Dr. C. E. P. Brooks. Second edition (*Review*), 9; and Acclimatization: Some Notes and Observations, Sir Aldo Castellani (*Review*), 712
- Climatic Temperature, Minimum, C. F. Talman, 431
- Clinical Laboratory Methods, A Manual of, Dr. C. L. Cummer. Third edition (*Review*), 116
- Clothes Moths and House Moths, Major E. E. Austen, assisted by A. W. McKenny Hughes, 55
- Cloud Photography, International, 577
- Clover Mites invade Dwelling-Houses, 557
- Coal: Economic Significance of, Capt. B. Acworth, 478; for Sea Transport, Rear-Admiral Scott-Hill, 479; Formation of Rock Joints and the Cleat of, Profs. P. F. Kendall and H. Briggs, 922; Industry, British: Early History of the (*Review*), 311; The Rise of the, Prof. J. U. Nef. 2 vols. (*Review*), 311; Low Temperature Carbonisation of, 31; -Mining Explosives, Recent Developments in, Dr. W. Payman, 846; The Utilisation of: 633; A. C. Hardy, and others, Symposium on the, 478
- Cobalt: Chloride: Constitution of Hydrochloric Acid Solutions of, P. Job, 338; Solutions of, Circular Magnetic Dichroism and Abnormal Magnetic Rotatory Dispersion of, M. Scherer, 70; Ion of Dissolved, Paramagnetism of the, R. Mercier, 338
- Cæsium Vapour, Absorption of Light in, Dr. H. J. J. Braddick and Prof. R. W. Ditchburn, 132
- Coffee, Root Development in, Distribution of Nitrates in the Soil and, V. A. Beckley and F. McNaughtan, 878
- Col du Marchairuz Region, The Virgulian and the Stratigraphy of the Portlandian of the, A. Lombard, 815
- Colloidal: Propellants, Rate of Burning of, Dr. A. D. Crow and W. E. Grimshaw, 60; F. R. W. Hunt and G. H. Hinds, 206; Solutions, Surface Tension of, and the Action of Light on Soap Solutions, Dr. P. Lecomte du Noüy, 689
- Colloids: Adsorption of, by Metallic Surfaces and its Influence on the Adherence of Electrolytic Deposits, P. Jacquet, 702; Flocculation of, Influence of Radioactive Radiations on the, A. Boutaric and Mlle. Madeleine Roy, 738; Preparation of, by Ultra-sonic Dispersion, N. Marinesco, 410
- Colonial: Educational Conference, Case for a, Sir George Maxwell, 812; Office Appointments, 55; 871
- Colonisation of a Disused Millpond at Hillsborough, Co. Down, Common and Cairns, 702
- Colorado, *University of, Studies*, Nov., 885
- Coloration Problems in Animals, 577
- Colour, A Simple Method for Determining, E. Haschek and M. Haitinger, 411
- Comba Region, Geology of the, H. Lagotala, 411
- Comenius in England: the Visit of Jan Amos Komenský (Comenius), the Czech Philosopher and Educationist, to London in 1641-1642; its Bearing on the Origins of the Royal Society, on the Development of the Encyclopædia, and on Plans for the Higher Education of the Indians of New England and Virginia, as described in Contemporary Documents. Selected, translated and edited, with an Introduction and Tables of Dates, by R. Fitzgibbon Young (*Review*), 306
- Comet: Halley's, in 1909-11, Dr. A. C. D. Crommelin, 282; New, 1933a., 281; Peltier-Whipple, 173; Pons-Winnecke, Periodic, 697
- Comets: 661; 845; Prof. van Biesbroeck, 245; of A.D. 868 and 1366, Dr. S. Kanda, 31; Perturbations of, by the Stars, E. Opik, 209
- Comital Flora of the British Isles (Flora Comitalis Britannicæ: Fl. Com. Brit.): The, being the Distribution of British (including a number of Non-Indigenous) Plants throughout the 152 Vice-Counties of Great Britain, Ireland and the Channel Islands, with the Place of Growth, Elevation, World-Distribution, Grade, Chief Synonyms and First Names by which the Plants were recorded as British. By Dr. G. Claridge Druce. With an original coloured Map showing the Botanical Vice-Counties presented by W. J. Patey (*Review*), 309
- Commonwealth Fund fellowships, awards of, 736
- Compensating Plate Currents, Method of, P. Donzelot and J. Divoux, 106
- Composite Surfaces in Higher Space, J. G. Semple, 886
- Compressed Air Wind Tunnel at the National Physical Laboratory, New, 442
- Cone, Motion of a, at High Speeds in Air, Taylor and Maccoll, 552
- Consolidated Gold Fields of South Africa, Ltd., awards of the, 432
- Constants and Numerical Data, Annual Tables of, Vol. 8, 2 parts; Vol. 9; Tables des matières du Vol. 9 (*Review*), 892
- Convention and Fact, Dr. N. R. Campbell, 237
- Co-operative Industrial Research, 817
- Copepods: of the Woods Hole Region, Mass., The, Dr. C. B. Wilson, 698; Sexual Reproduction in, A. G. Lowndes, 240
- Copper: -Aluminium Alloys, X-Ray Investigation of the, A. J. Bradley and Phyllis Jones, 589; Properties of, Influence of Oxygen on the, W. Broniewski and S. Jasian, 338
- Corallian Rocks of Yorkshire, V. Wilson (1), 595
- Corals, Growth of, T. Tamura and Y. Hada, 172

## CORRESPONDENCE

- Acetic Acid: at 25°, Dissociation Constant of, Limiting Mobilities of Some Monovalent Ions and the, Dr. A. I. Vogel and G. H. Jeffery, 27; in Water, Dissociation of, Dr. C. W. Davies and W. H. Banks, 328
- Acetylated Aldonic Nitriles, A Rule for the Rotatory Direction of the, Dr. V. Deulofeu, 548
- Acquired Characters, Inheritance of, Dr. R. L. Jenkins, 95
- Adenine: Hydrochloride, Crystal Structure of Vitamin B<sub>1</sub>, and of, J. D. Bernal and D. Crowfoot, 911; Vitamin B<sub>4</sub>, and, R. D. Heard, H. W. Kinnersley, J. R. O'Brien, Prof. R. A. Peters and V. Reader, 617
- Adrenal Gland, Vitamin C in the, G. Bourne, 874
- Animal Life, Components of the Atmosphere and Synthetic Gases in Relation to, Prof. J. W. Hershey, 238



- Alkali Metals, Remarkable Optical Properties of the, Prof. R. W. Wood, 582
- Alkyl Groups, Volumes of, and their Orienting Powers, Dr. R. J. W. Le Fèvre, 655
- Alkylanilines with Tertiary Alkyl Groups, Dr. W. J. Hickinbottom, 762
- Allium, Somatic Chromosomes in, Structure and Division of, Prof. T. K. Koshy, 362
- Aluminium: Hydride, Band Spectrum of, Predissociation and Pressure Effects in the, Prof. E. Hulthén and R. Rydberg, 470; Hyperfine Structure in, R. Ritschl, 58; Single Crystals, Recrystallisation Power and Shear Hardening in, Dr. W. G. Burgers, 326
- Angiosperms, Origin of, Prof. G. R. Wieland, 360
- Animal Growth, Heterogony and the Chemical Ground-Plan of, C. H. Waddington, 134
- Anode Spot in a Neon Tube, Dr. T. Takamine, T. Suga and A. Yanagihara, 584
- Antimony, Molecular Fluorescence of, Jean Genard, 132
- Aphanapteryx, The Dodo and the, G. Renshaw, 728
- Aquatic Insect Larvæ, Tracheal and Blood Gills in, Dr. W. H. Thorpe, 549
- Arsenic, Nuclear Moment of, M. F. Crawford and A. M. Crooker, 655
- Ascaphus*, The "Tail" of the Male American Toad, Prof. C. G. S. de Villiers, 692
- Ascorbic Acid: Prof. A. Szent-Györgyi and Prof. W. N. Haworth, 24; Constitution of, Dr. E. L. Hirst, E. G. V. Percival and F. Smith, 617; Vitamin C and, A. L. Bacharach, 364; (Vitamin C) and Glutathione in Animal Tissues, Estimation and Distribution of, T. W. Birch and Dr. W. J. Dann, 469
- Astronomical Radiative Stability, The, Sir Joseph Larmor, 805; Dr. G. C. Simpson, 875
- Atmosphere, Components of the, and Synthetic Gases in Relation to Animal Life, Prof. J. W. Hershey, 238
- Atomic Number Zero, The Neutron and Neutron, the New Element of, Prof. W. D. Harkins, 23
- Bacterial Growth Curve, The, and the History of Species, Dr. A. S. Corbet, 61
- Baltic, Inertia Currents in the, T. Gustafson and B. Kullenberg, 586
- Band Spectra which appear near Visible Triplet Lines of Mercury, E. Matuyama, 58
- Barium: Azide, Acceleration of the Decomposition of Crystals of, by the Emission from Radium Emanation, Prof. W. E. Garner and C. H. Moon, 513; Oxide (BaO), Band Spectrum of, P. C. Mahanti, 402
- Barley, Egyptian Neolithic, A. Jackson, 652
- p*-Benzoquinone Crystal, Orientations of Molecules in the, K. S. Krishnan and S. Banerjee, 653
- Beryllium and Helium, Lord Rayleigh, 724
- Binary Alloys at Room Temperature, Constitution of, Prof. A. N. Campbell, 438
- Biology, Teaching of, W. B. Yapp, 203
- Blood Pigments of the Invertebrates, Molecular Weights of the, Prof. The Svedberg and Astrid Hedenius, 325
- Boric Acid in Sea Water and its Effect on the Carbon Dioxide Equilibrium, K. Buch, 688
- Borrowed Days, The, Sir Herbert Maxwell, Bt., 515
- British Solomon Islands, Early History of the, R. J. A. W. Lever, 587
- Bromine: Spectra of, Br V, VII and IV, A. S. Rao and Dr. K. R. Rao, 170
- B. salmonicida* in River Waters, The Presence of a Bacteriophage for, Dr. C. Todd, 360
- 'Bull-Dog' Calf in African Cattle, J. Carmichael, 878
- Cadmium Hydride, Isotope Effect in the Spectrum of, E. Svensson, 28
- Cæsium Vapour, Absorption of Light in, Dr. H. J. J. Braddick and Prof. R. W. Ditchburn, 132
- Calcite, Solarisation of, Periodicity in the, S. Imori, 619
- Calcium Isotope with Mass 41 and the Radioactive Half-Period of Potassium, Prof. J. Kendall, W. T. Smith and T. Tait, 688
- Cancer-Producing Compounds, Sex Hormones and, Dr. J. W. Cook and Prof. E. C. Dodds, 205
- Carbon: Fusion of, A. Egerton and M. Milford, 169; Monoxide in Air, Detection of Traces of, Prof. H. Hartridge, 654; H. R. Ambler and T. C. Sutton, 766
- Carbonic Anhydrase and the State of Carbon Dioxide in Blood, late Dr. N. U. Meldrum and Dr. F. J. W. Roughton, 874
- Carbonyls of Lithium, Rubidium and Cæsium, Dr. T. G. Pearson, 166
- Carotene Derivative giving with Antimony Trichloride an Absorption Band at 610-630 m $\mu$ , A. M. van Eekelen and A. Emmerie, 275
- Cartilage, Glycogen in, Dr. H. B. Fell and Dr. R. Robison, 62
- Cassiopaiea,  $\gamma$ , Spectrum of, Dr. W. J. S. Lockyer, 134
- Cathode Ray: Photography of Random Electrical Transients, F. W. Chapman, 620; Tube, Frequency Range of the, A Method of Extending the, Prof. H. Hartridge, 95
- Cellulose Products, Lignin Content of, Dr. A. G. Norman and S. H. Jenkins, 729
- Chain Reactions, Reaction Cells in, A. R. Ubbelohde, 328
- Chick Embryo, Induction by Coagulated Organisers in the, C. H. Waddington, 275
- Chlorine, Hydrogen and, Photochemical Reaction of, Prof. H. B. Baker, 27; Prof. A. J. Allmand, 656
- Chlorophylls, Structural Formulæ of the, Prof. J. B. Conant and Emma M. Dietz, 131
- Christening, Caution in, Prof. H. E. Armstrong, 330
- Chromic Salts, Line Absorption of, in Relation to Coordination, Dr. C. H. Johnson and A. Mead, 399
- Chrysenes: and Certain Derivatives, Synthesis of, G. R. Ramage and Prof. R. Robinson, 205; Substituted  $\beta\gamma$ -Diphenyladipic Acids and Derivatives of, Dr. A. I. Vogel, 402
- Citrus*, Mycorrhiza in the Genus, Dr. M. C. Rayner, 399
- Coffee, Root Development in, Distribution of Nitrates in the Soil and, V. A. Beckley and F. McNaughtan, 878
- Colloidal: Propellants, Rate of burning of, Dr. A. D. Crow and W. E. Grimshaw, 60; F. R. W. Hunt and G. H. Hinds, 206; Solutions, Surface Tension of, and the Action of Light on Soap Solutions, Dr. P. Lecomte du Noüy, 689
- Convention and Fact, Dr. N. R. Campbell, 237
- Copepods, Sexual Reproduction in, A. G. Lowndes, 240
- Cosmic: Radiation, Origin of, H. Alfvén, 620; Rays, Energy of, Prof. E. Regener, 130
- Crustacea, Respiratory Movements in, Control of, Prof. H. Munro Fox and M. L. Johnson, 514
- Crystal: Lattice Constants, Determination of, by Electron Diffraction, Prof. G. I. Finch and A. G. Quarrell, 842; Structure and Orientation in Thin Films, Prof. G. I. Finch and A. G. Quarrell, 877
- Crystalline Style, Oxidase of the, C. Berkeley, 94
- Cuprous Oxide: A New Type of Photoelectric Effect in, in a Magnetic Field, Dr. I. Kikoin and Dr. M. Noskov, 725; Photo-Cell in Red Light, Reversal of the Current from a, Dr. H. H. Poole and Dr. W. R. G. Atkins, 133
- Curare, The Neuro-Muscular Junction and, Tudor Jones, 693
- Davainea proglottina*, Life-History of the Fowl Tapeworm, F. J. Brown, 276
- Debye's Dispersion of Nitrobenzene, Prof. J. Weigle and R. Luthi, 327
- Dehydro-Ascorbic Acid, Constitution of, Prof. P. Karrer, H. Salomon and K. Schöpp, 800
- Diphenyl Series, Crystal Structure of, Lucy W. Pickett, 513
- Dodo, The, and the Aphanapteryx, G. Renshaw, 728
- Dyes, Anti-Stokes Fluorescence in, Efficiency of, Dr. A. Jabłoński, 839
- Earthquakes: in the Holy Land: a Correction, Prof. Bailey Willis, 550; *P* Wave in, Corrections to the times of the, Dr. H. Jeffreys and K. E. Bullen, 97
- Egyptian Neolithic Barley, A. Jackson, 652
- Einstein", "The Case Against, Col. A. Lynch, 622
- Elastic Electron Scattering in Gases, Dr. S. Werner, 726
- Electrical Energy by Frog-Skin, Output of, W. L. Francis, 805



- Electrolytic Dissociation, Rôle of the Solvent in, Dr. A. R. Martin, 584; Dr. J. A. V. Butler and Miss L. C. Connell, 800
- Electrometer Triode in the X-Ray Ionisation Spectrometer, Dr. W. A. Wooster, 545; Dr. B. W. Robinson, 546
- Electron: Diffraction: by Films of Grease, Prof. G. P. Thomson and C. A. Murison, 237; by Vapours, Dr. H. de Laszlo, 803; Polarisation?, Prof. R. Whiddington, 908; Positive, A Possible Property of the, Dr. W. Elsasser, 764
- Electronic Oscillations, Production of, with a Two-Electrode Valve, J. S. McPetrie, 691
- Electrons in Amorphous and in Crystalline Antimony, Diffraction of, J. A. Prins, 760
- Elements: Artificial Transmutation of, Chemical Detection of, Prof. F. A. Paneth and P. L. Günther, 653; Light, Disintegration of, by Fast Protons, Dr. J. D. Cockcroft and Dr. E. T. S. Walton, 23
- Ergosterol and Cholesterol, Hydroxyl Group in, Prof. I. M. Heilbron and J. C. E. Simpson, 438
- 'Events', 'Time' and, Ideas of, W. W. L., 727
- Explosive Chain: Reaction between Hydrogen and Oxygen, Upper Pressure Limit in the, C. N. Hinshelwood and G. H. Grant, 361; Reactions, Upper Limit in, H. W. Melville and H. L. Roxburgh, 690
- Fact, Convention and, Dr. N. R. Campbell, 237
- Ferns, Sporangia containing Spermatozooids in, Alice E. Gairdner, 621
- Ferromagnetics, Atomic Moments of, Dr. E. C. Stoner, 433
- Fibres from the Coat of a Blackface Lamb, Dr. S. G. Barker, 799
- Fluorescence, Negative Polarisation in, K. S. Krishnan and S. M. Mitra, 204
- Fluorite from Obira, Japan, Thermoluminescence Spectrum of, Bands in the, Ei-ichi Iwase, 909
- Formaldehyde in Dew, Presence of, Prof. N. R. Dhar and Atma Ram, 800
- Fossil Bones, Preservation of, L. McL. Mann, 366; W. J. McCallien, 694
- Fourier Analysis and Vowel Curves, R. H. Nisbet, 401
- Frog, Hermaphrodite, A, A. M. Gardiner, 330
- Frogs, Spawning in, Factors Controlling Date of, R. M. Savage, 587
- Fuel-Knock, A Theory of, Dr. S. Steele, 724
- G., The Constant of Gravitation, Prof. V. V. Narlikar, 134
- Gallium Isotopes 69 and 71, Nuclear Moments of the, J. S. Campbell, 204
- Gammarus chevreuxi*, Sexton, Further Mutations in the Amphipod, Mrs. E. W. Sexton and Miss A. R. Clark, 201
- Gases, Mixtures of, Conductivity of, Dr. S. P. McCallum and L. Klatzow, 841
- Glucose Metabolism, Glutathione, Iodoacetic Acid and, Dr. J. H. Quastel, 206
- Glucuronic Acid, A New Unsaturated Derivative of, J. Pryde and R. T. Williams, 57
- Glutathione: and Tissue Glyoxalase, Iodoacetic Acid, Dr. F. Dickens, 130; Iodoacetic Acid and Glucose Metabolism, Dr. J. H. Quastel, 206
- Glycogen in Cartilage, Dr. H. B. Fell and Dr. R. Robison, 62
- Glycuronic Acid, Methylornarcotine, and Vitamin C, W. J. Dann, 24
- Glyoxalase, Tissue, Iodoacetic Acid, Glutathione and, Dr. F. Dickens, 130
- Gold, Organic Compounds of, Prof. C. S. Gibson, 130
- Gonad-Stimulating Hormones in Hypophysectomised Animals, Prof. J. B. Collip, Dr. H. Selye and Prof. D. L. Thomson, 56
- Graticules, Photographic, Sir Herbert Jackson, 766
- Heart, Abnormal Movability of the, S. Osawa, 241
- Helium, Beryllium and, Lord Rayleigh, 724
- Helminthosporium avenae*, Sporulation of, in Artificial Culture, W. A. R. Dillon Weston, 435
- 'Hexuronic Acid' (Ascorbic Acid) as the Antiscorbutic Factor, Prof. A. Szent-Györgyi and Prof. W. N. Haworth, 24; T. W. Birch, Dr. L. J. Harris, S. N. Ray, 273; W. J. Dann, 274
- Hibernian Halos, Radioactivity of Samarium and the Formation of, Dr. J. H. J. Poole, 654
- High-Frequency Electric Discharge in Gases, J. C. Wilson, 546
- Hydrocarbon Combustion in an Engine, A. Egerton and F. Ll. Smith, 725
- Hydrogen and Chlorine, Photochemical Reaction of, Prof. H. B. Baker, 27; Prof. A. J. Allmand, 656
- Hydroxyl Group: in Ergosterol and Cholesterol, Prof. I. M. Heilbron and J. C. E. Simpson, 438; The, and Soap Film Structure, W. J. Green, 873
- HygroscoPy, Capacitance, and Some of its Applications, Dr. R. K. Schofield, 96; Dr. W. L. Balls, 329
- Immiscible Liquid Layers, Four, Systems of, E. Lester Smith, 167
- Impulse Generator, A New, for Three Million Volts, T. E. Allibone, F. S. Edwards and D. B. McKenzie, 129
- Insects: and Micro-Climates, H. S. Leeson and K. Mellanby, 363; Dr. H. H. Darby, 837; Inhabiting the Soil Surface, Effects of Rainfall-Evaporation Ratio on, Dr. J. Davidson, 837
- Intelligence in Man, Inheritance of, A. F. Dufton, 763; Dr. C. C. Hurst, 764
- Internal Ballistics, The Combustion Problem of, Dr. A. D. Crow and W. E. Grimshaw, 805
- Invar, Dr. Ch.-Ed. Guillaume, 658
- Iodine: Arc Spectrum of, Prof. W. E. Curtis, 398; -Oxalate Reaction, Kinetics of the, Prof. N. R. Dhar, A. K. Bhattacharya and B. L. Mukerji, 840; Vapour at High Temperatures, Absorption Bands of, E. Skorko, 366
- Iodoacetic Acid: and Glucose Metabolism Glutathione, Dr. J. H. Quastel, 206; Glutathione and Tissue Glyoxalase, Dr. F. Dickens, 130
- Ionisation Produced by Radioactive Sources, Amplification of the, J. A. C. Tegan, 277
- Ionosphere: Characteristics of the, J. P. Schafer and W. M. Goodall, 804; Fine-Structure of the, Prof. E. V. Appleton, 872; J. A. Ratcliffe and E. L. C. White, 873
- Ions, Monovalent, Limiting Mobilities of Some, and the Dissociation Constant of Acetic Acid at 25°, Dr. A. I. Vogel and G. H. Jeffery, 27
- Kattegat, Boundary Tides in the, Dr. H. Pettersson and B. Kullenberg, 586
- Kennelly-Heaviside Layer, Polarisation of Echoes from the, T. L. Eckersley, 512
- Latitude, Variation Effect in, Correlatable with the Moon, Prof. H. T. Stetson, 437
- Lattice Distortion, Selective, in Wires under Torsion, W. A. Wood, 842
- Lepidosiren, Pelvic Filaments of, J. T. Cunningham and D. M. Reid; G. E. H. Foxon, 913
- Liesegang Rings, Dr. E. S. Hedges, 169
- Lightning Flash, A Destructive, Dr. C. V. Boys, 765
- Light: Measurement of, for Biological Purposes, Dr. W. H. Pearsall and P. Ullyott, 694; -Spots, Faint Transient, Photography of, Dr. L. F. Richardson, 401
- Liquids, Supersaturation of, with Gases, T. N. Richardson and Dr. K. C. Bailey, 762
- Local Lists of Animals, Prof. A. E. Boycott, 94
- Lolium*: Nitrogen Fixation in the Genus, R. Brown, 169; Seedlings, Fluorescence of, in Ultra-Violet Light, P. A. Linehan and Prof. S. P. Mercer, 202
- Loudness, Scales of, B. G. Churcher and A. J. King, 760
- Lunar Periodicity in Reproduction, Prof. T. A. Stephenson, 622
- Magnetic Disturbances, Recent, Rev. J. P. Rowland, 764
- Mars, The Minor Details of the Planet, Dr. E. M. Antoniadi, 802
- Mayas, Sacred Sandstone of the, Prof. T. D. A. Cockerell, 656
- Mendelian Factors in Quantitative Inheritance, Number of, Dr. R. A. Fisher, 400
- Methionine in Wool, J. Barritt, 689
- Methylornarcotine, Glycuronic Acid, and Vitamin C, W. J. Dann, 24
- Mice under Continued Treatment with Oestrin, Some Effects Observed in, H. Burrows, Prof. E. C. Dodds, and N. M. Kennaway, 801



- Mitochondria, Fixation of, J. H. Davie, 59
- Molecules of Intermediate Complexity, Kinetics of the Decomposition of, C. N. Hinshelwood and C. J. M. Fletcher, 24
- Molybdenum, Distribution of, Dr. W. A. Roach, 202
- Mussel, Common, Strange Spatfall of the, on the Common Cockle, Prof. J. H. Orton, 513
- Mutations, Spontaneous, Origin of, M. Navashin, 436
- Neoteny and Pædogensis, Meaning of, G. E. H. Foxon, 93
- Neuro-Muscular Junction, The, and Curare, Tudor Jones, 693
- Neutron, The Neutron and, the New Element of Atomic Number Zero, Prof. W. D. Harkins, 23
- Neutron: and Neutron, The, the New Element of Atomic Number Zero, Prof. W. D. Harkins, 23; Proton and Positron, Dr. N. Thon, 878
- Neutrons, Dr. D. Meksyn, 366
- Nerve: Action of Quaternary Ammonium Salts on, S. L. Cowan, 658; Mitogenetic Radiation of, Dr. A. Gurwitsch, 912
- Nitrates in the Soil, Distribution of, and Root Development in Coffee, V. A. Beckley and F. McNaughtan, 878
- Nitrobenzene, Debye's Dispersion of, Prof. J. Weigle and R. Luthi, 327
- Nitrogen Dioxide: Infra-Red Absorption Spectrum of, C. R. Bailey and A. B. D. Cassie, 239; Molecule, Form and Vibrational Frequencies of the, C. R. Bailey and A. B. D. Cassie, 910; R. Schaffert, 911
- Nitrous Oxide in the Glow Discharge, Dissociation of, E. A. Stewardson, 364
- NO<sub>2</sub>: Extension of the Visible Absorption System of, to Longer Wave-Lengths, J. Curry and Dr. G. Hertzberg, 842; Molecule, Form and Vibrational Frequencies of the, Dr. L. Harris, W. S. Benedict and G. W. King, 621
- Nematodes, Parasitic, Cultivation of, G. Lapage, 583
- Nuclear:  $\alpha$ -Particles, Fundamental State of, Dr. G. Gamow, 618; Energy Levels, Dr. G. Gamow, 433; Potential Barriers: and Nuclear Structure, Heights of, E. C. Pollard, 398; Heights of, E. C. Pollard, 97
- Nucleic Acids and Uracil, Irradiation of, F. F. Heyroth and J. R. Loofbourou, 92
- Numerical Coincidence, A, H. P. Hollis, 550
- Oestrogenic Substance from Plant Material, An, Dr. B. Skarżyński, 766
- Oestrus-Exciting Compound, A Synthetic, Dr. J. W. Cook, Prof. E. C. Dodds and C. L. Hewett, 56
- Oldway Human Skeleton, The, Dr. L. S. B. Leakey, Prof. H. Reck, Prof. P. G. H. Boswell, A. T. Hopwood and Dr. J. D. Solomon, 397
- Olefin Compounds, Catalytic Hydrogenation of, Dr. E. H. Farmer and R. A. E. Galley, 60
- Orthopodomys pulchripalpis*, Rondani (Diptera, Culicidae), A New British Record of, J. F. Marshall and J. Staley, 435
- Ovulation without 'Heat' in the Ewe, Occurrence of, R. Grant, 802
- Oxide Catalysts, Positive Ion Emission from, Dr. C. F. Powell and Luang Brata, 168
- Oysters (*O. edulis*), Breeding of, at Port Erin, Prof. J. H. Orton, Miss M. W. Parke and W. C. Smith, 26
- Ozone, Photosensitised Decomposition of, by Chlorine, Dr. R. G. W. Norrish and G. H. J. Neville, 544
- P. vulgata*, Environment of the Common Limpet, Some Limiting Factors in the, Prof. J. H. Orton, 693
- Pædogensis, Neoteny and, Meaning of, G. E. H. Foxon, 93
- Paramagnetic Susceptibility, Influence of Light on, P. W. Selwood, 761
- Pelagic Organisms, Unusual Occurrence of, Prof. W. J. Dakin, 239; G. P. Farran, 240
- Penetrating Radiation, Spectrum and Latitude Variation of, Dr. E. J. Williams, 511
- Phenomenal Regression to the Real Object, Prof. W. Peddie; Dr. R. H. Thouless, 544
- Phosphorus, Oxide of, Ultra-Violet Bands of, Prof. P. N. Ghosh and A. K. Sen Gupta, 841
- 12-Phosphotungstic Acid, Structure of the Molecule of, J. F. Keggin, 908
- Phytophthora megasperma* causing Pink Rot of the Potato, H. Cairns and A. E. Muskett, 277
- Pitdown Skull, The Second, Sir Arthur Smith Woodward, 242
- Pituitary Gland, Action of Proteolytic Enzymes on the Oxytocic Principle of the, Dr. J. M. Gulland and T. F. Macrae, 470
- Plant Virus, Protective Inoculation against a, Dr. R. N. Salaman, 468
- Plasticine Edible? Is, D. I. Clements, N. H. Howes and G. P. Wells, 330
- Positive Electron, New Evidence for the, Dr. J. Chadwick, P. M. S. Blackett and G. Occhialini, 473
- Positron, Neutron, Proton, and, Dr. N. Thon, 878
- Potassium, Radioactive Half-Period of, Calcium Isotope with Mass 41 and the, Prof. J. Kendall, W. T. Smith and T. Tait, 688
- Potatoes, Virus A of, Insect Transmission of, J. B. Loughnane, 838
- Priestley: as a Practical Chemist, Prof. T. S. Patterson 690; Dr. A. N. Meldrum, 801; Joseph, The "Leeds Portrait" of, W. C. Walker, 876
- Protein, Synthesis of, by Green Plants, L. Loose and Dr. W. H. Pearson, 362
- Proton, Neutron, Positron, Dr. N. Thon, 878
- Puccinia Helianthi* Schw., Union of Pycniospores and Haploid Hyphae in, J. H. Craigie, 25
- Pycnogonid, A Dodecapodous, Dr. W. T. Calman, 242
- Pyrrhotite, Iron Lattice of, Vacant Positions in the, Prof. G. Hägg, 167
- Radio-Waves? Interaction between, B. D. H. Tellegen, 840
- Rare Earths, Pure Salts of the, Fluorescence of, Prof. R. Tomaschek and O. Deutschbein, 473
- 'Raw' Weather, Prof. W. A. Osborne, 515
- Rectifier Photo-Cells, Reversal of Current in, J. Guild, 327; Dr. H. H. Poole and Dr. W. R. G. Atkins, 547
- Reproduction, Lunar Periodicity in, Prof. T. A. Stephenson, 622
- Resonance Ag I Lines, Fine-Structure of the, W. E. Williams and A. Middleton, 692
- Rickets, Experimental, as a Phosphorus Deficiency Disease, Prof. H. D. Kay and Dr. B. L. Guyatt, 468
- Ringworm Fungi, Development of Fuseaux, Aleuriospores and Spirals on detached Hairs infected by, Dr. A. M. Davidson and Dr. P. H. Gregory, 836
- Rubber Research, Dr. S. S. Pickles, 273
- Sabellids, Blood Circulation in, Reversible Stoppage of the, Prof. H. Munro Fox, 26
- Samarium: Radioactivity of, and the Formation of Hibernium Halos, Dr. J. H. J. Poole, 654: Range of Radiation from, Prof. G. Hevesy and Dr. M. Pahl, 434
- Schneider Mediumship, Further Light on the, Lord Charles Hope, 549; H. Price, 658
- Scientific Centralisation in the British Empire, Prof. C. Stanton Hicks, 397
- Seismographs, Hydraulic, Prof. S. K. Banerji and K. N. Sohoni, 547
- Sex: Artificial Control of, in the Progeny of Mammals, Prof. N. K. Koltzoff and V. N. Schröder, 329; Hormones and Cancer-Producing Compounds, Dr. J. W. Cook and Prof. E. C. Dodds, 205
- Sheep, Nutritional Condition of, and Susceptibility to Stomach Worm, A. H. H. Fraser and Dr. D. Robertson, 94
- Silver, Arc Spectrum of, Structure of the Lines of the, D. A. Jackson, 691
- Snails and Changes in Sea-Level, Prof. T. D. A. Cockerell, 277
- Soap Film Structure, The Hydroxyl Group and, W. J. Green, 873
- Sodium Benzoate, Chlorination of, Dr. J. C. Smith, 28
- Soot Films and Oil, Interaction between, J. H. Coste, 691; Dr. S. C. Blacktin, 873
- Spearman's General Factor, Ambiguity in Sign of, Prof. H. T. H. Piaggio, 170
- Species, History of, The Bacterial Growth Curve and the, Dr. A. S. Corbet, 61



- Spectral Lines in Indium and Gallium, Relative Intensity of, Miss R. Payne-Scott, 365
- Sponges, Light-Producing Powers of, Prof. E. Trojan, 728
- 'Stainless-Invar', A New Alloy, Prof. Kôtarô Honda, 587
- Strepinema Stage in Reduction, Prof. H. H. Dixon, 437
- Sulphur: Hexafluoride, K. G. Denbigh and Prof. R. Whytlaw-Gray, 763; -Hydrogen Reaction, New Experimental Evidence in the, E. E. Aynsley, Dr. T. G. Pearson and Dr. P. L. Robinson, 471
- Sunspots on the Solar Disc, Zones of Apparent Inhibition of, Prof. J. A. Carroll, 548
- Supersonic Vibrations set up in a Zinc Bar undergoing Transverse Vibrations, Prof. K. Prosad and S. Sharan, 803
- Syllis ramosa*, McIntosh, Distribution of the Polychæte Worm, Dr. C. Crossland, 242
- Symmetrical Region, Variation Problems for a, Prof. H. Bateman; Prof. E. T. Whittaker, 472
- Tektites, Origin of, F. Chapman; Dr. L. J. Spencer, 876
- Tellurium Fluorescence, Magnetic Quenching of, R. Smoluchowski, 914
- Thunderstorms, Summer, S. Morris Bower, 473
- 'Time': and 'Events', Ideas of, W. W. L., 727; Determination, Dr. J. de Graaff Hunter, 515; Measurements, Number 60 in, Prof. H. Chatley, 914
- Timothy Grass, A Fly Pest of, L. A. L. King and Agnes A. Meikle, 837
- Trees, Twisted, H. G. Champion, 133
- Triatomic Molecules, Structure of, A. B. D. Cassie, 438
- Ultra-Sonic Radiation, Chemical and Biological Effects of, Prof. A. Szent-Györgyi, 278
- Units, Fundamental, Dimensions of, Prof. H. Stansfield, 59; Prof. F. M. Denton, 585
- Uracil, Nucleic Acids and, Irradiation of, F. F. Heyroth and J. R. Loofbourow, 92
- Vibrating Metal Bars, Viscous Damping of, Prof. K. Sezawa, 803
- Virus Diseases and Intracellular Inclusions in Plants, Dr. F. M. L. Sheffield, 325
- Viscosity Measurements of Liquids by the Oscillating Disc Method, Prof. C. E. Fawsitt, 97
- Visual Experience, A Peculiar, Dr. F. A. Bather, 62
- Vitamin A: Absorption Spectrum of, at Low Temperatures, Dr. F. P. Bowden, S. D. D. Morris, and Dr. C. P. Snow, 582; Highly Active, Characteristics of, Dr. F. H. Carr and W. Jewell, 92; in Cod Liver Oil, An Inhibitor of the Antimony Trichloride Test for, A. Emmerie, 364; B<sub>1</sub>, Crystal Structure of, and of Adenine Hydrochloride, J. D. Bernal and D. Crowfoot, 911; B<sub>4</sub> and Adenine, R. D. Heard, H. W. Kinnersley, J. R. O'Brien, Prof. R. A. Peters and V. Reader, 617; C Activity, Indophenol Reducing Capacity of Lemon Juice and its Fractions in Relation to, Dr. S. S. Zilva, 363; and Ascorbic Acid, A. L. Bacharach, 364; Constitution of, Dr. F. Micheel and K. Kraft, 274; E. G. Cox and Dr. E. L. Hirst, 402; in the Adrenal Gland, G. Bourne, 874; Methylornarcotine, Glycuronic Acid, and, W. J. Dann, 24; Triphenylmethyl Derivative of, L. Vargha, 363
- Wave Equations and the Conservation of Energy, A. Lees, 402
- Weather, 'Raw', Dr. G. M. B. Dobson; Sir Leonard Hill, 28; 241; Prof. S. Russ, 131; H. E. Beckett, 132
- Whale Shark in the Waters Around Ceylon, The, Dr. E. W. Gudger, 165; Dr. J. Pearson, 729
- Wheat-Germ Oil: Absorption Spectrum of the Unsaponifiable Matter from, Dr. R. A. Morton and J. R. Edisbury, 618; Vitamin E Fraction of, Absorption Spectrum of the, Dr. P. Bowden and T. Moore, 512
- White Pine Blister Rust, Fusion of Pycniospores with Filamentous Hyphæ in the Pycnium in the, R. K. Pierson, 728
- Wireless Echoes, Recording, at the Transmitting Station, Prof. S. K. Mitra and H. Rakshit; R. A. Watson Watt and L. Bainbridge-Bell, 657
- Wool: Fibres, Origin of Curls and Twists in, Dr. J. E. Nichols, 201; Methionine in, J. Barritt, 689
- X-Radiation, Properties of, Prof. C. G. Barkla, 166
- γ-Excitation, Mechanism of, by β-Disintegration, Dr. G. Gamow, 57
- Corylophidæ (Coleoptera), New Species of, C. Deane, 287
- Cosmic: Dust, Increase in Mass of a Planet by the Effect of, F. Zagar (1), 775; Radiation in South Africa, Intensity of, S. M. Naudé and J. E. C. Coventry, 411; Origin of H. Alfvén, 619; (Symons Memorial Lecture), P. M. S. Blackett, 429; Ray Phenomena, Wilson Photographs of, Blackett and Occhialini, 589; Rays: Prof. A. H. Compton, 807; Energy of, Prof. E. Regener, 130; Latitude Variation of, Prof. A. H. Compton, 769; Nature of, Prof. A. H. Compton, 713; Ultra-Radiation, Corpuscular Nature of, Earth-Magnetic Effect and the, Prof. J. Clay, 136
- County Maps of England, Early (*Review*), 530
- Crustacea, Control of Respiratory Movements in, Prof. H. Munro Fox and M. L. Johnson, 514
- Crystal: Lattice Constants, Determination of, by Electron Diffraction, Prof. G. I. Finch and A. G. Quarrell, 842; Structure and Orientation in Thin Films, Prof. G. I. Finch and A. G. Quarrell, 877
- Crystalline Style, Oxidase of the, C. Berkeley, 94
- Crystals: of the Living Body, Sir William Bragg, 125; Orientation of Certain, by Hydrargillite, L. Royer, 596; Paramagnetic, at Low Temperatures, Principal Magnetic Susceptibilities of Some, Dr. L. C. Jackson, 338; The Form and Properties of, an Introduction to the Study of Minerals and the Use of the Petrological Microscope, Miss A. B. Dale (*Review*), 44; Thermal Expansion in, and Haüy's Law, A. Cavinato, 71
- Cubic Ferric Oxide, Dissociation of, A. Girard and G. Chaudron, 447
- Cuckoo, Swallow and, Arrive, 629
- Cuckoo's Call, The, 773
- Culture, Science and (*Review*), 707
- Cultures, Single-Cell, Transferring, to Solid Nutrient Media, L. O. Koblmüller and R. Vierthaler, 287
- Cuprite, Mono-Crystals of, The Photoelectric Effect in the, R. Deaglio, 887
- Cuprous Oxide: in a Magnetic Field, A New Type of Photoelectric Effect in, Dr. I. Kikoin and Dr. M. Noskov, 725; Photo-Cell in Red Light, Reversal of the Current from a, Dr. H. H. Poole and Dr. W. R. G. Atkins, 133
- Curare, the Neuro-Muscular Junction and, Tudor Jones, 693
- Curlwe, Long-billed, Restriction in Range of the, J. W. Sugden, 439
- Cyanide-Cyanamide Equilibrium, The, A. Perrot and R. Perrot, 375
- Cyclades Islands, A New Snake from the, F. Werner, 287
- Cyclone Season in the South Indian Ocean, R. A. Watson and N. R. McCurdy, 517
- Cyclops*, A New Species of, Found at Tenby, D. J. Scourfield, 135
- Cynocephalus*, Bone of Adult, and of Human Bone, Differential Microscopic Characters of the, Muller and Desmarez, 739
- Cytology: Experimental, Third International Congress of, 797; Recent Advances in, Dr. C. D. Darlington (*Review*), 5
- Daffodils, Narcissi and their Hybrids, H. W. Pugsley, 517
- Dahomey, Rainfall in, Dr. R. Pignol, 208
- Dairying, National Institute for Research in, Annual Report for year ending July 31, 1932, 870
- Dairy Products, Marketing, Co-operation in, R. W. Bartlett. 2 Vols. (*Review*), 188
- Daphnia magna* Straus, Antagonistic Action of Ultra-violet Rays on the Phototaxy of, R. J. Wojtusiak, 703
- Darwin Where He Did? Stands (*Review*), 709
- Darwin's Barometer, 464



- Davainea proglottina*, Life-History of the Fowl Tapeworm, F. J. Brown, 276
- Davy, Von, und Döbereiner bis Deacon: ein halbes Jahrhundert Grenzflächenkatalyse, Dr. A. Mittasch und E. Theis (*Review*), 150
- Deaf and Dumb in England and Wales, 580
- Death Valley a National Monument, 542
- 'Débacle', The, 373
- Debye's Dispersion of Nitrobenzene, Prof. J. Weigle and R. Luthi, 327; Theory (formula of Gronwall, La Mer and Sandved), Application of, to solutions of Copper Sulphate, Mlle. M. Quintin, 630
- Deep Drilling, New Record for, 721
- Definite Integrals with Bessel's Functions, K. Mayr, 703
- Dehydro-Ascorbic Acid, Constitution of, Prof. P. Karrer, H. Salomon and K. Schöpp, 800
- Delinquency: Constitution Types in, Practical Applications and Bio-physiological Foundations of Kretschmer's Types, Dr. W. A. Willems (*Review*), 188
- Delta Orionis, The Variable Star, Dr. J. Plassmann, 661
- Democracy: After, Addresses and Papers on the Present World Situation, H. G. Wells (*Review*), 183
- Dental Caries, Cause and Nature of, J. J. Enright, H. E. Friesell, and M. O. Trescher, 918
- Depopulation: and Disease, Nutritional Aspects of, Dr. W. M. Strong, 519; The Medical Sciences in Relation to, Dr. R. W. Cilento, 519
- De Sitter's World (*Review*), 487
- Development Commissioner, Sir William Cecil Dampier appointed a, 581
- Devonian Phosphates of Tennessee, Constitution of the, L. Cayeux, 666
- Dew Points and Boiling Points of Mixtures of Volatile Liquids, A Boiling Point Apparatus for the Determination of the, L. Gay and J. Soulié, 630
- Diabase Rocks at the You Yangs, near Geelong, A. Coulson, 71
- Diabetes, The Practical Treatment of, Dr. T. I. Bennett (*Review*), 9
- Diamond, Genesis of the, A. F. Williams. 2 Vols. (*Review*), 255
- Diamonds, Dr. A. E. H. Tutton (*Review*), 255
- Diaporthe*, Nits, The Genus, L. E. Wehmeyer, 880
- Diatomic Molecules, Band-Spectra of, Dr. W. Jevons; Dr. R. C. Johnson, 102
- Diazomethane, Photochemical Decomposition of, Kirkbride and Norrish, 404
- Dictyconoides*, *Loekhartia*, and *Rotalia*, The Genera, Col. L. M. Davies, 279
- Dielectric Phenomena. 3: Breakdown of Solid Dielectrics, S. Whitehead. Edited, with a preface, by E. B. Wedmore (*Review*), 384
- Differential Equations from the Algebraic Standpoint, Prof. J. F. Ritt (*Review*), 456
- Differenziali e propagazione ondosu, Caratteristiche dei sistemi, Prof. T. Levi-Civita. Lezioni raccolte dal Dr. G. Lampariello (*Review*), 45
- Diffraction Gratings used with Grazing Incidence, O. U. Vonwiller, 668
- 'Diffusion' and Disease, Dr. C. Nicolle, 879
- Diflavones, Synthesis of, J. Algar, Isabella M. McCarthy, and Eveline M. Dick, 666
- Dimetaphosphates, Preparation of the, P. Pascal and Mme. Réchid, 666
- Diphenyl Series, Crystal Structure of the, Lucy W. Pickett, 513
- Diphtheria, Past and Present: its Ætiology, Distribution, Transmission and Prevention, Dr. J. G. Forbes (*Review*), 150
- Direction Finding of Birds, An Experiment in, 701
- Discontinuous Functions, Effective Integration of, L. Labocetta (2), 71
- Discovery, The Great Age of. Edited by Prof. A. P. Newton (*Review*), 260
- Disease: Classical Descriptions of, with Biographical Sketches of the Authors, Prof. R. H. Major (*Review*), 895; The Inborn Factors in, an Essay, Sir Archibald E. Garrod (*Review*), 314
- Diselenomesoxanilides and Oxyselenanilides, A. Baroni, 107
- Dissociation Formula, A Simple Derivation of the, D. H. Menzel, 739
- Dodecolopoda mawsoni*, A New Species representing a New Genus of Pycnogonida, Dr. W. T. Calman and Isabella Gordon, 774
- Dodo: George Edwards's Picture of the, 615; The, and the Aphanapteryx, G. Renshaw, 728
- Donnan Equilibria: The, and their application to Chemical, Physiological and Technical Processes, Dr. T. R. Bolam (*Review*), 859
- Dove Marine Laboratory, Report for year ending June 30, 542
- Downtonian and Dittonian of Great Britain and North-west Europe, W. W. King, 738
- Dragons, G. D. Hornblower, 806
- Drink Problem, The Social and Economic Aspects of the (*Review*), 187
- Drosophila*: Genetic Studies on, 627; *melanogaster*, Genetics of certain Chromosome Anomalies in, A. H. Sturtevant and T. Dobzhansky, 627; *obscura*, Fallen, Spermatogenesis in, C. Koller and Thelma Townson (1), 447
- Dublin University, Sir Charles Arthur Kinahan Ball appointed Regius professor of surgery, and Prof. J. Purser professor of civil engineering, 772
- Duddell medal of the Physical Society, Award of the, to Prof. W. Gaede, 195
- Durham University, Miss Doris L. Reynolds appointed lecturer in geology, 811
- Dyes, Anti-Stokes Fluorescence in, Efficiency of, Dr. A. Jabłoński, 839
- Early Man in East Africa: 427; 462; Reports of Committees on, 477
- Earth: The Common, E. L. G. Watson (*Review*), 636; -Magnetic Effect and the Corpuscular Nature of (Cosmic) Ultra-Radiation, Prof. J. Clay, 136
- Earthquake: Alaskan, of April 26, 757; Californian, of March 10, 509; Damage and Earthquake Insurance, Dr. J. R. Freeman (*Review*), 381; in the North of England, 88; in North-west China, 88; in South-east Africa, 19; of March 2, The, C. E. Brazier and L. Génaux; C. Maurain, 596; Series at Nagusa, Japan, A. Imamura, T. Kodaira and H. Imamura, 136; the Californian, 391; the Kansu, of Dec. 26, 304; The Recent Japanese, Dr. C. Davison, 351; Wensleydale, Father J. P. Rowland, 128
- Earthquakes: Apparent Velocity of the Surface Propagation of, in relation to the Hypocentral Depth, C. Alessandri, 923; Bibliography of, 580; Destructiveness of (*Review*), 381; Felt and Recorded in Tokyo, Seismometrical Reports on the, 359; in the Holy Land: a Correction, Prof. Bailey Willis, 550; of Northern Africa, Mme. A. Hée, 807; P Wave in, Corrections to the Times of the, Dr. H. Jeffreys and K. E. Bullen, 97
- East: Anglia, Prehistoric Society of, Annual Business Meeting, Dr. Cyril Fox elected president for 1933, 520; Anglian Flora, The, Prof. E. J. Salisbury, 336
- Eclipse of Hi and Ho, Dr. J. K. Fotheringham, 881
- Eclipses, Mutual, and Occultations of Jupiter's Satellites, 173
- Ecological Studies in Victoria, R. T. Patton (1), 703
- Economic: Biologists, Association of, election of officers, 304; Conference, The World, 866; 889; Recovery, Education and, Dr. J. Macmillan Brown, 538; Sanctions, Inadequacy of, Dr. J. J. van der Leeuw, 867
- Economics: in Primitive Communities, Prof. R. Thurnwald (*Review*), 315; International (*Review*), 451
- Ecuador, New Fossil Fresh Water Molluscs from, W. B. Marshall and E. O. Bowles, 589
- Eddy Diffusion, O. F. T. Roberts, 916
- Edinburgh University: award of the Cameron prize to Dr. George F. Dick and Dr. Gladys H. Dick, 177; Sir Ian Hamilton installed as Lord Rector, 372; offer of honorary doctorates, 408; Prof. I. de Burgh Daly appointed professor of physiology, 700



- Education : and Economic Recovery, Dr. J. Macmillan Brown, 538 ; for Trades and Industries : a Historical Survey, C. T. Millis (*Review*), 44 ; The Crisis in, 628
- Eels—an Early Hypothesis, 665
- Egyptian : Neolithic Barley, A. Jackson, 652 ; Pottery, Corpus of, 357
- Eiffel Tower, Radiation of the Radiotransmitter of the, P. David, 179
- Einstein : The Case Against, Col. A. Lynch (*Review*), 260 ; re review of, Col. A. Lynch, 622
- Einsteinian Correction of Time in a Planetary Motion, M. Cimino, 107
- Elastic : Electron Scattering in Gases, Dr. S. Werner, 726 ; Energy Theory, Prof. J. A. van den Broek (*Review*), 347
- Elasticity, 'Linked', and its Mathematical Representation, E. Volterra, 107
- Electric : Trolley Omnibuses, C. J. Spencer, 869 ; Welding in Ship Construction, 796
- Electrical : Age : The, being further Everyday Marvels of Science, V. H. L. Searle (*Review*), 491 ; and Rubber Equipment on the Farm, 904 ; Conductivity and Atmospheric Condensation Nuclei during a voyage to Greenland, C. Maurain and J. Devaux, 35 ; Energy by Frog-Skin, Output of, W. L. Francis, 805 ; Engineers, Institution of, Ll. B. Atkinson elected an honorary member of the, 128 ; awards of the, 723 ; Equipment of Buildings, Regulations for the, 905 ; Measurements, Advanced, Dr. W. R. Smythe and Dr. W. C. Michels (*Review*), 322 ; Resistance, National Standards of, First Comparisons of the, A. Pérard and M. R. Romanowski, 887 ; Terms : A Dictionary of, including Telegraphy, Telephony and Wireless, S. R. Roget. Second edition (*Review*), 322
- Electricity : and Magnetism for Beginners, W. C. Badcock and Dr. E. J. Holmyard (*Review*), 347 ; Atmospheric, Dr. B. F. J. Schonland (*Review*), 785 ; Gas and other Fuels as Heating Agents, A. H. Barker, 32 ; Supply and Distribution, Costs of, J. M. Kennedy and Miss D. M. Noakes, 358
- Electrification : of an Ice Factory, J. H. Lamb, 833 ; of Railways in Britain, F. Lydall, 19 ; of the Swedish State Railways, Öfverholm, 199
- Electrodynamical Forces, Nature of, G. Eibenschütz, 923
- Electrolytes (*Review*), 382
- Electrolytic : Copper Deposited in the Presence of Colloids, Strains in, P. Jacquet, 70 ; Dissociation, Rôle of the Solvent in, Dr. A. R. Martin, 584 ; Dr. J. A. V. Butler and Miss L. C. Connell, 800
- Electromagnet, A Compact, for General Purposes, Dr. L. F. Bates and B. J. Lloyd Evans, 558
- Electrometer Triode in the X-ray Ionisation Spectrometer, Dr. W. A. Wooster, 545 ; Dr. B. W. Robinson, 546
- Electron : Diffraction : by Films of Grease, Prof. G. P. Thomson and C. A. Murison, 237 ; by Vapours, Dr. H. de Laszlo, 803 ; Energy of the Beams in, Prof. R. Whiddington and F. C. Poultney, 814 ; Inelastic Scattering in Gases, C. B. O. Mohr and F. H. Nicoll, 143 ; Motion of an, in a Crystalline Lattice, G. C. Wick, 71 ; Polarisation ? Prof. R. Whiddington, 908 ; Positive, A Possible Property of the, Dr. W. Elsasser, 764 ; Scattering by Atoms, Further Calculations of, Massey and Mohr, 368 ; Polarisation Phenomena in, E. Rupp, 209
- Electronic Oscillations, Production of, with a Two-Electrode Valve, J. S. McPetrie, 691
- Electrons : in Amorphous and in Crystalline Antimony, Diffraction of, J. A. Prins, 760 ; in Gases, Large Angle Scattering of, C. B. O. Mohr and F. H. Nicoll, 143 ; in Helium : at Zero Angle, Inelastic Scattering of, Prof. R. Whiddington and J. E. Taylor, 814 ; Scattering of, Prof. R. Whiddington and T. Emmerson, 814
- Electrophoresis, A Correct Arrangement for, Mlle. Choucroun, 630
- Electrostatic Precipitation, Direct-Current Generators for, 162
- Elektrischen Ladung der Erde, Die Aufrechterhaltung der, Prof. E. Schweidler (*Review*), 785
- Elektrolyte, Prof. H. Falkenhagen (*Review*), 382
- Elements : Artificial Transmutation of the (Boyle lecture), Lord Rutherford, 832 ; Chemical Detection of, Prof. F. A. Paneth and P. L. Günther, 652 ; Light, Disintegration of, by Fast Protons, Dr. J. D. Cockcroft and Dr. E. T. S. Walton, 23 ; Small Quantities of, Spectroscopic Detection of, W. Späth, 30 ; Transmutation of the, Recent Researches on the, Lord Rutherford, 388
- Elvers, Arrival of, 409
- Empire : Broadcasting, 16 ; Forestry Handbook, new edition, 870 ; *Journal of Experimental Agriculture*, 304 ; No. 1, 759 ; Timbers for Structural Design. British Columbia Douglas Fir, 244
- England : The Map of, or About England with an Ordnance Map, Col. Sir Charles Close (*Review*), 260
- English Language : Use of the, Dr. C. Norwood, 197 ; 741
- Entomological Society of London, The History of the, 1833-1933, Dr. S. A. Neave, assisted by F. J. Griffin (*Review*), 678
- Enzyme which dehydrogenates Stearic Acid, Presence in the Bile of an, G. Quagliariello, 411
- Enzymes : A Discovery and its Consequences, Dr. E. F. Armstrong, 535
- Eremophila Mitchellii*, Essential Oil from the Wood of, A. E. Bradfield, A. R. Penfold, and J. L. Simonsen, 667
- Ergosterol and Cholesterol, Hydroxyl Group in, Prof. I. M. Heilbron and J. C. E. Simpson, 438
- Eros, Mass of, Dr. K. Lundmark, 31
- Erysiphe graminis Tritici*, Host Specialisation of, E. B. Mains, 739
- Eskimo : Culture Sequence, J. A. Ford, 243 ; in Greenland, Spread of, Capt. E. Mikkelsen, 367 ; Vertebrae, Anomalous, Dr. T. D. Stewart, 125
- Essential News*, 614
- Ethane, Slow Combustion of, at High Pressures, D. M. Newitt and A. M. Bloch, 214
- Ethics and Archæology, 561
- Ethnogenics, Capt. G. Pitt-Rivers, 89
- Ethyl Alcohol and Ethyl Ether, Freezing Points of Binary Mixtures of, A. Lalande, 447
- $\alpha$ -Ethylene Oxides, Some, R. Lespieau and Mlle. B. Gredy, 447
- Eucalypts, Chemical Composition of the Woods of the Ironbark Group of, W. E. Cohen, A. L. Baldock, and A. G. Charles, 333
- Eucalyptus*, Identification of the Coloured Woods of the Genus, H. E. Dadswell and Maisie Burnell, 280
- Eugenics and Marriage Laws, L. M. Crump, 540
- Europe : Northern, Spring in, 812 ; Southern, Dr. Marion I. Newbiggin (*Review*), 317
- Evelyn's "Fumifugium", Reprint of, 651
- 'Events', 'Time' and, Ideas of, W. W. L., 727
- Everest : Mount, Col. H. L. Crosthwait, 10 ; Flight, Preliminary Tests for, 160 ; Projected Flight over, 392 ; Houston Expedition over, 499
- Evolution : and Philosophy, Prof. R. R. Gates (*Review*), 380 ; Creative, The Mechanism of, Dr. C. C. Hurst (*Review*), 780 ; Taxonomy and, Dr. W. H. Longley, 863 ; The Causes of, Prof. J. B. S. Haldane (*Review*), 709 ; The Scientific Basis of, Prof. T. H. Morgan (*Review*), 380 ; Up to Date (*Review*), 780
- Examination Methods, Committees on, 141
- Exchange of Goods during Economic Depression, 834
- Exhibition of 1851, appointments to Senior Studentships, 848
- Experimentalphysik, Handbuch der, Herausgegeben von W. Wien und F. Harms. Unter Mitarbeit von H. Lenz. Band 4 : Hydro- und Aerodynamik. Teil 4 : Rohre, Offene Gerinne, Zähigkeit. Herausgegeben von L. Schiller. Bearbeitet von L. Schiller, F. Eisner, S. Erk (*Review*), 602
- Explosion Flames, Photographic Analysis of, Prof. W. A. Bone, 300
- Explosions, Experimental, Air Waves from, Dr. F. J. W. Whipple, 138



- Explosive Chain Reaction: between Hydrogen and Oxygen, Upper Pressure Limit in the, C. N. Hinshelwood and G. H. Grant, 361; Upper Limit in, H. W. Melville and H. L. Roxburgh, 690
- Explosives: Chemical Examination of, A. Marshall (*Review*), 186; Their History, Manufacture, Properties and Tests, A. Marshall. Second edition. Vol. 3 (*Review*), 452; War and Post-War, Prof. R. C. Gale (*Review*), 452
- Exponential and Hyperbolic Functions, The, and their Applications, A. H. Bell (*Review*), 319
- Extra-Galactic Nebulae, The, Dr. H. Knox-Shaw, 247
- Extreme Ultra-Violet, Studies in the, and the very soft X-ray Region, Prof. M. Siegbahn (Guthrie lecture), 901
- Eyes and Colour Change, Prof. Ll. M. Bertholf, 331
- Fabrication, An Intentional, of an Engraving of a Horse's Hoof on Granite, by means of a Stone Tool, M. Badouin, 375
- Facial Growth in Children, Corisande Smyth and M. Young, 29
- Fact, Convention and, Dr. N. R. Campbell, 237
- Faith, Hope and Charity in Primitive Religion, Dr. R. R. Marett (*Review*), 9
- Faraday Effect of a Camphor Derivative, J. Verhaeghe, 666  
*Faraday House Journal*, 466
- Farm, Electrical and Rubber Equipment on the, 904
- Fat in Estivating Animals, 268
- Fauna of Hot Springs in North America, C. T. Briers, 403
- February Fill-Dyke, 141
- Feldspäte, Die, und ihre praktische Bestimmung, Dr. K. Chudoba (*Review*), 384
- Ferns, Sporangia containing Spermatozooids in, Alice E. Gardner, 621
- Ferromagnetics, Atomic Moments of, Dr. E. C. Stoner, 433
- Ferro-Silicons Rich in Silicon, Magnetic Susceptibility of, C. Bedel, 375
- Ferrous Metals and Alloys, Cast, Sampling and Analysis of, 845
- Fibres from the Coat of a Blackface Lamb, Dr. S. G. Barker, 799
- Fifty-five Year Rule, The, 146
- Film Institute, A British, 465
- Filter for the 3130 Mercury Line, A Method of Preparing a, G. C. Brock, 410
- Fire, Safety of Life from, Col. G. Simonds, 269
- Fish: and Fishing (*Review*), 42; Cultivation in the Philippines, 522; Culture, 177; Movements, Directional Control of, Dr. J. Gray, 774; Species (Cyprinids), Three New, from Asia Minor, V. Pietschmann, 704
- Fishery Research: Advisory Committee on, of the Development Commissioners, Prof. E. W. MacBride appointed chairman of the, 871; in Newfoundland, 918
- Fishes, Muscular Movements of, Dr. J. Gray, 825
- Flies Go in Winter? Where do, 249
- Flight: 'Instrumental', Stability of, G. A. Crocco, 71; Non-stop, New Record for, Squadron-Leader O. R. Gayford and Flight-Lieut. G. E. Nicholetts, 232
- Flint Miners of Blackpatch, The, J. H. Pull (*Review*), 677
- Flood-Lighting and Bird-Life, 55
- Flora: of Surrey, late C. E. Salmon. Edited by Dr. W. H. Pearsall (*Review*), 77; The East Anglian, Prof. E. J. Salisbury, 336
- Flow Kinetics: Model of Photolysis, E. Abel and H. Schmid, 251
- Flower-Size, Inheritance of, Prof. R. R. Gates, 136
- Fluorescence, Negative Polarisation in, K. S. Krishnan and S. M. Mitra, 204
- Fluorescent Screens, the Spurious Ring Exhibited by, J. V. Hughes, 558
- Fluorite from Obira, Japan, Bands in the Thermoluminescent Spectrum of, Ei-ichi Iwase, 909
- Fluorites, Luminescence Investigations with, (2), H. Haberlandt, 851
- Flyfisher, The, and the Trout's Point of View, Col. E. W. Harding (*Review*), 42
- Fly Swarms in Dwelling Houses, Composition of, 249
- Fog Droplets, Size of, M. Kinoshita and K. Uchiyama, 99
- Food: Consumption after Fasting, Capacity for, V. Famiani, 339; Relation of, to Disease, S. Dixon, 333; Storage at Low Temperature, Sir William Hardy (Hunter Memorial Lecture; Sir William Trueman Wood Lecture), 459; Value, Reconstructive, of the Embryos of Various Cereal and Leguminous Seeds, V. Famiani, 339
- Foods, The Structure and Composition of, Dr. A. L. Winton and Dr. Kate Barber Winton. Vol. 1 (*Review*), 316
- Forest: Fires: and Weather, T. Terada and T. Utigasaki, 161; in relation to Soil Fertility, Prof. F. P. Worley, 787; on the Roof of the (*Review*), 78; Products Research Board, Report for 1931, 847
- Forestry: British, Problems of, Prof. R. S. Troup, 900; Commission, Twelfth Annual Report, 406
- Formaldehyde in Dew, Presence of, Prof. N. R. Dhar and Atma Ram, 800
- Forthcoming Books of Science, 322
- Fossil: Bones: Bakelite Impregnation of, H. W. Nichols and P. C. Orr, 127; Preservation of, L. McL. Mann, 366; W. J. McCallien, 694; Mammals, Some Ancestral (*Review*), 454
- Fossiliferous Deposits in the Homa-Kendu Area, Kenya Colony, Dr. L. S. B. Leakey, 886
- Fourier Analysis and Vowel Curves, R. H. Nisbet, 401
- Fowl, Non-Disjunction in the, Prof. F. A. E. Crew, 446
- François Joseph Archipelago, Circumnavigation of the, by the North, J. Schokalsky, 70
- Franklin Institute, award of medals to Dr. Orville Wright, Dr. P. Sabatier and J. de la Cierva, 870, 871
- Franz Josef Land, Voyage around, Prof. N. N. Subov, 359
- Frazer Lectures, The, 1922-1932, by divers hands. Edited by W. R. Dawson (*Review*), 712
- French: Chemical Society, Annual Meeting of the, 870; Society of Physical Chemistry, 25th anniversary of the, 797
- Freshwater Biological Association, election of officers, 796
- Frog, Hermaphrodite, A. A. M. Gardiner, 330
- Frogs: and Fishes, Showers of, 666; Hibernation of, 34; Spawning in, Factors Controlling date of, R. M. Savage, 587; Spawning of, and a remarkable Tadpole, 521
- Frost and Shore Animals, 142
- Froude, William, Laboratory, Ship Researches at the, 162
- Fruits, Hardy, Trials of Varieties of, for Commercial Purposes, 63
- Fuel: Gas, Water and Lubricants, The Analysis of, Prof. S. W. Parr. Fourth edition (*Review*), 860; -Knock, A Theory of, Dr. S. Steele, 724; Research Board, Report for year ending March 31, 1932, 627; Testing: Laboratory Methods in Fuel Technology, G. W. Himus (*Review*), 259
- Fulminating Material, E. Mathias, 482
- Fundulus*, Xanthophores in, A. E. Warren, 287
- Fur-Bearing Animals in Michigan, Dr. N. Dearborn, 127
- Furunculosis, 213
- Furze or Gorse (*Ulex europæus*) Flowering, 34
- G., The Constant of Gravitation, Prof. V. V. Narlikar, 134
- $\gamma$ -Excitation by  $\beta$ -Disintegration, Mechanism of, Dr. G. Gamow, 57
- $\gamma$ -Rays: Anomalous Absorption of, B. Arakatsu, 696; Internal Conversion of, Hulme; H. M. Taylor and Mott, 99; Ellis and Mott, 517
- Gafsa Hills, Tunisia, Pleistocene Dating of, R. Vaufrey, 659
- Galactic: Co-ordinates, Tables for, J. Ohlsson, 100; Dimensions, H. Shapley, 739; Rotation, Miss Phyllis Hayford, 173
- Galaxy, Absorption of Light in the, Prof. J. Stebbins and Dr. C. M. Huffer, 769
- Gallium Isotopes 69 and 71, Nuclear Moments of the, J. S. Campbell, 204
- Gammarus chevreuxi*, Sexton, Further Mutations in the Amphipod, Mrs. E. W. Sexton and Miss A. R. Clark, 201
- Gannets, Return of the, 373



- Garnet in the Dartmoor Granite: its Petrogenetic Significance, A. Brammall and S. Bracewell, 250
- Gas, Use of, Development of the, S. Lacey, 478
- Gases: Conductivity of Mixtures of, Dr. S. P. McCallum and L. Klatzow, 841; Rare, Discovery of the, Prof. M. W. Travers, 65
- Gaseous: Combustion: at High Pressures, Prof. W. A. Bone, and others, 245; Researches on, Prof. W. A. Bone (Bakerian lecture), 494; Hydrogen Iodide, Action of, on some Iodine Derivatives of Hydrocarbons, G. Emschwiller, 738; Ions at Cathodes, Accommodation Coefficient of, K. T. Compton, 631; Oxidation, A. Ritchie and Ludham, 64; Tubes for Lighting, J. N. Addington, 235
- Gastropods: Crystalline Style in, Prof. C. M. Yonge, 915; Style-Sac of, R. V. Seshaiya, 30
- Gaza, Old, Sir Flinders Petrie, 868
- Geddes's Comet, 441
- Gegenschein, The, or Counter-glow, Dr. C. T. Elvey, 590
- Genetical Studies, Modern (*Review*), 185
- Gentleman, A Very Gallant, Commdr. L. C. Bernacchi (*Review*), 782
- Genus *Lolium*, Nitrogen Fixation in the, B. Brown, 169
- Geographical: Association, Annual Conference of the, Dr. L. D. Stamp, 68; Names, Foreign, Report on, 161
- Geography, An Approach to, Dr. H. R. Mill, 68
- Geological: Society of London, awards of the, 159; award of the Daniel-Pidgeon fund to J. D. Solomon, 616; election of officers, 432; Survey of Great Britain, Summary of Progress for 1930, 370
- Géologie et les mines de la France d'outremer, La (*Review*), 823
- Geologische Erforschung Thüringens in älterer Zeit: Die, ein Beitrag zur Geschichte der Geologie bis zum Jahre 1843, Prof. B. von Freyberg (*Review*), 531
- Geology: and Glaciation of some Islands of the Southern Ocean, etc., Sir Douglas Mawson, 847; and Petrology of the Mount Leinster district, North-east Victoria, E. Broadhurst and J. D. Campbell, 703; and Physical Geography, A French-English Vocabulary in, G. M. Davies (*Review*), 604; Economic, Aerial Survey in Relation to, D. Gill; H. Hemming, 160; in Great Britain, 370; in the Life of a Nation, The Place of, Dr. L. L. Fermor; Dr. L. D. Stamp, 226
- Geometry: Coordinate, A Treatise on (*Review*), 603; Coordinate, Elements of, J. M. Child (*Review*), 603
- Geophysical Prospecting, 791
- Geophysics, The Contribution of Radiotelegraphy to, 642
- Georgia and its People (*Review*), 309
- Georgian People: A History of the, from the Beginning down to the Russian Conquest in the Nineteenth Century, W. E. D. Allen (*Review*), 308
- Geothermic Gradient in Limagne, G. Grenet, 143
- German: Chemical Plant Exhibition ('Achema VII'), 1934, 907; Universities, Resignation of Jewish Professors, 687
- Gestalt Theory, The, and the Problem of Configuration, B. Petermann, translated by M. Fortes (*Review*), 604
- Glabratic Acid, G. Koller and G. Pfeiffer, 411
- Glasgow, Royal Technical College, Report of, 213
- Glasshouses, Disinfection of, with Sulphur, W. H. Read and O. B. Orchard, 844
- Glauconite in Limestone, Modes of Existence of, L. Cayeux, 143
- $\alpha$ -Glucoheptulite, Identification and Biochemical Oxidation of, Mme. Y. Khouvine and G. Nitzberg, 339
- Glucose: and Shedding the Shell of Crustaceans, Mme. Andrée Drilhon, 483; Metabolism, Glutathione, Iodoacetic Acid and, Dr. J. H. Quastel, 206
- Glucuronic Acid, A New Unsaturated Derivative of, J. Pryde and R. T. Williams, 57
- Glutathione, Iodoacetic Acid and Glucose Metabolism, Dr. J. H. Quastel, 206
- Glyceria aquatica*, Hydrocyanic Acid in, P. Guérin, 106
- Glycogen: in Cartilage, Dr. H. B. Fell and Dr. R. Robison, 62; Triacetate, W. S. Reich, 106
- Glycuronic Acid, Methylornarcotine, and Vitamin C, W. J. Dann, 24
- Gob Fires, Experimental, T. N. Mason; F. V. Tideswell, 521
- God, Existence and Nature of, A Study of the Ordinary Arguments for the, Rev. A. C. Bouquet (*Review*), 677
- Gold: in Kenya: 231; and Native Reserves, 37; -bearing strata of the Region of St. Yrieix (Haute-Vienne), Wakker, 483; Organic Compounds of, Prof. C. S. Gibson, 130
- Gonad-stimulating Hormones in Hypophysectomised Animals, Prof. J. B. Collip, Dr. H. Selye, and Prof. D. L. Thomson, 56
- Gondwanaland, Land Bridges of, Prof. C. Schuchert, 696
- Gordon, Genl., and the Double Coconut, 337
- Gorgonacea from the Great Barrier Reef, Prof. S. J. Hickson, 879
- Government Chemist, Work of the, 246
- Grain Conference, World, 758
- Granary, A Modern, 431
- Grass: -Land, Manuring of, 373; Silage, C. Boyle and J. J. Ryan, 410
- Graticules, Photographic, Sir Herbert Jackson, 766
- Gray, Thomas, Memorial Trust, awards under the, 359
- Great: Bear Lake Indians, Dr. C. M. Osgood, 623; Crested Grebe in Britain, Spread of the, T. H. Harrison and P. A. D. Hollom, 135
- Greenkeeping Research, 272
- Green Plants in a Confined Atmosphere, Life of, J. Beauverie and Mlle. S. Monchal, 36
- Greenland: East, New Map of, 90; Ice, Thickness of the, Dr. E. Sorge, 807; Total Calorific Radiation in, C. Maurain and J. Devaux, 106
- Greenwich, Royal Observatory, Annual Visitation, 882
- Grid: in Great Britain, Completion of the, 539; the French, 539
- Grouse, Red, Migration of, 579
- Growth, Influence of Living-Space upon, Dr. J. Podhradsky, 29
- Guatemala, Mexico and, Recent Discoveries in, 101
- Guébbard-Séverine, Annales, No. 8, 797
- Guggenheim, Daniel, medal, award of the, to Commdr. J. C. Hunsaker, 871
- Guiana Forest, A Naturalist in the, Major R. W. G. Hingston (*Review*), 78
- Gulick: John Thomas, Evolutionist and Missionary, portrayed through documents and discussions, A. Gulick (*Review*), 532
- Gypsy Art in Russia, M. A. Barannikov, 271
- Gyrocotyle*, Development of, J. S. Ruzskowski, 243
- Gyrostats, Self-Erecting, Prof. J. G. Gray, 250
- H-rays in Different Gases, Ionisation of, J. Schintlmeister, 251
- Halley's Comet: in 1909-11, Dr. A. C. D. Crommelin, 282; N. T. Bobrovnikoff, 282
- Halley, Edmond: Dr. A. Ferguson, 153; Correspondence and Papers of, Arranged and edited by E. F. MacPike, 153
- Halogens in Organic Substances, Estimation of the, by the Sodammonium Method, F. Govaert, 179
- Hancock's Steam Omnibus, Centenary of, C. E. Lee; C. F. D. Marshall, 647
- Harrison Memorial Prize, award of the, to Dr. H. J. Emeléus, 91
- Harrison's First Marine Timekeeper, 355
- Harvard University: Dr. J. B. Conant elected president of, 700; Physics at, 395
- Harveian Oration, 1932, Sir George Newman, 407
- Harvey: and Preventive Medicine, 407; and the College of Physicians, The Debt of Preventive Medicine to, Sir George Newman, 407
- Haut-Katanga: Petrographical Researches in the, M. Gysin, 411; (2), 815; (3), 887
- Hawaii, Kepelino's Traditions of, edited by Martha Warren Beckwith, 474
- Hawaiian Feathercape, H. G. Beasley, 171
- Hearing: Evolution and Mechanism of (*Review*), 147; in Man and Animals, Dr. R. T. Beatty (*Review*), 147; Tests of, 163
- Heart, Abnormal Movability of the, S. Osawa, 241



- Heat: in Air, Natural Convection of, when the heating is very small, P. Vernotte, 179; Transmission of, through Fabrics, M. C. Marsh, 558
- Heating: Agents, Electricity, Gas and other Fuels as, A. H. Barker, 32; and Ventilating Engineers, Institution of, *Journal* of the, March, 541
- Heathen Baptism in Early Britain, Miss Eleanor Hull, 403
- Heavside Layer, New Observations on the, Ratcliffe and White, 807
- Helm or Steering Orders, The New, 20
- Helminosporium avenæ*, Sporulation of, in Artificial Culture, W. A. R. Dillon Weston, 435
- Helium: Beryllium and, Lord Rayleigh, 724; Liquefaction Plant at the Clarendon Laboratory, Oxford, Prof. F. A. Lindemann and T. C. Keeley, 191
- Heredity and Hibernation in Insects, 249
- Herring Fishery off East Englia, Forecasting the, Dr. W. C. Hodgson, 98
- Herrings: and the Origin of Petroleum, 578; Icelandic, Food of, Dr. P. Jespersen, 884
- Hertzian Domain, Dispersion in the, J. Weigle, 144
- Heteroazeotrope, The Ternary, W. Swietoslawski and E. Wardzinski, 887
- Heterochrome Photometry of Incandescent Lamps, Solution of the Problem of, G. Ribaud, 667
- Heterodera schachtii*, the Potato Eelworm, J. Carroll, 850
- Hexafluorides of Sulphur, Selenium and Tellurium, Structures of the, L. O. Brockway and L. Pauling, 739
- Hexane, Action of Steam on, C. Matignon and M. Séon, 286
- 'Hexuronic: Acid' (Ascorbic Acid) as the Antiscorbic Factor, Prof. A. Szent-Györgyi and Prof. W. N. Haworth, 24; and its Chemical Determination, T. W. Birch, Dr. L. J. Harris, and S. N. Ray, 273; W. J. Dann, 274
- Hibernium Halos, Formation of, Radioactivity of Samarium and the, Dr. H. J. H. Poole, 654
- High: -Frequency Currents produced by High-Tension Magnetos, J. Jaffray, 559; Discharge in Gases, T. V. Ionesco and Mme. Irène Mihul, 887; J. C. Wilson, 546; Precision Levelling, Influence of the Daily Oscillations of the Vertical on the Results of, E. Prévot, 559; Pressure Boilers, C. H. Davy and C. H. Sparks, 90; Research, Prof. P. W. Bridgman, 280; The Physics of, Prof. P. W. Bridgman (*Review*), 259; Selectivity Tone Corrected Receiving Circuits, F. W. Colebrook, 442; Voltages, Electrostatic Production of, Van de Graaf, Compton, and Van Atta, 475
- Highway Research, Developments in, Prof. Steinburg, 334
- Hindu Metal Images, Dr. F. H. Gravely and T. N. Ramachandran, 279
- Hispine Beetles, Early Stages of, S. A. Maulik, 171
- History: as Science, 525; in Science, 777
- Hochelaga, Plan of, W. D. Lighthall, 64
- Hochwipfel Strata of the Carinthian Alps, A Fauna from the, K. Metz, 287
- Hæmolytic Streptococci: The, their Grouping by Agglutination, late Sir Frederick W. Andrewes and Ethel M. Christie, 593
- Honduras, South-Eastern, Archæological Expedition to, 650
- Hong-Kong, Climate of, T. F. Claxton, 104; Col. E. Gold, 236
- Hormones, Gonad-Stimulating, in Hypophysectomised Animals, Prof. J. B. Collip, Dr. H. Selye and Prof. D. L. Thomson, 56
- Horticultural Education Association, Year Book of the, 1932, 616
- Houston Expedition over Everest, 499
- Huddersfield Technical College, Work of the, 557
- Human Reflexology: General Principles of, an Introduction to the Objective Study of Personality, Prof. V. M. Bechterev. Translated by Emma and W. Murphy (*Review*), 675
- Hume, David, Dr. B. M. Laing (*Review*), 321
- Humidity Tables, Negretti and Zambra, 589
- Humour and Humanism in Baeyer's Laboratory, Prof. J. Read, 294
- Hurricanes of the Southern Hemisphere, 34
- Huxley and Scientific Education (Huxley Memorial Lecture), Prof. H. E. Armstrong, 684
- Hydra, Nerve-Net of, C. H. McConnell, 207
- Hydro- and Aerodynamics (*Review*), 602
- Hydrocarbon: Combustion in an Engine, A. Egerton and F. Ll. Smith, 725; Vapours, Polarity of, McAlpine and Smyth, 517
- Hydrocarbons Produced by the Action of Indene on Fatty Organomagnesium Derivatives, Velocity of Disengagement of, D. Ivanoff and I. Abdouloff, 483
- Hydrocephalus, a Hereditary Character in the House Mouse, F. H. Clark, 288
- Hydrochloric Acid, Influence of Temperature on the Absorption of Aqueous Solutions of, in the Extreme Ultra-Violet. R. Trehin, 179
- Hydrodynamics: Sir Horace Lamb. Sixth edition (*Review*), 313; Evolution of, Dr. H. Jeffreys (*Review*), 313
- Hydrogen: and Chlorine, Photochemical Reaction of, Prof. H. B. Baker, 27; Prof. A. J. Allmand, 656; and Oxygen: in a Silver Vessel, Combination of, C. N. Hinshelwood, E. A. Moelwyn-Hughes and S. C. Rolfe, 142; Reaction between, C. N. Hinshelwood, E. A. Moelwyn-Hughes and S. C. Rolfe, 625; Electrode, Improvements to the, for the Measurement of Hydrogen Ion Concentration in Solutions, P. Lecomte du Nôuy, 179; Isotope, G. N. Lewis, 590; on Mercury, Initial Electrolytic Over Voltage in the Disengagement of, R. Dufour, 482
- Hydrogenations, Catalysed, Velocity of, A. Kailan and O. Stuber, 251
- Hydronomics: Report of the Committee on, Division of Physical Sciences, National Research Council (*Review*), 112; (*Review*), 112
- Hydroxyl Group: in Ergosterol and Cholesterol, Prof. I. M. Heilbron and J. C. E. Simpson, 438; The, and Soap Film Structure, W. J. Green, 873
- Hygrometer, The Wet-and-Dry Bulb, F. J. W. Whipple, 374
- Hygroscopy: Capacitance, Dr. W. L. Balls, 329; Capacitance, and Some of its Applications, Dr. R. K. Schofield, 96
- Hyper-Elliptic Surfaces from the Real Point of View, Classification of, S. Cherubino, 339
- Hyperfine Structure and Nuclear Moments, Prof. B. Venkatesachar and L. Sibaiya, 844
- 'Iberomarusian', E. G. Gobert and H. Vaufrey, 367
- Ice Bridge, The: 557; A Correction, 921
- Iceland Spar, Pleochroism of, P. Le Roux, 447
- Ideal Home Exhibition, Science at the, 500
- Ideas, Adventures of, Prof. A. N. Whitehead (*Review*), 746
- Ignition-Coil Discharge Characteristics, Control of, Prof. G. I. Finch and R. W. Sutton, 374
- Illuminated Fountains, A. S. E. Ackermann, 396
- Immiscible Liquid Layers, Systems of, Four, E. Lester Smith, 167
- Impulse Generator, A New, for Three Million Volts, T. E. Allibone, F. S. Edwards and D. B. McKenzie, 129
- Incentives in Industry, The Problem of, Dr. G. H. Miles (*Review*), 321
- Index Veterinarius*, No. 1, 906
- India: 1931, The Census of, 109; Age of Retirement in, 146; Mechanical Transport in, Col. F. P. Barnes, 578; Mother Goddess in, Kalipada Mitra, 207; South: Prehistoric Gold-Mining in, L. Munn, 730; -West Monsoon in, 812; Wild Life in, Preservation of, 779
- Indian: Association for the Cultivation of Science, Appointment of K. S. Krishnan as secretary and Mahendral Sircar research professor in physics, 907; Caste Customs, L. S. S. O'Malley (*Review*), 638; Federation, 427; Hot Weather, 701; Institute of Science, Bangalore, 607; Progress at the, 834; Microlepidoptera, Life-Histories of, T. B. Fletcher, 474; Philosophy, A History of, Dr. Surendranath Dasgupta. Vol. 1. Second edition. Vol. 2 (*Review*), 855; Outlines of, M. Hiriyanna (*Review*), 855; Sage,



- An, Prof. H. E. Armstrong: (*Review*), 672; Sleeper Woods, Identification of, K. A. Chowdhury, 30; Thought, The Development of, Dr. T. Greenwood (*Review*), 855; Tribe, The Changing Culture of an, Dr. Margaret Mead (*Review*), 711; Woods, Calorific Values of, S. Krishna and S. Ramaswami, 281
- Indices of a Stable Population, Prof. R. Firth, 519
- Industrial: Administration, Institute of, 395; Aluminas, Velocity of Dissolution of, in Fused Cryolite, N. Parravano and O. D'Agostino, 107; Management, Specialist Posts in, Dr. W. H. Coates, 268; Psychology in Practice, H. J. Welch and Dr. G. H. Miles (*Review*), 567; Research, Co-operative, 817
- l'Industrie Nationale, Société d'Encouragement pour, award of the medal of the, to P. Chevenard, 867
- Industry: The Arts in, 73; The Management Factor in, 52
- Infestation of Stored Products by Insects, Prof. J. W. Munro, 82
- Influenza: March of, 22; Spread of, 128
- Infusoria, Ciliated, Axial Gradient in the, J. Monod, 339
- Insect-Eating in Siam, W. S. Bristowe, 234
- Insects: and Micro-Climates: Dr. H. H. Darby, 839; H. S. Leeson and K. Mellanby, 363; Inhabiting the Soil Surface, Dr. J. Davidson, 837
- Institut Colonial International: Great Britain and the Conferences of the, Prof. B. Williams, 683; Lord Lugard elected president of the, 683
- Integral Radiator (Black Body), of Electrically Heated Carbon, T. N. Panay, 179
- Intelligence in Man, Inheritance of, A. F. Dufton, 763; Dr. C. C. Hurst, 764
- Intensities, Relative, Direct Recording of, by means of a Microphotometer, N. Thomson, 558
- Interaction between Different Species of Animals, The Quantitative Theory of, V. A. Bailey, 524
- Interatomic Distances and Ferromagnetism, E. C. Stoner, 814
- Internal Ballistics, The Combustion Problem of, Dr. A. D. Crow and W. E. Grimshaw, 805
- International: Auxiliary Languages, Dr. E. Ritter, 102; Congress: for Applied Mechanics, The Fourth, 907; of Scientific and Applied Photography, 212; Ornithological Congress, The Eighth, 902; Relations: The Background of, Our World Horizons, National and International, Prof. C. Hodges (*Review*), 45
- Invar, Dr. Ch.-Ed. Guillaume, 658
- Invertebrates (*Review*), 76
- Invertebrata: The, a Manual for the Use of Students, L. A. Borradaile and F. A. Potts. With chapters by Prof. L. E. S. Eastham and J. T. Saunders (*Review*), 76
- Iodine: Arc Spectrum of, Prof. W. E. Curtis, 398; Atomic Weight of, Guichard, 738; -Oxalate Reaction, Kinetics of the, Prof. N. R. Dhar, A. K. Bhattacharya and B. L. Mukerji, 840; Tincture of, and Asepsis, R. Sorel, 596; Vapour at High Temperatures, Absorption Bands of, E. Skoroko, 366
- Iodoacetic Acid, Glutathione and: Glucose Metabolism, Dr. J. H. Quastel, 206; and Tissue Glyoxalase, Dr. F. Dickens, 130
- Iodo-Silver-Benzoin Complex, An, and its Application to the Oxidation of Ethylene Compounds into  $\alpha$ -Glycols, C. Prévost, 774
- Ionisation Produced by Radioactive Sources, Amplification of the, J. A. C. Teegan, 277
- Ionised Gases in the Magnetic Field, T. V. Ionescu and C. Mihul, 106
- Ionization in Cable Dielectrics, P. Dunsheath, 404
- Ionosphere: Characteristics of the, J. P. Schafer and W. M. Goodall, 804; Fine-Structure of the, Prof. E. V. Appleton, 872; J. A. Ratcliffe and E. L. C. White, 873; Wireless Investigations of the, An Automatic Recording Method for, C. T. R. Wilson, J. A. Ratcliffe and E. L. C. White, 522
- Ions: Gaseous, Prof. A. M. Tyndall, 65; Monovalent, Limiting Mobilities of Some, and the Dissociation Constant of Acetic Acid at 25°, Dr. A. I. Vogel and G. H. Jeffery, 27; Multiply-Charged Large, J. J. Nolan and J. G. O'Keefe, 106
- Iraq: Northern, Expedition to, 89; Petroleum and Pipe-Line, 864
- Ireland, Anthropological Survey of, 160
- Iris, Physiology of the, (1), J. Z. Young, 178
- Irish: Flora and Fauna, Origin of the: Dr. R. Lloyd Praeger, 279; 579; Plants, Some Noteworthy, Dr. R. Lloyd Praeger, 172; Woods and their Significance, A. C. Forbes, 246
- Iron and Steel: Industry, The, Sir William Larke, 335; Institute, K. Headlam-Morley appointed secretary of the, 272; Cast, Analysis of, 845; -working in the Bahr el Gharzal, T. C. Crawhall, 474
- Isotopes: of the Radio Elements, 440; Zero-Point Energy and the Separation of, H. Eyring, 739
- Israel: from the Beginnings to the Middle of the Eighth Century, Prof. A. Lods. Translated by Prof. S. H. Hooke (*Review*), 315
- Isthmian Links, Prof. B. Willis, 696
- January freeze-the-pot-by-the-fire, 34
- Japan Sea Floor, Lowering of the, Prof. H. Tsuya, 368
- Japanese: *Journal of Engineering*, Vol. 8, 543; Physiological Standards and Occupational Characteristics of Bodily Functions of the, Tomoyosi Isikawa, 588; Power Station, A Modern, 127
- Jehol: City of Emperors, Sir Sven Hedin. Translated by E. G. Nash (*Review*), 184
- Jews in Germany, 612
- Jupiter, Seasonal Changes on, A. S. Williams, 808
- Kaiser Wilhelm Gesellschaft, Work of the, 870
- Kamet Conquered, F. S. Smythe (*Review*), 224
- Kangaroo Mouse of Western America, 737
- Karyology and Systematic Relationship, 807
- Katabatic Winds, S. Atmanathan, 696
- Kattegat, Boundary Tides in the, H. Pettersson and B. Kullenberg, 586
- Kazakstan, Semipalatinsk District of, Rodents of the, B. A. Kuznetsov, 516
- Kea Parrot, The, 463
- Kennelly-Heaviside Layer: Prof. E. V. Appleton and R. Naismith, 808; Polarisation of Echoes from the, T. L. Eckersley, 512
- Kenya: Gold in, and Native Reserves, 37; 123; 231; Miners' 'Claims' and Native Lands in, 51
- Kerr Cell, The, E. E. Wright, 702
- Ketene, Sudden Pyrogenation of, J. A. Muller and Mlle. Eglantine Peytral, 375
- Kidston Collection of Fossil Plant Slides (2), Mary G. Calder, 922
- Kitchen-Middens at Gordon's Bay, H. A. Shapiro, 411
- Knowledge: and Action, 485; and Existence, The Theory of, Dr. W. T. Stace (*Review*), 455
- Kosmos, Prof. W. de Sitter (*Review*), 487
- Kuala Selinsing, Perak, Excavations at, I. H. N. Evans, 135
- Kuduru Hills, Nigeria, Younger Intrusive Rocks of the, A. D. N. Bain, 214
- K'unlun und Karakorum-Himalaya, Geologische Forschungen im westlichen, Dr. H. de Terra and others (*Review*), 600
- LaAl<sub>4</sub>, Crystalline Structure of the Compound, A. Rossi, 924
- Lactic Acid, Emetic Derivatives of, Volmar and Betz, 410
- Lambing Season in Great Britain, 557
- Lamellibranchs, Artificial Ridges of the Valves of (Northern Annam), Mlle. M. Colani, 523
- Lancaster Frankland Chemical Society, Inauguration of the, 196; Prof. H. E. Armstrong elected president, 197
- Land Utilisation: Maps, 198; Survey, Second Annual Report of the, 396
- Landolt's Reaction, Retarding Action of Glass on, A. Juliard, 338



- Language: Difficulty and Scientific Progress, 197; in Civilization, The Spirit of, K. Vossler. Translated by O. Oeser (*Review*), 152; in the Service of Science, 741
- Landslide at Toge, Japan, Prof. N. Nasu and Prof. N. Miyabe, 99
- Late-Glacial Re-advance Moraines of the Highland Border West of the River Tay, J. B. Simpson, 522
- Latent Image, Evolution of the, C. Jausseran, 410
- Latitude, Variation: Effect in, Correlatable with the Moon, Prof. H. T. Stetson, 437; of, Dr. J. C. Dobbie, 769
- Lattice Distortion, Selective, in Wires under Torsion, W. A. Wood, 842
- Lead: Effects of the Addition of Tellurium to, W. Singleton and Brindley Jones, 696; from Cyrtolite, Baxter and Alter, 881; Volumetric Determination of, A. Travers and Lu, 523
- Least Squares, Method of, Sir Arthur Eddington, 374
- Leather, Examination of, for the Presence of Extractable Chromium Compounds, F. E. Humphreys and H. Phillips, 813
- Leben und Erkennen: Vorarbeiten zu einer biologischen Philosophie, Prof. G. Wolff (*Review*), 529
- Leeches, Land, Prof. J. P. Moore, 63
- Leeds University: A. V. Williamson elected reader in geography, 372; gifts by C. R. Brotherton and B. Scattergood; renewal of subscription of the West Yorkshire Coal Owners' Association, 665; Report for 1931-32, 700; Dr. W. MacAdam elected professor of clinical medicine; Dr. R. H. Evans appointed lecturer in civil engineering; gift from Mrs. Graham, 772; Pathology and Bacteriology at, 835; Institution of a diploma course in biology in, 920
- Legendre, Centenary of the death of, 18
- Leguminous Seeds, Nutrition with, and Reproduction, V. Zagami, 108
- Lepidoptera, Nomenclature in (*Review*), 566
- Lepidosiren: Pelvic: Fins of the, G. E. H. Foxon, 732; Filaments of, J. T. Cunningham and D. M. Reid; G. E. H. Foxon, 913; The Pituitary in, and its Development, T. Kerr, 523
- Leverhulme Research Fellowships, Appointment of an Advisory Committee, 795
- Leyden Observatory, Report for 1932, 553
- Libyan Desert, Volcanic Craters in the, Dr. K. S. Sandford, 46
- Liesegang Rings: Dr. E. S. Hedges, 169; and other Periodic Structures, Dr. E. S. Hedges (*Review*), 316
- Life and Thought: My, an Autobiography, A. Schweitzer. Translated by C. T. Campion (*Review*), 785
- Light: and Life, Prof. N. Bohr, 421; 457; for Interferometer Work, Sources of, Rolt and Barrell, 244; in Interstellar Space, Absorption of, J. Dufay and Ssu-Pin Liau, 923; Measurement of, for Biological Purposes, Dr. W. H. Pearsall and P. Ulyott, 694; -Sensitive Apparatus, Practical Applications of, Major C. E. Prince, 430; -Spots, Faint Transient, Photography of, Dr. L. F. Richardson, 401
- Lightning: Flash, A Destructive, Dr. C. V. Boys, 765; Investigation in South Africa, W. H. F. Tredre, 19; Progressive, A New Stereoscope, Dr. C. V. Boys, 492; Protection Against, Code for, 509
- Lilydale Limestone, Stromatoporoids of the, Elizabeth A. Ripper (1), 106
- Limestone Oil Wells, Reopening, with Acid, 541
- Limnologie, regionalen, Grundzüge der, Prof. E. Naumann (*Review*), 223
- Limpets, Age and Growth of, N. Abe, 30
- Linear Partial Differential Equations in the Plane, M. Brillouin, 410
- Linnean Research Association, Report of the, 614
- Lines of Varieties, Curvature of, T. Boggio, 71
- Linnean Society of London: election of Dr. E. D. Merrill, Dr. E. Baur, Prof. A. Pascher and Prof. F. Silvestri as foreign members, 759; election of officers, 798; Linnean medal presented to Prof. R. Chodat, 793
- Liquid Surfaces, Instability of, Dr. L. Rosenhead, 175
- Liquids: on Solid Surfaces, Spreading of, Buckley and Snyder, 407; with Gases, Supersaturation of, T. N. Richardson and Dr. K. C. Bailey, 762
- Lister Institute, Report of the, 870
- Lithium Alloys, A. Baroni (1), 71
- Liver and Liver Extracts, Iron and Copper in, H. G. Rees, 702
- Liverpool University: bequest to, by Dr. J. M. Hunt, 51; Prof. J. Proudman elected professor of oceanography in, 391; gift to, by W. Horton, 557
- Living Machinery, Prof. A. V. Hill (*Review*), 860
- Local Lists of Animals, Prof. A. E. Boycott, 94
- Locusts: in South Africa, The Phases of, Prof. J. C. Faure, 423; South African, Phases in, B. P. Uvarov, 423
- Logarithmetica Britannica: being a Standard Table of Logarithms to Twenty Decimal Places, Dr. A. J. Thompson. Part 5: Numbers 50,000 to 60,000 (*Review*), 785
- Lolium* Seedlings, Fluorescence of, in Ultra-Violet Light, P. A. Linehan and Prof. S. P. Mercer, 202
- London: Hospital, Collected Researches, 1932, 835; School of Hygiene and Tropical Medicine: Annual Report, 177; Hand List of Periodicals. Second edition, C. Barnard, 906; Subsidence of, T. E. Longfield, 558; University: Grants to, by City Companies, 104; Prof. L. N. G. Filon elected vice-chancellor; title of reader in experimental physiology conferred on H. P. Gilding; F. A. Greene appointed a fellow of King's College, 177; grants from the Leathersellers' Company and the Pilgrim Trust, 248; Prof. J. B. S. Haldane appointed professor of genetics at University College; W. P. Yetts appointed professor of Chinese art and archaeology at the Courtauld Institute of Art; Prof. C. L. Burt appointed Heath Clark lecturer for 1933, 336; conferment of the title of reader in experimental physiology on H. P. Gilding; conferment of doctorates, 372; bequest by A. L. Leon; J. Stinton Jones appointed consultant engineer for heating etc. for the new buildings in Bloomsbury, 408; Prof. A. J. S. Pippard appointed professor of civil engineering at Imperial College—City and Guilds College; P. M. S. Blackett appointed professor of physics at Birkbeck College; W. R. Spurrell appointed reader in physiology at Guy's Hospital Medical School; Dr. Vera Anstey appointed Cassel lecturer in commerce at the London School of Economics, 480; conferment of doctorates, 628; grants by City Companies, 700; Report for 1932-33, 736; and the British Museum, 755; C. A. Mace appointed reader in psychology at Bedford College; title of reader conferred on Dr. Katharine H. Coward, Dr. D. C. Jones, and B. Topley; award of Dunn exhibitions to J. C. B. Bone and J. S. Horn, 772; title of professor conferred on Dr. L. S. Stebbing, 811; grants from City Companies, 884; and the Development of Science, 896; The New Buildings for the, T. Ll. Humberstone, 903; award of doctorates, 920
- Lonicera*, Presence of a Centrosomic Apparatus in Species of the Genus, P. A. Dangeard, 886
- Loudness, Scales of, B. G. Churcher and A. J. King, 760
- Low Temperature Research, Prof. Keesom, 768
- Lubricants, Hydrogenated Motor, 643
- Lubricating Oils, Volatility Range of, Measurement of, R. N. J. Saal and C. G. Verver, 661
- Lucerne 'Flea', Ecology of the, D. S. MacLagan, 556
- Lunar Periodicity in Reproduction, Prof. T. A. Stephenson, 622
- Lund Zone of the Astronomische Gesellschaft Catalogue, Proper Motions in the, W. Gyllenberg, 245
- Lyons Atmosphere, Progressive Darkening of the, A. Allix, 179
- Machine Age's Starvation Predicted, Prof. R. A. Gortner, 393
- Macrolepidoptera of the World: The, a Systematic Description of the Hitherto Known Macrolepidoptera. Edited by Prof. A. Seitz. Suppt. to Vol. 1: The Palearctic Butterflies (*Review*), 566



- Madagascar: Social Organisation and Marriage in, R. Linton, 843; Zoologie der, G. Grandidier et G. Petit (*Review*), 748
- Maglemose in Britain, Age of, H. and M. E. Godwin, 551
- Magnesium: Chlorite and Double Chlorites of Copper with Magnesium, Barium and Thallium, G. R. Levi and D. Ghiron, 775; Silicides, Thermal Decomposition of the, G. Gire, 923; Sublimation of, in a Vacuum and Casting in an Atmosphere of Argon, J. Herenguel and G. Chaudron, 179; Zinc and Aluminium Films, Structure of, Prof. G. I. Finch and A. G. Quarrell, 482
- Magnetic: and Electric Double Refraction, Anomalous Dispersion in, M. Schwob, 630; Data and Mine Surveying, T. G. Bocking, 768; Disturbances, Recent, Rev. J. P. Rowland, 764; Double Refraction of Some Cerium Salts in Aqueous and Non-Aqueous Solutions, C. Haenny, 887; Measurements at Mogadiscio, M. Bossolasco, 560
- Magneto-Rotation in Coloured Glass and Rock Salt, G. Kúrti, 411
- Malabar House, The, Dr. M. D. Raghavan, 29
- Man: and Medicine: an Introduction to Medical Knowledge, Dr. H. E. Sigerist. Translated by Margaret Galt Boise (*Review*), 894; and Metals: a History of Mining in Relation to the Development of Civilisation, Dr. T. A. Rickard. 2 vols. (*Review*), 743; Ancient and Modern, Dr. S. Zuckerman, 367; Constitution and Temperament in, K. H. R. Edwards, 832; The Inequality of, and other Essays, Prof. J. B. S. Haldane (*Review*), 529; The Races of, Differentiation and Dispersal of Man, Prof. R. B. Bean (*Review*), 712
- Managerial and Administrative Problems, Study Group on, 719
- Manchester University: Prof. I. M. Heilbron appointed professor of organic chemistry; retirement of Dr. J. Prescott and J. Winterbottom, 772; Dr. M. Polanyi appointed professor of physical chemistry in, 902
- Manihiki and Rakahanga, Cook Islands, Ethnology of, Te Rangi Hiroa (Dr. P. H. Buck), 588
- Mankind, The Proper Study of, B. A. Howard (*Review*), 676
- Manure, Distribution of, 445
- Maps, Reproductions of Early Engraved, 2: English County Maps in the Collection of the Royal Geographical Society. With Introduction and Notes by E. Heawood (*Review*), 530
- Marble, Solution of, in Acids, Velocity of, W. Jacek (3), 887
- Marcapata Valley, Eastern Peru, Geology of the, J. A. Douglas, 70
- 'March Brown' of the Angler, The, 481
- March Winds, 285
- Marianas Islands, Archaeology of the, Laura Maud Thompson, 623
- Marine Fishes, Low Temperatures cause Mortality amongst, 373
- Market Gardening, Recent Developments in, 395
- Marmite, Medicinal and Dietetic Value of, 616
- Marquesan Insects, I, 623
- Marquis, The, and the Land Agent, Prof. G. N. Watson, 67
- Marrubüne, New Method of Preparing, L. J. and F. Mercier, 143
- Mars: Canals on, H. B. Brydon, 518; Planet, The Minor Details of, Dr. E. M. Antoniadi, 802; Recent Observations of, Dr. R. L. Waterfield, 845
- Mathematical Association, Annual Meeting of the, 67
- Matrices and Continued Fractions, Prof. H. W. Turnbull, 922
- Maya and Aztec, Gods of, J. E. Thompson, 171
- Mayas, Sacred Sandstone of the, Prof. T. D. A. Cockerell, 656
- Mayflies and Man, 701
- May Sunshine, 629
- Maze, Symbolism of the, W. F. J. Knight, 98
- Mechanics and Acoustics, Physical Principles of, Prof. R. W. Pohl. Translated by Winifred M. Deans (*Review*), 320
- Medical: Biography (*Review*), 40; Research Council and the Rockefeller Foundation, award of travelling fellowships to H. W. Fullerton, Miss M. H. Roscoe, Dr. D. Sheehan and Dr. D. Zuckerman, 907
- Medieval Faith and Fable, Rev. Canon J. A. MacCulloch (*Review*), 80
- Mediterranean Region: The Geography of the, Its Relation to Ancient History, Prof. Ellen Churchill Semple (*Review*), 317
- Memory, Experiments on (*Review*), 309
- Mercury, Visible Triplet Lines of, Band Spectra which Appear Near, E. Matuyama, 58
- Mesolithic Age in Britain, 32
- Metals in very Thin Plates, Reflecting Power of, P. Rouard, 36
- Metamorphism: a Study of the Transformations of Rock Masses, Dr. A. Harker (*Review*), 310; in Rocks, the Process of, Prof. P. Niggli (*Review*), 310
- Meteor Craters, Prof. F. A. Melton and W. Schriever, 100
- Meteor Craters, Dr. L. J. Spencer, 172
- Methylornarcotine, Glycuronic Acid, and Vitamin C, W. J. Dann, 24
- Mexico and Guatemala, Recent Discoveries in, 101
- Mechanik und Akustik, Einführung in die, Prof. R. W. Pohl. Zweite Auflage (*Review*), 568
- Mechanical Transport in India, Col. F. P. Barnes, 578
- Mechanik, Handbuch der physikalischen und technischen. Herausgegeben von Prof. F. Auerbach und Prof. W. Hort. Band 3: Statik und Dynamik elastischer Körper nebst Anwendungsgebieten, zum Gebrauch für Ingenieure, Physiker und Mathematiker. Band 4, Hälfte 1: Lief. 1. Lief. 2. Band 4, Hälfte 2: Technische Physik der festen Körper, zum Gebrauch für Ingenieure, Physiker und Mathematiker (*Review*), 748
- Medical: Education, Methods and Problems of, Vol. 21, 441; Research Council: Sir Thomas Lewis appointed a member of the, 581; Report of the, for the year 1931-1932, 753; in Great Britain, 753
- Medicine: Man and, an Introduction to Medical Knowledge, Dr. H. E. Sigerist. Translated by Margaret Galt Boise (*Review*), 894
- Melanogenesis, Biological Signification of, E. Friedheim, 483
- Melanophore Reactions, Cellular Transmission of Neurohumoral Substances in, G. H. Parker, 776
- Melchett Medal of the Institute of Fuel, award of the, to Sir John Cadman, 581
- Membrane Equilibria (*Review*), 859
- Mendel medal of Villanova College, award of the, to Prof. H. S. Taylor, 759
- Mendelian Factors in Quantitative Inheritance, Number of, Dr. R. A. Fisher, 400
- Mental Deficiency Practice: the Procedure for the Ascertainment and Disposal of the Mentally Defective, Dr. F. C. Shrubbsall and Dr. A. C. Williams (*Review*), 456
- Mercury: Hornsby's Observations of, 405; Arc Rectifiers, 54; Fulminate, Thermal Decomposition and Detonation of, Prof. W. E. Garner and H. R. Hailes, 286
- Mergat's Phenomenon, Production of, by d'Arsonvalisation with Short Waves, H. Bordier, 375
- Mesopotamia, Northern, Excavations in, 685
- Metallic: Neodymium Free from Iron and Silicon, Preparation of, F. Trombe, 595; Objects in Museums, Preservation of, Dr. A. Scott, 906
- Metals: and Civilisation (*Review*), 743; Cold Working of, Energy absorbed in the, Rosenhain and Stott, 769; in the Service of Human Life and Industry, Sir Harold Carpenter, 733; Institute of, election of officers, 467; Journal of the, Vol. 49. Edited by G. Shaw Scott (*Review*), 187
- Meteor Crater: Age of, Prof. E. Blackwelder, 404; Arizona, D. M. Barringer, 579
- Meteoritic Irons and Silica-Glass from the Meteorite Craters of Henbury (Central Australia) and Wabar (Arabia), Dr. L. J. Spencer, 250



- Meteorite : Scars in Carolina, Probable, F. A. Melton and W. Schriever, 624 ; The Great Siberian, 614
- Meteorological : Data, Correlation of, Sir Gilbert Walker, 284 ; Records of Southport, 199
- Methane : Action of Steam on, C. Matignon and M. Séon, 215 ; Halogen Derivatives of, Infra-red Absorption Spectra of some, J. Lecomte, 738
- Methionine in Wool, J. Barritt, 689
- Methylene Blue, Reduction of, by an *Endomyces* at the expense of its Endocellular Hydrogen Donators, F. Chodat and M. Junquera, 815
- Metrology by Light Waves at the National Physical Laboratory, 192
- Metropolitan-Vickers Electrical Co., Ltd. : Representatives in Russia, 428 ; the Research and Testing Departments of the, 126 ; 649
- Mexican and Ecuadorian Copper and Bronze Axes, M. A. Clement, 279
- Mexico's "Houses of the People", 557
- Mice under Continued Treatment with Œstrin, Some Effects Observed in, H. Burrows, Prof. E. C. Dodds, and N. M. Kennaway, 801
- Microscope : Evolution of the, R. S. Whipple (*Review*) 219 ; The History of the, compiled from original instruments and documents, up to the introduction of the Achromatic Microscope, Dr. R. S. Clay and T. H. Court (*Review*), 219
- Middlesex in British, Roman and Saxon Times, Sir Montague Sharpe. Second edition (*Review*), 677
- Migration from and to Great Britain, H. Leak and T. Friday, 125
- Milk : the Colloidal Calcium Phosphate of, G. T. Pyne and J. J. Ryan, 35 ; the Freezing-Point of, G. W. Monier-Williams, 702 ; Report of the Reorganisation Committee for (Ministry of Agriculture and Fisheries), 605 ; Supply, Agriculture and, Prof. H. E. Armstrong, 605
- Milne's Theory of the Expansion of the Universe, Dr. G. C. McVittie, 533
- Mind-Body Relation, Absurdity of any, Dr. C. S. Myers, 579
- Mindouli-Mines Region, Stratigraphical Study of the, H. Lagotala, 144
- Mineral Oils, Dewaxing and Acid Refining, Dr. N. O. Backlund, 31
- Mineralogy : A Textbook of, with an extended treatise on Crystallography and Physical Mineralogy, Prof. E. S. Dana. Fourth edition, revised and enlarged by Prof. W. E. Ford (*Review*), 318
- Miner's Nystagmus, Third Report on, 394
- Mines : Roof Falls in, Prevention of, 140 ; Underground Lighting in, R. H. Campin, 465
- Mining : and Metallurgy, Institution of, award of the gold medal to Sir John Cadman, 432 ; Institute of Scotland, C. A. Carlow elected president of the, 650
- Minnesota Pleistocene *Homo*, A. E. Jenks, 739
- Mistral, Greatest Strength of the, 338
- Mites of Fruit Trees, A. M. Masee, 136
- Mitochondria, Fixation of, J. H. Davie, 59
- Mitogenetische Strahlung, Die, zugleich zweiter Band der "Probleme der Zellteilung", Prof. A. Gurwitsch. Unter Mitwirkung von Lydia Gurwitsch (*Review*), 79
- Mixtures of Substances of Large Electric Moment, Magnetic Susceptibility of some, J. E. Garssen, 523
- Molecules : of Intermediate Complexity, Kinetics of the Decomposition of, C. N. Hinshelwood and C. J. M. Fletcher, 24 ; Simple, and Elementary Processes, Prof. A. J. Allmand, 173
- Mole's Winter Store of Earthworms, 285
- Mollusca, The British Marine, R. Winckworth, 334
- Molybdenum, Distribution of, Dr. W. A. Roach, 202
- Monte Rosso di Verra, Mineral Deposits of, T. Carpanese, 775 ; (2), 924
- Moon : New, An Early Observation of the, 100 ; Partial Eclipse of the, Sept. 14, 1932, Photometric Study of the, F. Link, 179
- Moon's Shadow on the Earth, Photographing the, W. M. Browne, 697
- Mornington Earth Tremor of Sept. 3, 1932, W. M. Holmes, 71
- Motor Car Lights on the Road, Dr. Dickinson, 20
- Mousterian Age, A Spear-Point of Bone of, Abbé Breuil, Dr. H. Martin, 53
- Mole, Captive, Observations on a, L. E. Adams, 466
- Mollusca, Spawning in, Spring Outburst of, 445
- Morphology, The Old, and the New, Dr. H. Hamshaw Thomas, 47
- Mother-Tongue in India, Use of the, 444
- Mottramite and Psittacimite, Identity of, with Cupriferous Descloizite (Cuprod-Escloizite), F. A. Bannister, with chemical analyses by M. H. Hey, 250
- Mucor*, Biometric Researches on the Spores of, W. Schopfer, 483
- Murray, John, Expedition, The, Prof. J. Stanley Gardiner, 640
- Muscular Work, Fatigue and Recovery, G. P. Crowden (*Review*), 321
- Museums : of British Territory and the Mediterranean, 430 ; of Canada, 84
- Musk : -Rat in Britain, The, Prof. J. Ritchie, 385 ; -Rats at the London Zoo, 755
- Mussel, Strange Spatfall of the Common, on the Common Cockle, Prof. J. H. Orton, 513
- Mutations, Spontaneous, Origin of, M. Navashin, 436
- Mutsu Bay, Tintinnids of, 695
- Mycorrhiza on Conifer Roots, 176
- Mycorrhizal Theory, Objections to the, J. Costantin, 447
- Nationalism and Academic Freedom, 853
- National : Physical Laboratory, Collated Researches of the. Vol. 23, 162 ; New Radio Department of the, R. A. Watson Watt appointed superintendent, 720
- Native Reserves, Gold in Kenya and, 37
- Natural History : Intensive, Prof. E. J. Salisbury (*Review*), 343 ; The Standard, from Amoeba to Man, G. J. Arrow and others. Edited by W. P. Pycraft (*Review*), 152
- Naturalist*, resignation of T. Sheppard of editorship of the, 304 ; The, and the Country Side (*Review*), 636
- Naturwissenschaften, Die* (birthday of Dr. Arnold Berliner), 127
- Natuna Islands, Birds of the, H. C. Oberholser, 207
- Naturæ, Vox, E. Terbea (*Review*), 491
- Naval Architects, Institution of : award of premium to Dr. G. Kempf and H. Lerbs, 164 ; Lord Stonehaven nominated as president of the, 432
- Navy, Health of the, 1931, Vice-Adm. R. St. G. S. Bond, 906
- Nebulosity Surrounding a Nova, Illumination of, B. M. Peck, 808
- Nematodes, Parasitic, Cultivation of, G. Lapage, 583
- Neodymium-Samarium Fractionation, Radioactivity of a, M. Curie and S. Takvorian, 702
- Neolithic Fortress, Late, Homolka, Bohemia, V. J. Fewkes, 207
- Neon Discharge Tubes, Behaviour of, in a Flashing Capacity Circuit by Means of a Cathode Ray Oscillograph, J. H. J. Poole, 35
- Neoteny and Pædogogenesis, Meaning of, G. E. H. Foxon, 93
- Nerve : Action of Quaternary Ammonium Salts on, S. L. Cowan, 658 ; Impulse, Nature of the, Prof. A. V. Hill, 233 ; 497 ; 501 ; Mitogenetic Radiation of, Dr. A. Gurwitsch, 912
- Nesting Season, Opening of the, 445
- Nettle, Stinging, Eradication of the, G. H. Bates, 208
- Neural Energy Constant : The, A Study of the Bases of Consciousness, Dr. J. Bostock (*Review*), 80
- Neuro : Humoral Mechanisms, Prof. R. J. Brocklehurst, 65 ; -Muscular Junction, the, and Curare, Tudor Jones, 693
- Neuton, The Neutron and, The New Element of Atomic Number Zero, Prof. W. D. Harkins, 23
- Neutral Aryl Sulphites, Reaction of Phosphorus Pentachloride on the, P. Carré and D. Libermann, 667



- Neutron : and Neutron, The, The New Element of Atomic Number Zero, Prof. W. D. Harkins, 23; and Proton, Law of Force between, E. C. Pollard, 814; Chemical Nature of the, P. Achalme, 559; Proton, and Positron, Dr. N. Thon, 878; The, Dr. J. Chadwick (Bakerian lecture), 794
- Neutrons : Dr. D. Meksyn, 366; Conditions of Emission of, by the Action of  $\alpha$ -Particles on the Light Elements, Mme. Irène Curie and F. Joliot, 447; Emission of, by Aluminium under the Action of the  $\alpha$ -Particles, P. Auger and G. M. Herzen, 523
- New Britain*, 358
- Newfoundland : Fishery Research in, 918; Ice off, 409
- New South Wales : Association of the Tertiary Alkaline Rocks of, with late Tertiary Tectonic Lines, C. A. Sussmilch, 667; Linnean Society of, Prof. A. N. St. G. H. Burkitt elected president of the, 759; Mineralogy of the Narrabeen Series of, Alma G. Culey, 523
- New Year Honours, 17
- New Zealand, Trout Fishing in, Prof. E. Percival, 163
- Niari : Limestones of, Continental Formation Subjacent to the, H. Lagotala, 851; Stratigraphic Scale of the, H. Lagotala, 215
- Nickel : and Nickel-Chromium Alloys in the Neighbourhood of their Curie Points, Measurements of the Thermoelectric Powers of, A. W. Foster, 814; Salts, Electrolysis of, Influence of the Magnetic Field on the, H. Forestier, 70
- Nicotine, the Toxic Action and Elimination of, N. Sabatucci (1-2), 483
- Niger, Barrages on the, 466
- Nigeria, Census of, S. M. Jacob, 516
- Nile Flood, 921
- Niobium, Determination of, by Orthoxyquinoline, P. Süe, 738
- Nitrates in the Soil, Distribution of, and Root Development in Coffee, V. A. Beckley and F. McNaughtan, 878
- Nitrobenzene, Debye's Dispersion of, Prof. R. Weigle and R. Luthi, 327
- Nitrogen : Dioxide, Infra-Red Absorption Spectrum of, C. R. Bailey and A. B. D. Cassie, 239; Dioxide Molecule, Form and Vibrational Frequencies of the, C. R. Bailey and A. B. D. Cassie; R. Schaffert, 910; Fixation in the Genus *Lolium*, R. Brown, 169; Organic, Estimation of, in the presence of Nitrates by Kjeldahl's Method, R. Cambier and L. Leroux, 179; -Uptake of Plants, Prof. A. I. Virtanen, 534
- Nitrogenous Manuring of Legumes, H. Burgevin, 660
- Nitrous Oxide : and Carbon Dioxide, A Bomb Calorimeter Determination of the Heats of Formation of, R. W. Fenning and F. T. Cotton, 446; in the Glow Discharge, Dissociation of, E. A. Stewardson, 364
- NO<sub>2</sub> : Extension of the Visible Absorption System of, to longer Wave-lengths, J. Curry and Dr. G. Herzberg, 842; Molecule, Form and Vibrational Frequencies of the, Dr. L. Harris, W. S. Benedict and G. W. King, 621
- Nomogram : The, The Theory and Practical Construction of Computation Charts, H. J. Allecock and J. R. Jones (*Review*), 785
- Non-Linear Equations of the Elliptic Type, G. Giraud, 215
- North : Atlantic Gale, 18; China Amphibia and Reptiles, Handbook of, Dr. Alice M. Boring, C. C. Liu, and S. C. Chou, 304
- Northern Lights : The Official Account of the British Arctic Air-Route Expedition, 1930-1931, F. S. Chapman, and others (*Review*), 317
- Norton, Thomas, and the "Ordinal of Alchemy", Dr. E. J. Holmyard, 520
- Norwegian : Antarctic Expedition, Capt. H. Rüser-Larsen, 301; Oyster Pools, T. Gaarder and R. Spärck, 806
- Nova : A Remarkable Short-Lived, Delporte and Arend, 553; of March 20, Dr. Kukarkin, 590; Phenomenon, Frequency of the, C. Lönnqvist, 64
- Nuclear : Potential Barriers, Heights of, E. C. Pollard, 97;  $\alpha$ -Particles, Fundamental State of, Dr. G. Gamow, 618; Energy Levels, Dr. G. Gamow, 433; Moments, Predictions of, Prof. B. Venkatesachar and T. S. Subbaraya, 552; Potential Barriers, Heights of, and Nuclear Structure, E. C. Pollard, 398
- Nucleic Acids and Uracil, Irradiation of, F. F. Heyroth and J. R. Loofbourow, 92
- Numerical Coincidence, A, H. P. Hollis, 550
- Nutrient Salts in the Sea, Depletion of, 445
- Nutrition, Recent Investigations in, 357
- Oaks in Cultivation in the British Isles, Sir Oscar and E. F. Warburg, 905
- Oats, Grain Colour in, Inheritance of, W. Robb, 517
- Observer's Handbook for 1933, 369
- Obstacles Revolving Round an Axis Parallel to the General Direction of Flow, Vortices Produced by, P. Dupin and M. Teissié, 179
- Oceanographical Work of the *Carnegie (Review)*, 114
- Oceanography : (Bulletin of the National Research Council. No. 85 : Physics of the Earth, 5) (*Review*), 344; Progress of, 214
- Octopus vulgaris*, Haemocyanin of, Svedberg and Erikson, 137
- Oenothera*, Phylogeny in the Genus, Prof. R. R. Gates, 589
- Östrogenic Substance from Plant Material, An, Dr. B. Skarżyński, 766
- Östrus-exciting Compound, A Synthetic, Dr. J. W. Cook, Prof. E. C. Dodds, and C. L. Hewett, 56
- Oil : and Natural Gas, Migration of, Prof. V. C. Illing, 475; and Water, Separation of, Molecular Phenomena at the Surface of, J. J. Trillat and L. Leprince-Ringuet, 850; Oxidation and the Lubricating Properties of, R. O. King, 476; Reserves and Production, V. R. Garfias, 868; Seeds and Vegetable Oils, Survey of, Vol. 2, 542
- Oldoway Human Skeleton, The, Dr. L. S. B. Leakey, Prof. H. Reck, Prof. P. G. H. Boswell, A. T. Hopwood, and Dr. J. D. Solomon, 397
- Old : Trades and New Knowledge, Sir William Bragg (*Review*), 860; Wine and New Bottles, Dr. A. Ferguson (*Review*), 417
- Olefinic Compounds, Catalytic Hydrogenation of, Dr. E. H. Farmer and R. A. E. Galley, 60
- Olive, A Non-Parasitic Alteration of the, R. Gigante, 851
- Omaha Secret Societies, Dr. R. F. Fortune, 331
- Opiliones-Laniatores, The Arachnid Group, late Dr. W. Sørensen, revised by Dr. C. With and Dr. K. L. Henriksen, 543
- Ophiocytium Nageli* in Victoria, Two Species of, *O. terrestris* n.s. and *O. arbuscula* Rabenhorst, Jean Heyward, 107
- Opium Poppy, Atavism in a Strain of the, L. Blaringhem, 178
- Optic Tectum, A Phylogenetic Consideration of the, G. K. Huber and Elizabeth C. Crosby, 739
- Optical : Rotatory Power, Prof. T. M. Lowry and H. Hudson (4), 374; Rotatory Power, Fundamental Laws of, Prof. W. Kuhn, 771
- Ordovician Rocks of the Trefriw District, North Wales, D. A. Bryn Davies, 595
- Organic : Reagents for Metals, Hopkin and Williams, Ltd., 396; Oxides, Dissociable, C. Dufraisse and J. A. Monier, Jr., 887; Syntheses : an Annual Publication of Satisfactory Methods for the Preparation of Organic Chemicals. F. C. Whitmore, editor-in-chief. Vol. 12 (*Review*), 604
- Orthogonal Polynomials with Two Variables, M. Ghermanesco, 107
- Orthophosphoric Acid, Action of Solutions of, on Ordinary Cellulose, G. Champetier, 703
- Orthopodomyia pulchripalpis*, Rondani (Diptera, Culicidae), A New British Record of, J. F. Marshall and J. Staley, 435
- Osiris and the Atom, J. G. Crowther (*Review*), 320
- Osler and other Papers, Prof. W. S. Thayer (*Review*), 40
- Outline Series, The. 11 vols. (*Review*), 8



- Ovaries, Transplantation of, Preserved Outside the Organism, A. Lipschütz, 143
- Ovulation Without 'Heat' in the Ewe, Occurrence of, R. Grant, 802
- Oxford University : Dr. G. D. Hale Carpenter appointed Hope professor of zoology, 159; Junior Scientific Club, Jubilee of the, 757; Old Ashmolean, 250th Anniversary of the, 684; Report of the Lewis Evans Collection, 884
- Oxide Catalysts, Positive Ion Emission from, Dr. C. F. Powell and Luang Brata, 168
- Oxides, Dissociable Organic, C. Dufraisse and R. Buret, 70
- Oximes and Semicarbazones, Colour and Structure of, Mme. Ramart-Lucas and Mme. M. Grumez, 70
- Oxyflavonic Compounds, Microchemical Characters of the, A. Guillermond and R. Gautheret, 410
- Oxygen : Commercial, Manufacture of, G. Claude, 70; Hydrogen and, Reaction between, C. N. Hinshelwood, E. A. Moelwyn-Hughes and S. C. Rolfe, 625; Liquid, Magnetic Double Refraction of, P. Lainé, 850; Molecule, Magnetic Behaviour of the, R. Einaudi, 71
- Oxyquinoline, Azo Derivatives of, Utilisation of Some, as Reagents in Qualitative Analysis, G. Gutzeit and R. Monnier, 144
- Oysters (*O. edulis*), Breeding of, at Port Erin, Prof. J. H. Orton, Miss M. W. Parke and W. C. Smith, 26
- Ozone : Liquid, Magnetic Properties of, P. Lainé, 702; Photosensitised Decomposition of, by Chlorine, Dr. R. G. W. Norrish and G. H. J. Neville, 544
- Pacific : Influence of the, on the Circulation in the South-West Atlantic Ocean, A. J. Clowes, 189; Islands, Reptiles and Amphibians of the, C. E. and May Danheim Burt, 767; Ocean, Soviet Expedition to the, 391; Science Congress, Fifth, 757; Scientific Problems of the, Lord Rutherford, 831
- Pædogenesis, Neoteny and, Meaning of, G. E. H. Foxon, 93
- Paint and Varnish Industries, Research in the, 794
- Painted Lady Migrates, The, 849
- Palæontographical Society, election of officers, 649
- Palæozoic : Fossils from Victoria, F. Chapman, 703; Planktonic Faunas of North America, R. Ruedemann, 775
- Palestine : Ancient Man in, Miss Dorothy Garrod, 19; M. T. Dawe appointed director of agriculture and forests, 543; Mesolithic Culture in, 767
- Pamir, A Photogrammetric Survey in the, P. Lake (*Review*), 744
- Panda, The, at the Zoological Gardens, 428
- Papal Observatory in Castel Gandolfo, 124
- Papua, Depopulation in, Sir Hubert Murray, and others, 519
- Paraffins, Normal, Crystal Structure of the, Dr. A. Müller, 100
- Paramagnetic Susceptibility, Influence of Light on, P. W. Selwood, 761
- Parc National Suisse, Les Insectes Forestiers du, Dr. A. Barbey, 234
- Paris Academy of Sciences, Prize awards of the, 174
- Parsons : Charles, his Life and Work, R. Appleyard (*Review*), 891
- Particle Size and X-Ray Spectroscopy, Fonda, 332
- Partridge Disease, 177; and its Causes. Edited by Major M. Portal and Dr. W. E. Collinge (*Review*), 224; Numbers, Fluctuations of, 178; Shooting, 142
- Passivity Phenomena, Theory of, W. J. Müller (18), 888
- Pasteur, Louis, The Genius of, P. Compton (*Review*), 40
- Pastures, Nutritive Value of, E. J. Sheehy, 30
- Patents : British, and Designs Statutes as Amended and Consolidated to 1932. With an Introduction and Index by H. J. W. Bliss (*Review*), 79; for Chemists, The Law of, Dr. J. Rossman (*Review*), 115; Trade Marks and Designs : their Commercial Aspect and Development, C. W. Thomas (*Review*), 79
- Patwin and Maidu Cult Origins, E. M. Loeb, 659
- Pearl Oysters, Breeding of, coincident with Full Moon, 665
- Pedigree Schedules : the Study and Preparation of Family Records (*Review*), 712
- Peirce, Charles Sanders, Collected Papers of. Edited by C. Hartshorne and P. Weiss. 2 vols. (*Review*), 639
- Pelagic Organisms, Unusual Occurrence of, Prof. W. J. Dakin, 239; G. P. Farran, 240
- Penetrating Radiation, Photography of the Tracks of, P. M. S. Blackett and G. Occhialini, 286
- Penguin Embryos, C. W. Parsons, 695
- Pepys, Samuel : Christ's Hospital and, 267; Tercentenary : of, T. E. James, 228; and the Royal Society, 299; E. Chappell, 833; The Priestley and, Commemorations, 443
- Periodic : Functions, Almost, A. S. Besicovitch (*Review*), 384; Light Beam, Action of a, on Metallic Sheets, Q. Majorana, 447
- Permanganate, Action of Hydrogen Peroxide on, P. Dubois, 923
- Persepolis, Excavations of, 233
- Persia, "Wind of 120 Days", 773
- Perturbed Series, Hyperfine Structure of, E. Gwynne Jones, 813
- Peterhead Sealers and Whalers, Dr. R. W. Gray, 904
- Petrography and Petrology : a Textbook, Prof. F. F. Grout (*Review*), 317
- Pétrole, Le, de Mésopotamie et son Pipe-Line, V. Forbin, 864
- Pétroles naturels et artificiels, J.-J. Chartrou (*Review*), 455
- Petroleum : Congress, World, 758; Herrings and the Origin of, 578; Iraq, and Pipe-Line, 864; Production in Russia, P. C. Beckstrom, 541; Technology : and Chemical Industry, 145; Aircraft in Relation to, 160
- Petrols, Vapours of, Accidental Ignition of, by Electric Sparks, A. Kling and A. Soulier, 106
- Pflanzenanalyse, Handbuch der, Herausgegeben von G. Klein. Band 2 : Spezielle Analyse. Teil 1 : Anorganische Stoffe; Organische Stoffe, I (*Review*), 8
- Phæocystis and Herrings, 737
- Pharmacognosy, A Textbook of, J. W. Cooper and T. C. Denston (*Review*), 419
- Pharmacopœia : The British, 1932 (*Review*), 6; The Extra, of Martindale and Westcott. Revised by Dr. W. H. Martindale. Twentieth edition. In 2 vols. Vol. 1 (*Review*), 6
- Pharmacy, Principles of, H. B. Mackie (*Review*), 895
- Phase, Variations of, by Reflection on very Thin Metallic Films, P. Rouard, 410
- Phaseolus multiflorus*, Petaloid Formation of the Calyx in, E. Tschermak, 560
- Phenols and Naphthols, Action of Gaseous Cyanogen on, (2), G. Machek, 851; (3), 852
- Phenomenal Regression to the Real Object, Dr. R. H. Thouless, 261
- Philips Sodium Lamp, 440
- Philosophy : Biology and (*Review*), 529; of a Scientific Man, The, P. R. Heyl (*Review*), 491
- Philyrea latifolia*, The Heterosides of, Mlle. A. Kramer, 631
- Phlogiston Theory, The History of the, Dr. J. H. White (*Review*), 531
- Phosphorescent Zinc Sulphide, Connexion between the Two General Methods for the Preparation of, R. Coustal, 887
- Phosphoric Anhydride, Modifications of, K. Boratynski and A. Nowakowski, 595
- Phosphorus : Liquid, Dielectric Constant of, S. Dobinski, 447; Pentachloride, Mechanism of the Reaction of, on Neutral Alkyl Sulphites, P. Carré and D. Libermann, 143; Ultra-Violet Bands of Oxide of, Prof. P. N. Ghosh and A. K. Sen Gupta, 841
- 12-Phosphotungstic Acid, Molecule of, Structure of the, J. F. Keggin, 908
- Photocells : and their Application, Dr. V. K. Zworykin and Dr. E. D. Wilson. Second edition (*Review*), 860; of the Dry Rectifier Type for the Measurement of Daylight, Suitability of, Drs. H. H. Poole and W. R. G. Atkins, 850



- Photochemical Kinetics, R. Wegscheider, 287
- Photoelectric: Experiment, A. New, Q. Majorana, 71; 107; Phenomenon, A. New, Exhibited by Metallic Sheets, Q. Majorana, 559; Polarimeter, Improvement of the, G. Bruhat and A. Guinier, 630
- Photographic: Densities, Exact Measurement of, P. Fleury and G. A. Boutry, 738; Sensibility, Influence of Pressure on the, to Various Monochromatic Radiations, Ny Tsi-Ze and Chien Ling-Chao, 286; Sensitisers for the Infra-Red, Miss N. I. Fisher and Miss F. M. Hamer, 475
- Photography, Scientific and Applied, International Congress of, 212
- Photometry, Everyday, with Photoelectric Cells, Dr. J. W. T. Walsh, 660
- Photovoltaic Elements, Differentiation of the Electronic Effects and the Photoelectric Effects in, R. Audubert, 482
- Physic, Modern (*Review*), 6
- Physical: Atomic Weights, Dr. F. W. Aston, 172; Bibliographies, 615; Society: election of officers, 510; presentation of the Duddell medal to Prof. W. Gaede, 901; Society's Exhibition, Lectures at the, 66; World in Cinematography, Image of the, Torahiko Terada, 358
- Physics: Elementary, G. Stead. Fourth edition (*Review*), 748; in the Boot and Shoe Industry, H. Bradley, 756; Institute of: award of prizes to E. Lancaster-Jones, Dr. J. L. Miller and J. E. L. Robinson, 467; election of officers, 797; Intermediate, Dr. C. J. Smith (*Review*), 532; Numerical Examples in, Dr. W. N. Bond (*Review*), 320; Practical, W. R. Bower and Prof. J. Satterly. Third edition (*Review*), 491; Theoretical, A Concise (*Review*), 221; The Method of, Prof. A. Einstein (Herbert Spencer Lecture), 867
- Physik: ein Lehrbuch für Studierende an den Universitäten und technischen Hochschulen, Prof. W. H. Westphal. Dritte Auflage (*Review*), 895; Kosmischen, Ergebnisse der. Herausgegeben von V. Conrad und L. Weickmann. Band I (*Review*), 785; theoretischen, Lehrbuch der, Prof. G. Joos (*Review*), 221
- Physikalisch-chemisches Taschenbuch, Herausgegeben von C. Drucker und E. Proskauer. 2 Band (*Review*), 676
- Phytophthora megasperma* causing Pink Rot of the Potato, H. Cairns and A. E. Muskett, 277
- Phytosterol Group, Investigations in the, (2), C. Antoniani, 483
- Phytosteryl Acetate Test as a Routine Method for Examining Butter Fats, H. Hawley, 814
- Piedmontite in Quartz-Muscovite-Schist from the Shotover Valley, Western Otago, New Zealand, F. J. Turner, 630
- Pilot Balloon Observations at Mauritius, R. A. Watson and N. R. McCurdy, 626
- Piltown Skull, A Second, Sir Arthur Smith Woodward, 242
- Pinastric Acid, Constitution of, G. Koller and G. Pfeiffer, 411
- Pitchblende at Great Bear Lake, Canada, H. S. Spence, 208
- Pit-Head Baths, J. H. Mitchell, 207
- Pituitary Gland, Action of Proteolytic Enzymes on the Oxytocic Principle of the, Dr. J. M. Gulland and T. F. Macrae, 470
- Place Names, Spelling of, 161
- Plane Algebraic Curves, Prof. H. Hilton. Second edition (*Review*), 383
- Planet: New Minor, 808; The New, 1933 HH, 881
- Planetary System, Origin of the, Dr. R. Gunn, 405
- Planets: Minor, 441; Spectra of the, Prof. W. M. Slipher (George Darwin Lecture), 734
- Planktonic Diatoms, Spring Increase of, 285
- Plant: Genetics, Recent Advances in, Dr. F. W. Sansome and J. Philp (*Review*), 185; Histology, Methods in, Prof. C. J. Chamberlain. Fifth edition (*Review*), 44; Virus: Protective Inoculation against a, Dr. R. N. Salaman, 468; Research, Dr. Kenneth N. Smith, 915
- Plants: Green, Distribution of Nitrates and 'Organisation' of Nitrogen in the Leaves of, E. Parisi and G. De Vito, 107; The Growth Hormone of, K. V. Thimann and J. Bonner, (2), 631; Physiology of, Functions of Radiation in the, F. S. Brackett and E. S. Johnstone, 331; Sexuality in, Discovery of, Dr. C. Zirkle, 392
- Plastic: Materials, Exhibition of, 510; Sediments, Relative Impermeability of the, towards Rain Water, Spring Water and various Alkaline Solutions, P. Urbain, 739
- Plasticine Edible?, Is, D. I. Clements, N. H. Howes and G. P. Wells, 330
- Plasticity: a Mechanics of the Plastic State of Matter, Dr. A. Nádai, assisted by A. M. Wahl (*Review*), 383
- Platinum: Compounds, Decomposition of Some Complex, at Progressively Increasing Temperatures, P. Vallet, 143; Thin Splattered Films of, Crystalline State of, Prof. G. P. Thomson, N. Stuart and C. A. Murison, 522
- Pliny's Chemical Knowledge, Dr. E. J. Holmyard (*Review*), 305
- Polarisationsebene des Lichtes, Drehung der, W. Kuhn und K. Freudenberg (*Review*), 677
- Polarografo: Il, sua teoria e applicazioni, Dr. G. Semerano (*Review*), 260
- Polar Year, International Commission for the, 1932-33, 810
- Police, Technical Training of the, 754
- Polish Guide to Zoology, 905
- Pollination in Orchards, G. F. Wilson, 659
- Polonium Acetylacetonate, Existence of a, Servigne, 375
- Polynesia, Ceremonial Exchange in, Dr. I. Hogbin, 439
- Population: Density and Egg-Laying in Flies, Prof. R. Pearl; Dr. Alpatov, 176; Problems in the Pacific, 519
- Port: Erin Biological Station, Research at the, 21; Sanitary Regulations, Revised, 616
- Positive Electron, New Evidence for the, Dr. J. Chadwick, P. M. S. Blackett and G. Occhialini, 473
- Positron, Neutron, Proton and, Dr. N. Thon, 878
- Potassium, Radioactive Half-Period of: Calcium Isotope with Mass 41 and the, Prof. J. Kendall, W. W. Smith and T. Tait, 688
- Potato, Degenerescence in the, Variations in the Virulence of, J. Costantin, 850
- Potatoes: Early, 886; in the Fens, 594; Insect Transmission of Virus A of, J. B. Loughnane, 838; Normal and Leaf-Roll Variations in the Total Nitrogen Content of, G. Cockerham, 375
- Poultry Manure, Production of Kiln-dried, R. Sayce and F. Hanley, 198
- Power: Alcohol, 341; Station Efficiency, W. S. Burge, 518
- Prehistoric Society of East Anglia: Annual Business Meeting, Dr. Cyril Fox elected president for 1933, 520; *Proceedings* of the, vol. 7, pt. 1, 465
- Pressures, Variable, Methods of Measuring and Recording Rapidly, A. Labarthe and M. Demontvignier, 179
- Prickly Pear in Australia, Eradication of, 613
- Priestley: and Peps Commemorations, The, 443; as a Practical Chemist, Prof. T. S. Patterson, 690; Dr. A. N. Meldrum, 801; as a Scientific Man and Theorist, Sir Philip Hartog, 555; Bicentenary Celebrations at Warrington, 498; Celebration at the Chemical Society, 555; The "Leeds Portrait" of, W. C. Walker, 876; The Scientific Work of, Prof. J. R. Partington, 348
- Priestley's: Associations with London, H. G. Wayling, 350; Science to Chemistry, Sir Harold Hartley, 555; Work on Gases and Nitrogen Peroxide, Prof. A. N. Meldrum, 555
- Primes and Factors, Emma Gifford (*Review*), 785
- Professions, The, Prof. A. M. Carr-Saunders and P. A. Wilson (*Review*), 863
- Progress and Scientific Method, 1
- Prosperity, The Means to, J. M. Keynes (*Review*), 451



- Protein : Foods in Growth, Comparative Value of Various, E. F. Terroine and Mlle. Simone Valla, 375 ; Synthesis of, by Green Plants, L. Loose and Dr. W. H. Pearsall, 362
- Proton, Neutron, and Positron, Dr. N. Thon, 878
- Protons : Liberated by Neutrons, Photographic Detection of, Marietta Blau and Hertha Wambacher (2), 287 ; Produced in the Artificial Disintegration of the Nitrogen Nucleus, E. C. Pollard, 482
- Protoselenosulphochloride, A. Baroni, 483
- Prout's Hypothesis, Papers by Dr. W. Prout (1815-16), J. S. Stas (1860) and C. Marignac (1860) (*Review*), 152
- Proverbes et maximes Peuls et Toucouleurs traduits, expliqués et annotés, H. Gaden (*Review*), 347
- Psychoanalysis, The Medical Value of, Dr. F. Alexander (*Review*), 532
- Psychologique, L'Année, Publiée par Prof. H. Piéron. Année 32 (1931). Vols. 1 and 2 (*Review*), 604
- Psychology : Genetic, (1), J. L. Gray and Pearl Moshinsky, 922 ; in Autobiography, A History of, Vol. 2. B. Bourdon, and others (*Review*), 321
- Psychotherapy, Analytical, An Introduction to, Dr. T. A. Ross (*Review*), 639
- Public Analysts, Society of, election of officers, 359
- Puccinia Helianthi* Schw., Union of Pycniospores and Haploid Hymphae in, J. H. Craigie, 25
- Pumping Machinery, Science Museum Handbook of, G. F. Westcott, 542
- Pycnogonid, A Dodecapodous, Dr. W. T. Calman, 242
- Pyridine-Iodine Molecular Association, A. M. Chatelet, 923
- Pyrométrie optique, Traité de, Prof. G. Ribaud (*Review*), 151
- Pyrophosphoric Acid, Absorptive Power of Soil for, A. Fabris, 775
- Pyrrhotite, Iron Lattice of, Vacant Positions in the, Prof. G. Hägg, 168
- Pyrrholic Aldehydes, Action of Alkaline Hypoiodites on the, P. Pratesi, 924
- Quail, Changed Standing of the, 337
- Quanten-mechanik, Die Gruppentheoretische Methode in der, Prof. B. L. van der Waerden (*Review*), 531
- Quantification, Théorie de la, dans la nouvelle mécanique, Prof. L. de Broglie (*Review*), 639
- Quartz : as a Standard for Accurate Lattice-Spacing Measurements, A. J. Bradley and A. H. Jay, 813 ; Crystal, Oscillating, as an Accurate Clock, Scheibe and Adelsberger, 281
- Quinine Salts, Rotatory Power of, in Aqueous Solution, C. Lapp, 703
- Queen* : of Bermuda, Electrical Equipment of the, 796 ; of the Sciences, The, Prof. E. T. Bell (*Review*), 319
- Quekett Microscopic Club, election of officers, 272
- Rabbit : Blood Group Inheritance in the, W. E. Castle and C. E. Keeler, 775 ; Tests for Linkage between the Blood-Group Genes and other known Genes of the, W. E. Castle and C. E. Keeler, 775
- Racial Distributions in Palaeolithic Europe, M. C. Burkitt, 540
- Radiation, Penetrating : Absorption of, Prof. E. Regener, 880 ; Spectrum and Latitude Variation of, Dr. E. J. Williams, 511
- Radioactive : Minerals, Primary, Analysis of, A. Karl, 143 ; Substances, New, A. Debiérne, 630
- Radio : Communications by very Short Electric Waves, Marchese Marconi, 292 ; Direction-Finding, C. E. Horton and C. Crampton ; J. F. Coales, 846 ; -Electric Waves, Short, Apparent Velocity of, N. Stoyko and R. Jouast, 887 ; Research Board, Report of the, for the year 1931, 156 ; Telephone Links, 731 ; Union, International Scientific, Prof. A. E. Kennelly elected president of the, 55 ; Valve, The 'Catkin', 735 ; -Waves, Interaction between, B. D. A. Tellegen, 840
- Radiometer Action and the Pressure of Radiation, Mary Bell and S. E. Green, 374
- Radium in Canada, Assays of, H. S. Spencer, 55
- Railway Electrification Experience, Col. C. Leigh, 649
- Railways in Britain, Electrification of, F. Lydall, 19
- Rainfall : at Capodimonte during 1833-1931, E. Guerrieri, 107 ; over the British Isles, 1820 to 1929, J. Glasspoole, 737
- Raman : Effect (24), H. Kopper and A. Pongratz, 251 ; Spectra and Chemistry, 263
- Rangoon, Geology and Underground Water of, P. Leicester, 916
- Rare Earth : Elements, Radioactivity of some, Libby and Latimer, 368 ; Group, Use of Non-Aqueous Solvents in the Study of the, B. S. Hopkins and L. L. Quill, 739 ; Earths, Fluorescence of Pure Salts of the, Prof. R. Tomaschek and O. Deutschbein, 473
- Rat : Crested, at the London Zoo, 794 ; The Crustacean Chromatophore Activator and the Gonads of the, B. Kropp, 631
- Ray Society, election of officers, 466
- Rayon Industry, The (*Review*), 454
- Rays Entering the Eye Pupil at Different Points, Luminous Efficiency of, W. S. Stiles and B. H. Crawford, 250
- Reading University : appointment of Dr. R. H. Stoughton as professor of horticulture, 248 ; Prof. R. Rae appointed professor of agriculture, 772
- Recrystallisation and Coloration, Prof. K. Przi Bram, (3), 560
- Rectifier Photo-Cells, Reversal of Current in, J. Guild, 327 ; Dr. H. H. Poole and Dr. W. R. G. Atkins, 547
- 'Red Coal', Prince Ginori Conti, 679
- Red Deer Shed their Antlers, 629
- Reflexology (*Review*), 675
- Regression, Phenomenal, to the Real Object, Prof. W. Peddie ; Dr. R. H. Thouless, 544
- Regulus, Occultation of, on April 6, 553
- Reinmuth Planet, 1932 HA, Dr. G. Stracke, 369
- Religious Experience : its Nature, Types and Validity, Rev. A. C. Bouquet (*Review*), 677
- Relativity : Addresses and Discussions on, 722 ; and the Structure of the Universe (*Review*), 637 ; of Time, Kennedy and Thorndike, 136 ; Special Theory of, Momentum and Energy in the, Prof. A. C. Banerji, 517
- Remembering : a Study in Experimental and Social Psychology, Prof. F. C. Bartlett (*Review*), 309
- Renéville (French Congo), Borings in the Marly Limestones of, H. Lagotala, 215
- Reproduction, Lunar Periodicity in, Prof. T. A. Stephenson, 622
- Research : Financing, 289 ; in Central Asia, 705 ; The Spirit of, Dr. T. Brailsford Robertson. Edited by Jane W. Robertson (*Review*), 111
- Resonance : Ag I Lines, Fine Structure of the, W. E. Williams and A. Middleton, 692 ; Radiation : Frequency Distribution of, R. W. Ditchburn, 106 ; Possibility of Separating Isotopes by the Use of, R. W. Ditchburn, 106 ; through a Gas Transmission of, R. W. Ditchburn, 738
- Rhenium : Dr. E. S. Kronman (*Review*), 224 ; Metallic, The Constant Paramagnetism of, N. Perakis and L. Capatos, 559 ; Spectra of, H. Schober, (3), 411 ; (4), 851
- Rhesus Monkey, Sexual Cycle in the, Dr. C. G. Hartmann, 626
- Rhodesia, Southern, Meteorology in, 54
- Ribaucour's Transformation and Spherical Representation (3), H. Hamburger, 339
- Rice Grass, The Economic Possibilities of, J. Bryce, 368
- Richborough, Roman, Dr. J. P. Bushe-Fox, 539
- Rickets, Experimental, as a Phosphorus Deficiency Disease, Prof. H. D. Kay and Dr. B. L. Guyatt, 468
- Ringworm Fungi, Development of Fuseaux, Aleuriospores, and Spirals on detached Hairs infected by, Dr. A. M. Davidson and Dr. P. H. Gregory, 836



- Road: Island Refuges, Guard Posts for, 394; Research Board, Major F. C. Cook appointed chairman of the, 686; Station, Harmondsworth transferred to the Department of Scientific and Industrial Research, 686
- Rock: -Salt, Blue, Recrystallisation and, Prof. K. Przibram, 287; Specimens of, for Measuring their Electrical Resistance, Methods for putting in Circuit, Mme. F. Bayard-Duclaux, 887
- Rocks: Certain Igneous, Magnetic Properties of, A. F. Hallmond and E. F. Herroun, 338; Thermal Conductivities of, Determination of the, H. A. Nancarrow, 702
- Rodents, Jumping, A. B. Howell, 623
- Roebuck, Dr. John, Work of, 196
- Roof Falls in Mines, Prevention of, 140
- Root: Nodule Bacteria and Leguminous Plants, E. B. Fred, I. L. Baldwin and Elizabeth McCoy, 99; Studies, III, W. S. Rogers, 695
- Roscoe, Sir Henry Enfield, Centenary of the birth of, 18
- Ross Institute for Tropical Diseases: Activities of the, 300; Annual Report for 1932, 835
- Ross: Ronald, Discoverer and Creator, R. L. Mégroz (*Review*), 40
- Rotatory Power, Curious Case of Change of Sign of the, and of Mutarotation, Pariselle, 702
- Royal: Academy: Lessons in Visualisation from the, Dr. Vaughan Cornish, 644; Portraits at the, 646; Winter Exhibition, 52; Aeronautical Society: award of the gold medal to Sir Richard Glazebrook, 359; award of silver medals to D. L. H. Williams and A. H. R. Fedden, 510; foundation of two medals; award of the British silver medal to Capt. C. F. Uwins, Squadron-Leader O. R. Gayford and Flight-Lieut. G. E. Nicholets, 685; Asiatic Society of Bombay, Sir John H. Marshall awarded the gold medal of the, 683; Astronomical Society: award of the gold medal to Dr. V. M. Slipher, 91; election of officers, 236; Cornwall Polytechnic Society, 99th Annual Report, 833; Geographical Society, awards of the, 543; Danish Academy, Dr. C. Tate Regan elected a foreign member of the, 650; Dublin Society, Prof. P. A. Murphy awarded the Boyle medal of the, 683; Entomological Society of London, The, 678; Institution: Annual Meeting; presentation of portrait of Sir William Bragg, 647; gift from the Rockefeller Foundation, 686; Meteorological Society, election of officers, 200; Microscopical Society, election of officers, 128; Observatory, Greenwich, Annual Visitation, 882; Society: Mond Laboratory, Cambridge University, Opening of the, 210; Recommendations for election to the, 353; Prof. V. F. K. Bjerknes, Prof. H. W. Cushing, Prof. P. Debye, Prof. F. A. F. C. Went elected foreign members of the, 798; of Edinburgh: election of fellows, 354; award of the Makdougall-Brisbane prize to Dr. A. C. Aitken, and the Gunning Victoria Jubilee prize to Sir James Walker, 359; presentation of the James Scott prize to Prof. A. Sommerfeld, 687; of South Africa: election of officers, 22; election of officers, 687
- Rubber: Industry Bill, 650; New Source of, 21; Research, 181; Dr. S. S. Pickles, 273; Bill, 576
- Russia: Botany in, 554; Petroleum Production in, R. C. Beckstrom, 541
- Russian Arctic Expeditions, 797
- Ryegrasses, Fluorescence in, Linehan and Mercer, 474; E. W. Hullett and J. W. Calder, 475
- RZ Cassiopeiae with Eclipses, The Double System, J. Ellsworth, 850
- Sabellids, Blood Circulation in, Reversible Stoppage of the, Prof. H. Munro Fox, 26
- Safeguarding of Industries Act, Articles Chargeable with Duty under Part I of the, 651
- Safety in Mines Research Board, appointments to the, 91
- Sage Grouse, Display of, 773
- Saharan Rock-Engravings, Dr. T. Monod, 551
- St. Andrews University: offer by F. O. Salisbury of a replica of a portrait of Dr. E. Harkness, 372; proposed conferment of doctorates, 480; retirement of Prof. J. E. A. Steggall, 628; J. Anderson appointed professor of surgery, 848
- St. Hilary's Day, 69
- St. Valentine's Day, 214
- Salamander Embryos, Segmentation of Spinal Nerves in, S. R. Detwiler, 739
- Salmon: Fishing, E. Taverner, and others (*Review*), 42; Hatching and Salmon Migrations, Dr. W. L. Calderwood (*Review*), 42; Season; Disease, 213
- Salt, Inorganic, An Optically Active, Mann, 808
- Saltpetre, Chile, Origin of the, Dr. C. T. Kautter, 556
- Samarium: Radioactivity of, and the Formation of Hibernium Halos, Dr. J. H. J. Poole, 654; Range of Radiation from, Prof. G. Hevesy and Dr. M. Pahl, 434
- Sandfell, Laccolith and 'Dome of Elevation', L. Hawkes and Hilda K. Hawkes, 214
- San Diego: Know Your, M. J. Rogers, 903; Museum, 903
- Santa Monica Mountains, California, Glacial Epochs of the, Prof. W. M. Davis, 288
- Schistocerca peregrina*, Desert Anhydrobiosis and its Influence on the Animal Cycle of, E. Roubaud, 774
- Schistosomiasis in the Philippines, M. A. Tubangui, 99
- Schneider: Mediumship, Further Light on the: (*Review*), 489; Lord Charles Hope, 549; H. Price, 658; Rudi, An Account of Some Further Experiments with, a Minute-by-Minute Record of 27 Séances, H. Price (*Review*), 489
- Schools and the Social Upheaval, 408
- Science: A Symposium of, Prof. F. S. Marvin (*Review*), 674; Anatomy of Modern, an Introduction to the Scientific Philosophy of To-day, B. Bavink. Translated, with additional notes and Bibliography, by H. S. Hatfield (*Review*), 707; and Culture (*Review*), 707; and Service in Universities Overseas, 377; and the Textile Industry, Dr. K. Lee, 162; bequests to, Sir Dugald Clerk, 235; *Forum*, No. 1, 649; General, F. Fairbrother and E. Nightingale. Part I (*Review*), 420; ?, General, What is, 141; History in, 777; in the Changing World, T. Holland, and others. Edited by Mary Adams (*Review*), 674; in the Schools, 217; Irresponsibility of, Prof. H. Levy, 162; ? Is Man Ethically Fit for the Bounties of, Prof. D. D. Kanga, 233; Language in the Service of, 741; Masters' Association, Annual Meeting of the, F. C. Tompkins, 65; Museum, Photoelectric Exhibition at the, 429; Tabular Data of (*Review*), 892
- Sciences, Meet the, W. M. Malisoff (*Review*), 639
- Scientific: and Industrial Research, Department of, Report for Year 1931-32, 570; 669; and Learned Societies of Great Britain and Ireland, The Official Year-Book of the, 1931-1932 (*Review*), 45; and Technical Books, Recent: January 28, iii; February 25, iii; March 25, v; April 29, v; May 27, v; June 24, iii; Centenaries in 1933, Eng.-Capt. E. C. Smith, 14; Centralisation in the British Empire, Prof. C. Stanton Hicks, 397; Method, Ethical Conditions of, Bishop of Durham (Fison Memorial Lecture), 902; Progress and, I; Professionalism, 861; Riddles, Sir J. Arthur Thomson (*Review*), 315
- Scientists, A Rebuke to, Prof. A. Findlay, 1
- Scotia Sea, Soundings in the, H. F. P. Herdman, 440
- Scottish Marine: Biological Station, Millport, Report of the, 904; Fauna, A. C. Stephen, 446; Tectonics, Help from America in Reading, Prof. E. B. Bailey, 522
- Scott's Own Expedition (*Review*), 782
- 'Sea: -Blue Bird of March', The, 445; -Lions in California, Breeding Season of, 885; Movements of the, Use of the Cattaneo Wave Pump for Utilising the, J. Richard, 179
- Seal, Harp: Breeding Habits of the, 558; Food of the, and its Significance, 558
- Sedimentation, Researches on, 394



- Seed Germination, Temperature Relations of, T. I. Edwards, 404
- Seeds: Germinating, of *Pisum sativum* and *Triticum vulgare*, Influence of certain Chemical Agents on the Carbon Dioxide Output of, under Optimum Germination Conditions, J. Kisser and R. Furtauer, 251; Influence of Treatment of, with Chemical Stimulants on the Cell Growth of the Rootlets, J. Kisser and J. Schubert, 251
- Seismographs, Hydraulic, Prof. S. K. Banerji and K. N. Sohoni, 547
- Seismology, Theoretical, Introduction to, Rev. J. B. Macelwane and Rev. F. W. Sohon. Part 2: Seismometry, Rev. F. W. Sohon (*Review*), 824
- Selectivity and Radio Communication, 442
- Semi-Conductors in a Magnetic Field, J. W. Harding, 731
- Seric Proteins Isolated by the Acetone Method and Myxoprotein, Modification of the, A. Bonot, 106
- Severn Barrage Scheme, The, 449
- Sewage Purification by a New Process, G. H. Gleason and A. C. Loonam, 697
- Sex: Artificial Control of, in the Progeny of Mammals, Prof. N. K. Koltzoff and V. N. Schröder, 329; Hormone, A New Crystallised, A. Girard, G. Sandulesco, A. Fridenson and J. J. Rutgers, 71; Hormones and Cancer-Producing Compounds, Dr. J. W. Cook and Prof. E. C. Dodds, 205
- Sexual Cycle in the Rhesus Monkey, Dr. C. G. Hartmann, 626
- Shamal, 885
- Shamans and Spiritism on the Mosquito Coast, Honduras, Dr. E. Conzemius, 135
- Sheep, Nutritional Condition of, and Susceptibility to Stomach Worm, A. H. H. Fraser and Dr. D. Robertson, 94
- Sheffield University: Dr. G. A. Clark appointed professor of physiology, W. R. Maddocks lecturer in metallurgy, J. Dick assistant lecturer in mechanical engineering, A. J. Macdougall assistant lecturer in metallurgy, 736; Dr. L. C. D. Hermitte appointed demonstrator in pathology, Dr. E. James junior assistant bacteriologist and demonstrator; resignation of Prof. E. Mellanby and J. W. Kershaw, 884
- Shrimp Industry of Leigh-on-Sea, A. L. Wells, 270
- Silica: Gel, Heats of Moistening, with various Liquids, R. Berthon, 106; in the Organism and the Siliceous Particles of the Blood, L. Lemarte and E. Kahane, 523; Volatile Transport of, J. W. Greig, H. E. Mervin and E. S. Shepherd, 768
- Silkstone Coal Seam of Yorkshire, 64
- Silver: Arc Spectrum of, Structure of the Lines of the, D. A. Jackson, 691; Iodomercurate, F. Gallais, 215; the Life-Story of an Atlantic Salmon, R. L. Haig-Brown (*Review*), 42; Voltameter, New Form of, M. Picard and A. Stampa, 666
- Size Limits, Legal, and their Effect upon Fisheries, N. B. Scofield, 831
- Skiddaw Granite and its Residual Products, C. S. Hitchen, 482
- Skye, Differentiated Sills in, Dr. F. Walker, 440
- Skylark's Song, 105
- Sleep, Agglomeration Theory of, W. D. Bancroft and J. E. Rutzler, Jr., 739
- Smithsonian Field Expeditions in 1932, 721
- Snails and Changes in Sea-Level, Prof. T. D. A. Cockerell, 277
- Snail's Tissue, Culture of, Prof. J. B. Gatenby and E. S. Duthie, 474
- Snell Memorial medal of the National Institute of Agricultural Botany, award of the, to Dr. Kenneth M. Smith, 164
- Soap Film Structure, The Hydroxyl Group and, W. J. Green, 873
- Social: Anthropology, Dr. P. Radin (*Review*), 315; Hygiene Congress, Sixth Imperial, 798; Study, Methods of, Sidney and Beatrice Webb (*Review*), 748
- Sociological Review*, Vol. 24, No. 3, Supplement to, 466
- Sociology, Institute of, Incorporation of the, 33
- Socrates, Before and After, Prof. F. M. Cornford (*Review*), 491
- Sodium: Benzoate, Chlorination of, Dr. J. C. Smith, 28; Salicylate, Yield of Fluorescence of, P. Dubouloz, 850; Sulphite in Photographic Developing Solutions, G. Gopala Rao and Madhusudanan Pandalai, 100
- Soil: Chemical Composition of the, and that of its Colloidal Contents, Relationships between the, O. Bottoni, 560; Electrical Properties of, for Alternating Currents: with Particular Reference to Radio-Frequencies, Dr. R. L. Smith-Rose, 142; Fertility, Forest Fires in Relation to, Prof. F. P. Worley, 787; Microbiology, Principles of, Prof. S. A. Waksman. Second edition (*Review*), 316; Scientific Study of the, An Introduction to the, Prof. N. H. Comber. Second edition (*Review*), 316; Tilling the, 141
- Solanine Poisoning, S. G. Willimott, 813
- Solar: Activity, a Remarkable Epoch of, H. Mémery; E. Esclançon, 559; Eclipse, Effects of, on Audio Frequency Atmospheric, E. T. Burton and E. M. Boardman, 81; Halo, A Complex, R. C. T. Evans and Dr. C. Evans, 613; Prominences at Meudon, Direct Observation of, B. Lyot, 70; 332; Radiation in Relation to its Warming Effect on the Human Body, H. M. Vernon, 737; Spectrum from 4040 to 4390 Å., Microphotometry of the, Dr. R. v. d. R. Woolley, 917; System, Origin of the, A. C. Gifford, 518
- Solid Solutions by Precipitation, and Isomorphism between Complexes of Platinum and of Quadrivalent Tellurium, G. Natta and R. Pirani (2), 107
- Solids, Decomposition and Detonation of, Prof. W. E. Garner, 65
- Soot Films and Oil, Interaction between, J. H. Coste, 691; Dr. S. C. Blacktin, 873
- 'Sooty Moulds' of Some Australian Plants, Eileen E. Fisher, 107
- Sothic Cycle, A, Mrs. A. S. D. Maunder, 332
- Sound: Films: at Chicago University, 593; Synthetic, 125; in Gases in Tubes, Velocity of, Dr. G. W. C. Kaye and G. C. Sharratt, 338; The World of, Sir William Bragg (*Review*), 860
- South Africa: Geology of, Dr. S. H. Haughton, 624; Royal Society of, election of officers, 22; Vanished Races in, D. S. van der Merwe, 392; African: Culture?, A New, Dr. E. C. N. Van Hoepen, 393; Institute for Medical Research, Report for 1931, 22; Australia, Mining Facilities in, 395; -Eastern Union of Scientific Societies, 38th Annual Congress, 919; Prof. H. L. Hawkins elected president for 1934, 920
- Soviet Education, The Broad Highway of, C. A. Harrison, 920
- Spat-fall and Shore Populations, 921
- Spatial Distance in a Curved Space-Line, Measurement of, H. S. Ruse, 250
- Spearman's General Factor, Ambiguity in Sign of, Prof. H. T. H. Piaggio, 170
- Species, History of, The Bacterial Growth Curve and the, Dr. A. S. Corbet, 61
- Spectral Lines in Indium and Gallium, Relative Intensity of, Miss R. Payne-Smith, 365
- Spectrograph for Study of Fibrous Substances, Adam Hilger, Ltd., 844
- Spectroscope, Application of the, to Biology, H. Ramage, 919
- Spectroscopic Analysis by X-Rays (*Review*), 39
- Spectroscopic, Handbuch der, Prof. H. Kayser und Prof. H. Konen. Band 8, Lief 1 (*Review*), 824
- Spectrum: Analysis at the Massachusetts Institute of Technology, 393; Infra-Red Region of the, C. R. Bailey and A. B. D. Cassie (8), 286
- Spektralphotometrie, Objective, Drs. L. S. Ornstein, W. J. H. Moll, und H. C. Burger (*Review*), 824
- Spencer's Scientific Correspondence with Sir J. G. Frazer and others. Edited by Dr. R. R. Marett and T. K. Penniman (*Review*), 187
- Sperm Whales in the North Atlantic, 594
- Spider Crabs from Japan, Dr. Tsune Sakai, 551



- Spiders: of Denmark, The (*Review*), 149; The Biology of, with especial reference to the Danish Fauna, E. Nielsen. 2 Vols. (*Review*), 149
- Spike Disease in Indian Sandal, 89; 720
- Spiral Nebulae, Motion of the, Dr. Knox Shaw, 697
- Sponges: Californian, M. de Laubenfels, 588; from the North-Western Pacific, Dr. Y. Okada, 279; Light-producing Powers of, Prof. E. Trojan, 728; Locomotion in, M. Burton, 356
- Spray Spreaders, Present uses and Future Development of, H. Martin, 768
- Spreng- und Zündstoffe: Chemische Untersuchung der, unter besonderer Berücksichtigung der zu ihrer Herstellung notwendigen Ausgangsstoffe. Unter Verwendung eines von Hermann Kast hinterlassenen Manuskriptes. Herausgegeben von L. Metz (*Review*), 186
- Spring: Equinox, The, 409; Flush, The, 813; Winds and some Biological Effects, 409
- Squirrel, The Grey, A. D. Middleton (*Review*), 45
- 'Stainless-Invar', A New Alloy, Prof. K. Honda, 587
- 'Standard Gold' and Silver: the Way Out of the Crisis, Dr. E. Zucker, 198
- Star: Occulted by Jupiter, A, 845; of the Cepheid Type, Mean Absorption Coefficient in a Variable, G. Tiercy, 888; Influence of the Absolute Magnitude of a, on the Width of the lines of Stellar Hydrogen, P. Rossier, 483; A Variable, with Eclipses of Short Period, R. Tremblot, 815
- Stars: Class *Be*, Suggested Mechanism of, D. B. McLaughlin, 739; Colour Temperatures of, 281; Composition of the (Halley lecture), Prof. H. N. Russell, 832; Double, Measures of, at the Union Observatory, Johannesburg, W. H. van den Bos, 476; Ephemerides of Variable, 590; Faint, Spectral Types of, Dr. Humason, 209; Faint, with Common Proper Motion, W. J. Luyten, 625; New Proper Motions of, from Bergedorf Observatory, C. Vick, 625; of the  $\mu$ -Cephei Type, W. Zessewitsch, 137; of the Cluster *M7*, Diameter of some, Rossier, 888; of the Type *A5*, Width of a Photographic Stellar Spectrum for, G. Tiercy and A. Grosrey, 888; Variable, in the Globular Cluster *M.53*, 441; Radial Velocities of, Dr. P. W. Merrill, 917
- State-aided Research in Great Britain, 669
- Statistical: Methods for Research Workers, Dr. R. A. Fisher. Fourth edition (*Review*), 383; Tables, Dr. R. A. Fisher (*Review*), 893
- Steam: Action of, on Heavy Petroleum Oils and on certain Cyclic Hydrocarbons, C. Matignon and M. Séon, 523; -Jet Operated Air Ejectors, F. R. B. Watson, 369; Tables, N. S. Osborne, H. F. Stimson, E. F. Fiock, and D. C. Ginnings, 624
- Steel, Medium Carbon, Fatigue Limit of, J. W. Cuthbertson, 140
- Steels: Alteration of, by Hydrogen, L. Jacqué, 36; Rustless, Measurement of the Degree of Polishing in view of the Determination of the Amount of Corrosion of, J. Cournot and Mlle. Louise Halm, 738
- Stellar Spectra, Bright Lines in, 64
- Stereochemie: Prof. S. Goldschmidt (*Review*), 783; eine Zusammenfassung der Ergebnisse, Grundlagen und Probleme, Herausgegeben von Prof. K. Freudenberg. Lief. 1, 2, 3 (*Review*), 563
- Stereochemistry and Physics, Relations between, Prof. P. Debye (Faraday lecture), 498
- Sterility in Domesticated Animals, Dr. W. Orr and Dr. F. F. Darling, 200
- Stoic, The, 104
- Stoke Park (R. G. Burden) Fund for Research in Mental Disorders, 159
- Stone, Decay of, Relationship of Micro-organisms to the, S. G. Paine, F. L. Lingood, Freda Schimmer, and T. C. Thrupp, 178
- Stork in Western Europe, J. Sokolowski, 403
- Strahlenoptik, Dr. M. Herzberger (*Review*), 747
- Stratosphere: New Ascent into, 614; Temperature of the, Dr. B. Rolf, 280
- Strawberry 'Yellow Edge' Disease, R. V. Harris, 730
- Strepsinema Stage in Reduction, Prof. H. H. Dixon, 437
- Sturgeon, Spawning-time of the, 812
- Styria: Eastern, Geology of, the Rocks and their Inter-Relationships, R. Schwinner, 560; Flower-Visiting Insects in, 1913, K. Fritsch, 852
- Subject Index to Periodicals, 1931 (*Review*), 711
- Sublimation, Inverse, O. Dony, 731
- Submarine: Faulting in Kimmeridgian Times, Prof. E. B. Bailey and Dr. J. Weir, 244; Telephone Cables at Carrier Frequencies, Dr. E. W. Smith, 431; Valleys, Prof. F. P. Shepard, 331
- Subsidence of London, T. E. Longfield, 558
- Sudan: Anglo-Egyptian, Fossiliferous Siliceous Boulders from the, L. R. Cox, 70; Nilotic, Pagan Tribes of the, Prof. C. G. Seligman and Brenda Z. Seligman (*Review*), 345; Southern, Tribes of the, E. B. Haddon (*Review*), 345
- Suffolk, East, Rural Education in, 848
- Sugar in the Blood, Application of the Iodometric Method to the Estimation of, H. Bierry, B. Gouzon, and Mlle. C. Magnan, 667
- Sulphates as Manure, Importance of, G. Bertrand and L. Silberstein, 215
- Sulphur: and Nitrogen, Utilisation of, from Cystine at the level of Endogenous Protein Metabolism, E. F. Terroine, P. Mezinceseo, and Mlle. Simone Valla, 483; Hexafluoride, Higher Homologues of, K. G. Denbigh and Prof. R. Whytlaw-Gray, 763; -Hydrogen Reaction, New Experimental Evidence in the, E. E. Aynsley, Dr. T. G. Pearson, and Dr. P. L. Robinson, 471
- Sulphuric Acid, Ionisation of, Prof. H. M. Dawson, 375
- Summer Thermocline in Seas and Lakes, 773
- Sun, Total Eclipse of the, Aug. 31, 1932, A. de La Baume Pluvinel and D. Barbier, 922
- Sun-Fish in British Waters, 665
- Sunspot Areas and Numbers for 1932, 661
- Sunspots: and Meteorological Phenomena, H. Mémary, 591; Earth's Influence on, P. R. Chidambara Aiyar, 245; Large Group of, 209; on the Solar Disc, Zones of Apparent Inhibition of, Prof. J. A. Carroll, 548
- Supersonic: Blower, Some Results obtained with a, L. Santon, 523; Vibrations set up in a Zinc Bar undergoing Transverse Vibrations, Prof. K. Prosad and S. Sharan, 803
- Surface: Catalysis (*Review*), 150; Tension and its Measurement, Dr. A. Ferguson, 66
- Surrey Flora, A New (*Review*), 77
- Surveying from Air Photographs, A Simple Method of, Lieut. J. S. A. Salt, 650
- Suspensions Prepared starting with Proteins separated from Serum by the so-called Acetone Method, C. Achard and A. Boutaric, 178
- Swallow and Cuckoo Arrive, 629
- Sweden, Higher Education in, 480
- Sword, They that take the, Dr. E. Wingfield-Stratford (*Review*), 635
- Syllis ramosa*, McIntosh Distribution of the Polychaete Worm, Dr. C. Crossland, 242
- Symbols, Units and Nomenclature Commission, Conference of the, A. E. Kennelly, 775
- Symmetrical Region, Variation Problems for a, Prof. H. Bateman; Prof. E. T. Whittaker, 472
- Symmetry, Determination of, A Possible Source of Error in the, from Optical Extinction-Angles, M. H. Hey, 630
- Tables for Statisticians and Biometricians. Edited by Prof. Karl Pearson. Part 1, third edition; Part 2 (*Review*), 893
- Tabular Data of Science (*Review*), 892
- Talbot's Bands, late A. C. G. Beach, 702
- Talking Pictures: and Acoustics, C. M. R. Balbi (*Review*), 188; and Picture Telegraphy (*Review*), 781
- Tapir, Concealing Coloration of the, 867
- Tartaric Acid and Chromium, Compounds of, J. P. Mathieu, 106
- Tata, Lady, Memorial Fund scholarships, award of, 920



- Taxonomy and Evolution, Dr. W. H. Longley, 863  
 Technical: Education: F. H. Reid, 883; International Bureau of, A. Abbott and E. G. Savage appointed to act as representative and correspondent respectively, 811; Institutions, Association of Teachers in, Annual Conference, 883  
 Technocracy, 87  
 Tektites: Origin of, Dr. L. J. Spencer, 117; 596; 876; F. Chapman, 876  
 Television: Sir Ambrose Fleming, 539; First Principles of, A. Dinsdale (*Review*), 456  
 Tell: -Billa, Dr. E. A. Speiser, 806; Duweir, Palestine, Excavations at, 648; L. J. Starkey, 897  
 Tellurium Fluorescence, Magnetic Quenching of, R. Smoluchowski, 914  
 Temperature: below 0.27° K., Prof. W. J. de Haas, E. C. Wiersma, and Prof. H. A. Kramers, 719; Recorder, A. New, Dr. W. Cawood and H. S. Patterson, 332  
 Tempora Mutantur, 105  
 Terns, Homing Sense of, 701  
 Terrestrial Magnetic Field, Diurnal Incidence of Disturbance in the, A. Crichton Mitchell, 446  
 Tertiary Alcohols, Dehydration of some, by Anhydrous Copper Sulphate, A. Meyer and M. Tuot, 851  
 Textile: Design: and Colour: Elementary Weaves and Figured Fabrics, W. Watson. Third edition, with appendices on the manufacture of Rayon (Artificial Silk) and Standard Yarns, Weaves and Fabrics (*Review*), 187; and Fabric Structure, Elementary, J. Read (*Review*), 187; Industry, Science and the, Dr. K. Lee, 162  
 Thallous Thiocarbonate, Preparation and Properties of, Picon, 179  
 Thames Valley, Lower, Deposits, 756  
*Theileria dispar*, Experimental Suppression of Sexual Reproduction in, E. Sergent, A. Donatien, L. Parrot, and F. Lestoquard, 143  
 Thermal Balance of a Water Drop or Ice Particle Suspended in the Atmosphere, C. S. Durst, 35  
 Thermionic Vacuum Tubes and their Applications, Prof. E. V. Appleton (*Review*), 9  
 Thermoelectric: Elements, Construction of, A. Cotton, 559; Phenomena, A New Method of Realisation of, A. Egal, 410  
 Thicknesses, A Magnetic Apparatus for the Determination of, A. Bricout, 595  
 Thiobenzophenone, Magnetic Rotatory Dispersion of a Coloured Diamagnetic Compound, A. Cotton and M. Schérer, 215  
 Thiocyan- and Thio-pyrroles, and Pyrrole Disulphides, P. Pratesi, 411  
 Thiosulphuric Acid, Decomposition of, in Dilute Solution at the Boiling Point, E. Carrière and Mlle. Carlini, 286  
 Thixotropy of certain Salts, Causes of the, P. Bary, 338  
 Thompson: Mary Clark, medal of the Washington National Academy of Sciences, award of the, to Dr. F. A. Bather, 304; John, the Work of, 232  
 Thomsonite, Dehydration of, A. E. Mourant, 630  
 Thorium Sulphide, Picon, 70  
 Thought in Progress, The Play of (*Review*), 746  
 Thunderclouds, Penetrating Rays from, Schonland and Viljoen, 916  
 Thunderstorms, Summer, S. Morris Bower, 473  
 Tide Marks, Quantitative Studies between the, R. Elmhirst, 767  
 Tidal Shifts in the Earth's Crust, Dr. H. T. Stetson and Dr. A. L. Loomis, 137  
 Tierwelt der Nord- und Ostsee, Die, Begründet von G. Grimpe und E. Wagler. Herausgegeben von G. Grimpe. Lief. 21. Teil 1.d<sub>2</sub>; Teil 2.g (*Review*), 116  
*Tilletia* Species of Wheat in Australia in 1931, Geographical Distribution of, J. G. Churchward, 631  
 Timber: During Seasoning, Longitudinal Variation of, M. B. Welch, 667; Home-Grown, Census of Production of, 905; Investigations on, 847  
 'Time' and 'Events', Ideas of, W. W. L., 727  
 Time: Determination, Dr. J. de Graaf Hunter, 515; Divisions of, in use in Ancient Mesopotamia, Dr. J. K. Fotheringham, 299; Measurement: Old and New, Hope-Jones, 67; Measurements, Number 60 in: 299; Prof. H. Chatley, 914  
 Timothy Grass, A Fly Pest of, L. A. L. King and Miss Agnes A. Meikle, 837  
 Tissue Structure of Homologous Organs (Prepuce Glands) in Mice and Rats, Differences in the, J. Schaffer, 703  
 Tobacco Mosaic, Some Effects of the Ordinary, upon the Developmental Anatomy of the Host Plant, J. Grainger and Rachel M. Heafford, 814  
 Tomato Late-Blight Rot, G. B. Ramsey and Alice A. Bailey, 440  
 Tonfilm: Aufnahme und Wiedergabe nach dem Klangfilm-Verfahren. (System Klangfilm-Tobis.) Herausgegeben von Dr. F. Fischer und Dr. H. Lichte (*Review*), 781  
 Tonga Archipelago, Fishes from the, H. W. Fowler, 63  
 Tonphotographie: Einführung in die, photographische Grundlagen der Lichtton-Aufzeichnung. Prof. J. Eggert und Dr. R. Schmidt (*Review*), 781  
 Tornados in U.S.A., 481  
 Tortoise, Anatomy of the, late Dr. J. Stuart Thomson, 396  
 Trail that is Always New, The, W. P. Lowe (*Review*), 636  
 Transitory Regimes, E. Crausse and J. Baubiac, 559  
 Transport Problems of the Empire, W. R. Jeffreys, 126  
 Trans  $\gamma$ -Oxycrotonic Acid, R. Rambaudo, 483  
 Tree: Growth in the Tropics, Periodicity in, Jean Schweizer, 624; Roots, Dr. E. V. Laing, 176  
 Trees: of Ireland, H. M. Fitzpatrick, 35; Roots of, Disintegration Action of, M. A. R. Khan, 844; Twisted, H. G. Champion, 133  
 Tremadoc Shales in the Tortworth Inlier, Gloucestershire, T. Smith, with notes on Fossils by C. J. Stubblefield, 214  
 Trematodes of Marine Mammals, E. W. Price, 243  
 Trevithick Centenary Commemorations, 577; 609  
 Triatomic Molecules, Structure of, A. B. D. Cassie, 438  
 Trigonometry, Elementary, Dr. J. Prescott and H. V. Lowry (*Review*), 420  
 Trinkler Expedition to Central Asia, The, Dr. L. D. Stamp (*Review*), 600  
 Trout: Brown, Spring Food of, 337; Fishing in New Zealand, Prof. E. Percival, 163; Sea, The Life of the, especially in Scottish Waters: with Chapters on the Reading and Measuring of Scales, G. H. Nall (*Review*), 42  
 Tsetse Fly, Control of the, R. W. Harris, and others, 463  
 Tumor Tissue, Application of Optical Spectroscopy to Analysis of, Winifred R. Mankin, 668  
 Tumours, Growth of Transplantable, in Plasma and Serum Culture Media, R. J. Ludford, 250  
 Tungstates, Metallic, Preparation of the, A. Karl, 923  
 Turbine, Early Days of the, C. Turnbull, 20  
 Turnips, Resistance of, to Finger and Toe Disease, 849  
 Turtle: Leathery, Egg-Laying of, 849; Painted, Egg-Laying and Incubation of, 849  
 Twins, Intellectual Resemblance of, L. Herrman and Prof. L. Hogben, 446  
 Uganda: Archæological Discoveries in, E. J. Wayland, 439; Stone Age Culture in, E. J. Wayland and M. C. Burkitt, 730  
 Ulijanowsk, Plant Geography of, H. Grosset, 696  
 Ultra: -filtration, Principles of, as applied to Biological Problems, W. J. Elford, 178; -Microscopic Organisms and the troubles which they cause, Sir Henry Dale, 370; -Pressures, Biological Effects of, J. Basset and M. A. Machebœuf, 251; J. Basset, Mme. E. Wollman, M. A. Machebœuf, and M. Bardach, 774; -Short-wave Radio Research, E. C. S. Megaw, 269; -Sonic Radiation, Chemical and Biological Effects of, Prof. A. Szent-Györgyi, 278; -Sound Waves, Measurement of the Absorption of, by Liquids, P. Biquard, 375; -Sounds, Action of, on Photographic Plates, N. Marinesco and J. J. Trillat, 667; -Violet: Light:



- and Fungi. Alice A. Bailey, 404; at British Health Resorts, 91; Rays, Absorption of, by Methane, etc., W. Kemula and S. Mrazek, 106
- Unemployment and the Schools, H. N. Penlington, 578
- Units: Fundamental, Dimensions of, Prof. H. Stansfield, 59; Prof. F. M. Denton, 585
- Universe: Expanding, Sir Arthur Eddington (*Review*), 637; Expansion of the, Milne's Theory of the, Dr. G. C. McVittie, 533; Through Wonderlands of the, R. K. Golikere (*Review*), 823
- Universities: of the Empire, Year Book of the, 1933. Edited by Sir H. Frank Heath (*Review*), 710; Overseas, Science and Service in, 377; *Review*, April, 885
- University: College, Cardiff: Bequest by Prof. C. M. Thompson, 372; Metallurgy Building at, 391; Degrees, Spurious, 686; Graduate, Training the, Sir Charles Grant Robertson, 268; Statistics of Great Britain, 770; Teachers, Association of, and Displaced Teachers in German Universities, 920
- Unsaturated Fatty Acids, Monolayers of, Rate of Oxidation of, A. H. Hughes and Prof. E. K. Rideal, 446
- Upper: Atmospheric Ionisation, Weekly Measurements of, Prof. E. V. Appleton and R. Naismith, 522; Devonian Rocks of the Chudleigh area, South Devon, L. G. Annis, 482
- Ur, Ritual at, C. L. Woolley, 356
- Uracil, Nucleic Acids and, Irradiation of, F. F. Heyroth and J. R. Looftbourow, 92
- Uranium in Spring Waters and Deposits, Detection of, F. Hernegger, 704
- Uric Acid, A New Plant Principle, R. Fosse, P. de Graeve, and P. E. Thomas, 179
- U.S.A.: American Museum of Natural History, election of F. T. Davison as president and Dr. H. F. Osborn as honorary president, 236; Bureau of Standards, Annual Report of the, 394; Dr. L. J. Briggs appointed director of the, 580; doctorates conferred in, 480; Effect of the Economic Depression on Schools in, 480; Tornados in, 481; Forest Products Research in, 199; Legal Medicine in, 722; Local Archaeological Observation in the, 868; National Academy of Sciences, award of the Alexander Agassiz medal to Dr. A. Defant, the Public Welfare medal to Dr. W. H. Park, the John J. Carty medal and award to the late Dr. John Joseph Carty, the Henry Draper medal to Dr. V. M. Slipher, and the Mary Clark Thompson medal to Dr. F. A. Bather, 754; elections to membership, 754; Naval Observatory, Publications of the, 917; Secondary Schools in, 104; Service for the Blind in, 906
- U.S.S.R., Academy of Sciences, Sir Robert Hadfield, Bt. elected an honorary member of the, 272
- Vacuum Technique, Laboratory, Dr. S. H. Piper, 65
- Vai Script, A. Klingenheim, 915
- Valoniaventricosa*, Penetration of *m*-Bromo-phenol Indophenol and of Guaiacol Indophenol into, Matilda Moldenhauer Brooks, 631
- Vanadium in certain Tunicates, Presence of, J. Cantacuzène and A. Tchekirian, 35
- Vancouver Island, Relationships of the Mammals of, E. R. Hall, 879
- Variety  $V_n$ , Concurrent Directions in a, C. Agostinelli, 851
- Vegetation, Influence of Man on, Prof. E. J. Salisbury, 919
- Vererbungswissenschaft, Handbuch der. Herausgegeben von E. Baur und M. Hartmann. Lief. 15 (Bd. 3, L): Entstehung der Kulturpflanzen. Von E. Schieman (*Review*), 604
- Vertebrate Skeletons, Making Whole Mounts of, M. Rahimullah and Prof. B. K. Das, 171
- Verulanium 1932, Dr. and Mrs. A. E. Mortimer Wheeler, 300
- Veterinary: Publications, 615; Research in the Union of South Africa, 905
- Vibrating Metal Bars, Viscous Damping of, Prof. K. Sezawa, 803
- Vine, Comparative Composition in the, of Homologous Leaves, H. Legatu and L. Maume, 815
- Virus: Diseases, 370; and Intracellular Inclusions in Plants, Dr. F. M. L. Sheffield, 325; of Exanthematic Fevers, Passage of the, by the Digestive Canal in the Rat, C. Nicolle, J. Laigret, and P. Giroud, 375
- Viscosity: Measurements of Liquids by the Oscillating Disc Method, Prof. C. E. Fawcitt, 97; of a Molten Metal, Measurement of the, by means of an Oscillating Disc, V. H. Stott, 850
- Vision and Colour Vision, Dr. R. A. Houstoun (*Review*), 532
- Visual: Acuity, Measurement of, R. J. Lythgoe and Dorothy E. Corkill, 98; Experience, A Peculiar, Dr. F. A. Bather, 62; Sensations, Measurement of, Dr. N. R. Campbell, 850
- Vital Capacity and Occupational Characteristics, 588
- Vitamin A: Absorption Spectrum of, at Low Temperatures, Dr. F. P. Bowden, S. D. D. Morris, and Dr. C. P. Snow, 582; Highly Active, Characteristics of, Dr. F. H. Carr and W. Jewell, 92; in Cod Liver Oil, An Inhibitor of the Antimony Trichloride Test for, A. Emmerie, 364; B<sub>1</sub>, Crystal Structure of, and of Adenine Hydrochloride, J. D. Bernal and D. Crowfoot, 911; B<sub>2</sub> and Adenine, R. D. Heard, H. W. Kimmsley, J. R. O'Brien, Prof. R. A. Peters, and V. Reader, 617; C Activity, Indophenol Reducing Capacity of Lemon Juice and its Fractions in relation to, Dr. S. S. Zilva, 363; and Ascorbic Acid, A. L. Bacharach, 364; Constitution of, Dr. F. Micheel and K. Kraft, 274; E. G. Cox and Dr. E. L. Hirst, 402; Identification of, Prof. A. Szent-Györgyi, 225; in the Adrenal Gland, G. Bourne, 874; Methylornarotone, Glycuronic Acid, and, W. J. Dann, 24; Triphenylmethyl Derivative of, L. Vargha, 363; Content of Australian, New Zealand and English Butters, M. E. F. Crawford, E. O. V. Perry, and Dr. S. S. Zilva, 770
- Vitamines, Les, Mme. Lucie Randoïn et H. Simonnet (*Review*), 258
- Vitamins: A Survey of Present Knowledge (*Review*), 857; (*Review*), 258; Bibliographical Survey of, 1650-1930, with a Section on Patents, M. H. Wodlinger (*Review*), 568; Recent Research on the, 118; Research on, A. L. Bacharach (*Review*), 857
- Vivisection of Criminals, 902
- Vocational Guidance and the Health of the Industrial Worker, A. Macrae, 243
- Volcanic: and Tertiary Marine Series at Curlew, near Geelong, the Older, A. Coulson, 71; Craters in the Libyan Desert, Dr. K. S. Sandford, 46; Fumaroles, G. Ponte, 923
- Volcanoes, Central African, Dr. J. Parkinson (*Review*), 821
- Voltaes, Very High, Dangers of, 833
- Vosges, Schistogreywacke Complex of the, Stratigraphic Subdivision of the, G. Dubois, 339
- Wales, University of, award of doctorates, 665
- Wanderers Wetterbuch: Einführung in das Verständnis der Wettervorgänge, Dr. O. Myrbach (*Review*), 786
- Wapiti Deer in Wyoming, Census of, 516
- War, Civilisation and (*Review*), 635
- Water: Flow of, between Moving Boundaries, Cornish, 731; -Fowl and Game-Birds in Captivity: some notes on Habits and Management, A. F. Moody (*Review*), 316; -Level, Falling, in the Chalk under London, Dewey, and others, 882; Power Development, Canadian, in 1932, Dr. Brysson Cunningham, 788; Thermal Conductivity of, L. H. Martin and K. C. Lang, 813
- Watt, James, Memorial Institute, Birmingham, 757
- Wave: Equations and the Conservation of Energy. A. Lees, 402; -Lengths of Light and the Fundamental Standards of Length, A New Apparatus for Determining the Relationship between, J. E. Sears and H. Barrell, 192; Mechanics: Elementary Theory, Prof. J. Frenkel (*Review*), 860
- Weather: Prophet: Be your Own, a Book for the Holidays and after, E. S. Player (*Review*), 712; 'Raw', Dr. G. M. B. Dobson; Sir Leonard Hill, 28; Prof. S. Russ, 131; H. E. Beckett, 132; Sir Leonard Hill, 241; Prof. W. A. Osborne, 515



- World, Tabulation of, Weather, E. W. Bliss (5), 35  
 Webster's Collegiate Dictionary. Fourth edition (*Review*), 456  
 Weddell Sea, Ice in the, J. M. Wordie and Dr. S. Kemp, 916  
 Weed-Killers, Effect of, on the Soil, W. E. Bowser and J. D. Newton, 880  
 Weeds, 737  
 West Regional Broadcasting Station in Great Britain, 664  
 'Western Indian' Art, 843  
 Weston Standard Cell, The Temperature Coefficient of the, P. Vigoureux and S. Watts, 374  
 Whale Shark in the Waters around Ceylon, The, Dr. E. W. Gudger, 165; Dr. J. Pearson, 729  
 Wheat: Embryos, Nutritive Value of, V. Famiani, 107; -Germ Oil, Absorption Spectrum of the Unsaponifiable matter from, Dr. R. A. Morton and J. A. Edisbury, 618; of the Vitamin E fraction of, Dr. P. Bowden and T. Moore, 512; Spring, 284  
 White Pine Blister Rust, Fusion of Pycniospores with Filamentous Hyphæ in the Pycnium of the, R. K. Pierson, 728  
 Whooping-Cough, Mortality from, Dr. B. Hill, 269  
 Wicken Fen, The Natural History of. Edited by Prof. J. Stanley Gardiner. Part 6 (*Review*), 343  
 Wild Life in India, Preservation of, 779  
 Wind: Direction in the British Isles since 1341, Variations of, Dr. C. E. P. Brooks and Theresa M. Hunt, 814; Gradients, Steep, in Inversions, Breakdown of, C. S. Durst, 35; Over Different Surfaces, Variations in the Structure of, C. S. Durst, 814  
 Windle, Sir Bertram: Bertram Coghill Alan Windle, F.R.S.: a Memoir, Dr. Monica Taylor (*Review*), 307; Prof. W. Wright (*Review*), 307  
 Wireless: Echoes, Recording, at the Transmitting Station, Prof. S. K. Mitra and H. Rakshit; R. A. Watson Watt and L. Bainbridge-Bell, 657; Waves, The Travel of, Sir Frank Smith, 642  
 Witchcraft in Africa, F. H. Melland, 195  
 Wood: Daily Shrinkage and Swelling of, M. B. Welch, 667; Moisture Content of, M. B. Welch, 524  
 Woods Hole Region, Mass., The Copepods of the, Dr. C. B. Wilson, 698  
 Wool: Fibres, Curls and Twists in, Origin of, Dr. J. E. Nichols, 201; Industries Research Association, Report of the, for 1932-33, 719; Methionine in, J. Barritt, 689  
 Woolly Hair in a Nordic Pedigree, Dr. O. L. Mohr, 695  
 Woo's Formula, An Extension of, C. Cannata, 339  
 World: A Vanished, Dr. A. Ferguson (*Review*), 75; Crisis and the Gold Standard, C. Lallemand, 70; Economic Conference, The, 866; 889; Order, New, The Cost of a, R. Brightman (*Review*), 183; Power Conference, Forthcoming, 22  
 Worms, Collecting and Preserving, 90  
 Xenohelix in the Maryland Miocene, L. Dryden, 775  
 Xenon, Ultra-Violet Absorption Bands of, Prof. J. C. McLennan and R. Turnbull, 214  
 X-Radiation, Properties of, Prof. C. G. Barkla, 166  
 X-Ray: Spectra, Quadrupole Lines in, E. Sègre (2), 411; Tube Current and Voltage, Measurement of, Dr. G. W. C. Kaye and G. E. Bell, 552  
 X-Rays: Diffraction of, by Liquid Sulphur, A. H. Blatchford, 813; Spectroscopic Analysis by (*Review*), 39  
 Yangtse-Kiang Flood of 1931, L. Brandt, 280  
 Yeast: Growth, Influence of Sodium and Potassium Ions in, Prof. I. Novi, 63; Permeability of, to Methylene Blue, Combined Influence of pH and Glucose on the, M. Junquera, 411  
 Yugoslavia, American Archaeologists in, Dr. V. J. Fewkes, 393  
 Yuman: Ethnology, E. W. Gifford, 915; Music, Miss Densmore, 98  
*Zea Mays*, A Correlation of Ring-shaped Chromosomes with Variegation in, Barbara McClintock, 631  
 Zentral-Asien und Karakorum-Himalaya, Geographische Forschungen im westlichen, Dr. E. Trinkler (*Review*), 600  
 Zeolites, The, M. H. Hey (5), 630  
 Zinc Oxide: and Anhydrous Zinc Chloride at High Temperature, Behaviour of Mixtures of, A. Ferrari and G. Trampetti, 339; Fluorescence of, Beutel and Kutzelnigg, 917  
 Zoological: Advice to the State, Importance of, Dr. J. Gray, 88; Expedition to Morocco (1930), Results of a, F. Werner and R. Ebner, (5), Scorpions, 287; Gardens: Indian Rhinoceros at the, 683; New Gorilla House at the, 646; Society of London, Report for 1932, 755  
 Zoologie: Handbuch der, eine Naturgeschichte der Stämme des Tierreiches, Gegründet von Prof. W. Kükenenthal. Herausgegeben von Dr. T. Krumbach, Bd. 2: Vermes Amera, Vermes Polymera, Echiurida, Sipunculida, Priapulida. Lief. 11; Bd. 2, Lief. 12, Lief. 13; Bd. 2, Lief. 14; Bd. 3, Hälfte 2: Chelicerata, Pantopoda, Onychophora, Vermes Oligomera. Lief. 1, Teil 3; Lief. 2, Lief. 3; Bd. 6: Acrania (Cephalopoda), Cyclostoma, Ichthya, Amphibia. Hälfte 2, Lief. 1, Lief. 2; Bd. 7: Saurapsida, Allgemeines; Reptilia; Aves. Hälfte 1, Lief. 1; Bd. 7: Saurapsida, Allgemeines; Reptilia; Aves. Hälfte 2, Lief. 6 (*Review*), 222  
 Zoology, Descriptive (*Review*), 222  
 Zurich University, Centenary of, 684







Supplements should be collated and bound  
with the numbers with which they were issued.









A WEEKLY JOURNAL OF SCIENCE

"To the solid ground  
Of Nature trusts the mind that builds for aye."—WORDSWORTH.

SATURDAY, JANUARY 7, 1933

No. 3297

Vol. 131

CONTENTS

	PAGE
Progress and Scientific Method . . . . .	1
Properties of the Atom. By Prof. G. Hevesy . . . . .	4
Chromosome Mechanics. By Prof. A. H. Sturtevant . . . . .	5
Modern Physic. By T. A. H. . . . .	6
Short Reviews . . . . .	8
Mount Everest. By Col. H. L. Crosthwait, C.I.E. . . . .	10
Scientific Centenaries in 1933. By Eng.-Capt. Edgar C. Smith, O.B.E., R.N. . . . .	14
Empire Broadcasting. By R. L. S.-R. . . . .	16
News and Views . . . . .	17
Letters to the Editor :	
Disintegration of Light Elements by Fast Protons.—Dr. J. D. Cockroft and Dr. E. T. S. Walton . . . . .	23
The Neutron and Neutron, the New Element of Atomic Number Zero.—Prof. William D. Harkins . . . . .	23
Kinetics of the Decomposition of Molecules of Intermediate Complexity.—C. N. Hinshelwood, F.R.S., and C. J. M. Fletcher . . . . .	24
'Hexuronic Acid' (Ascorbic Acid) as the Antiscorbutic Factor.—Prof. A. Szent-Györgyi and Prof. W. N. Haworth, F.R.S. . . . .	24
Methylnornarcotine, Glycuronic Acid, and Vitamin C.—W. J. Dann . . . . .	24
Union of Pycniospores and Haploid Hyphæ in <i>Puccinia Helianthi</i> Schw.—J. H. Craigie . . . . .	25
Breeding of Oysters ( <i>O. edulis</i> ) at Port Erin.—J. H. Orton, Miss M. W. Parke and W. C. Smith . . . . .	26
Reversible Stoppage of the Blood Circulation in Sabellids.—Prof. H. Munro Fox . . . . .	26
Photochemical Reaction of Hydrogen and Chlorine.—Prof. H. B. Baker, C.B.E., F.R.S. . . . .	27
Limiting Mobilities of some Monovalent Ions and the Dissociation Constant of Acetic Acid at 25°.—Dr. A. I. Vogel and G. H. Jeffery . . . . .	27
'Raw' Weather.—Dr. G. M. B. Dobson, F.R.S.; Sir Leonard Hill, F.R.S. . . . .	28
Isotope Effect in the Spectrum of Cadmium Hydride.—Eric Svensson . . . . .	28
Chlorination of Sodium Benzoate.—Dr. J. C. Smith . . . . .	28
Research Items . . . . .	29
Astronomical Topics . . . . .	31
Electricity, Gas and Other Fuels as Heating Agents . . . . .	32
Mesolithic Age in Britain . . . . .	32
University and Educational Intelligence . . . . .	33
Calendar of Nature Topics . . . . .	34
Societies and Academies . . . . .	35
Forthcoming Events . . . . .	36
Official Publications Received . . . . .	36

Progress and Scientific Method

AMONG the misfortunes of this present age are the tendencies of the Press to seize on the sensational in the business of science, and of the public to expect such sensational pronouncements. This, equally with the absence of an adequate scientific element in our general educational system, of which the first is indeed a consequence, is mainly responsible for the general failure to understand the scientific spirit and the place of science in our civilisation.

Unquestionably, extravagant claims have been made alike regarding the contribution of science to general welfare and the part which men of science have to play in the State and in the general life of the community, and such claims have done great disservice to the cause of science. The evidence, however, does not indicate that in the main such claims have emanated from scientific workers themselves. They have more frequently been due to the journalistic quest for the sensational, to the quotation of impressive passages in the utterances of a man of science apart from the qualifying context. Of this danger the treatment recently accorded to a scholarly address by Prof. A. Findlay to a joint meeting of the Manchester chemical societies is a pertinent illustration. Under the headlines of "A Rebuke to Scientists" it is hard to recognise the thought-provoking address of Prof. Findlay with its wide sweep and philosophic temper, recalling at times the presidential address of General Smuts to the British Association in 1931. Prof. Findlay stressed the idealistic value of science rather than its



material results and suggested that the real claim of science to a wider recognition and cultivation in the community is based on such values. The spirit of science, as expressed in the quest for truth, is an essential element complementary to beauty and goodness in the perfecting of humanity, and its inculcation should form an essential element in our system of education.

This plea for science as an essential element of culture and not as part of a technical training was, however, ignored by those who fastened on his refutation of the claims of scientific workers to a privileged position in national administration. Unfortunately, Prof. Findlay himself made one or two incautious remarks which have tended to offset his admirable presentation of a point of view which scientific workers themselves have often been prone to overlook, owing to the widespread neglect of the teaching of the philosophy of science or the scientific outlook in the universities. Few scientific workers with any experience of industry would, for example, care to endorse the statement that, so far as industry is concerned, the battle for scientific control is already won. The position of the Cotton Industry Research Association in the very city in which the lecture was delivered should have been sufficient reminder of how very far we are yet from a general acceptance by industry of the importance of research as an essential element in industrial efficiency and advance. Similarly, so far as national administration is concerned, without pointing to a host of matters in which the neglect of technical factors and scientific opinion has been conspicuous, it is sufficient to recall that the report of the Bridgeman Committee on the Post Office issued recently was the first public inquiry committee to give full recognition to the scientific expert in the Civil Service scheme of things. Only in this report was it recognised officially that the scientific expert is entitled to participate on level terms with the administrative expert and the financial expert in the formulation of policy.

If the principle has been conceded, the application here and elsewhere has yet to be worked out, and those who most welcome Prof. Findlay's insistence on the cultural value of science will most regret his untoward suggestions regarding the capability of men of science for administrative work or the extent to which they have been accepted in such positions. While Prof. Findlay's protest against the mechanisation of industry and his warning against the dangers of materialism

and an excessive emphasis on mechanical efficiency will be warmly welcomed, the influence of science on industry has scarcely been either so materialistic or so mechanising as he implies. On the contrary, the application of scientific methods of management characteristic of large-scale industry pays an attention to the human factor which was formerly rarely encountered. The results which have attended the investigations of the National Institute of Industrial Psychology or of the Industrial Health Research Board already attest the humanising effect which applied science can exert on industrial conditions. Moreover, the increasing attention which is being directed to the theory of management has already emphasised the importance to efficient administration of encouraging the development of individual responsibility, the expression of personality and the organisation of the team spirit.

It is indeed here that Prof. Findlay's address is most open to criticism. So far from human nature being intractable to the scientific method, the evidence suggests that one of the most urgent needs of to-day is an adequate attack on the social sciences and a determined attempt to place sociology, economics, psychology on a really scientific basis. Much patient research in anthropology and human biology will be required before this can be achieved, and it is highly probable that the most important contributions of science to human welfare during the next few decades will come from such fields as these, which enable us to understand and interpret more accurately the human factor and our social, economic and industrial problems.

Apart altogether from these considerations, Prof. Findlay's dislike for extravagance has led him to overlook the essential challenge presented by such spokesmen as Sir Alfred Ewing and Prof. Miles Walker. The failure of our present administrative methods to which our economic and international difficulties bear witness, and of which the bankruptcy of the Disarmament Conference is a recent example, had led many others besides men of science to wonder whether methods in which action is determined less by political prejudice than by dispassionate analysis of the ascertained facts may not offer better hope of success. The disposition to accept the leadership of science is prompted by a growing realisation of the extent to which scientific and technical factors enter into all our problems in this scientific age and that, if such factors are



only one aspect of our problems, they present an aspect which demands accurate assessment and intelligent action if disaster is to be avoided.

This point of view does not suggest that numerous other considerations are not involved in an administrative decision. It does, however, contend that the scientific worker who possesses administrative ability as well as the capacity to assess the technical facts is at least as likely to arrive at a sound decision, as those without such scientific knowledge and training, and that the openmindedness and willingness to face change associated with the scientific outlook is an important and hopeful element at the present time. The situation is so serious that accepted doctrines in finance, economics, politics are being questioned and must stand their trial as every scientific theory has to do in the advance of science.

Scientific management stands essentially for the substitution of exact scientific knowledge for opinions or rule of thumb methods, and not for the disregard of essential elements in a problem, whether those elements are or are not what is usually described as technical.

Even in industry, such exact scientific knowledge involves to an increasing extent a re-examination of the whole of our economic and indeed of our political machinery and ideas—a re-examination conducted much in the spirit of an engineer faced with a problem in factory or office management and concerned solely with the issue of improving those arrangements so as to secure a higher standard of living for the community. The world believes that the advancement of objective and exact knowledge is inevitable and ultimately beneficial and that the problems of distribution and finance, for example, so long treated in haphazard and fatalistic fashion, will yield to exact knowledge.

It can accordingly scarcely be questioned that in the modern State the scientific expert will occupy a position of increasing responsibility, and the security of our civilisation largely depends upon the efficiency and expedition with which methods are worked out for permitting his effective participation in public as in industrial affairs. Possibly the solution may be found along lines visualised by General Smuts, and the nations learn to look to the organised system of the expert report and accept as a matter of course, just as judicial decisions are accepted, the authoritative and impartial lead which it gives.

An important factor, however, is bound to be

the general outlook of the scientific worker himself. His specialist knowledge of one particular field must be joined to a sense of values, a wide outlook and a public spirit which induce him to place his services to a greater extent at the disposal of society. In the leisure State there should be no room for the excessive specialisation and narrowness of outlook deplored by Prof. Findlay, and it should be possible so to re-organise our training that the cultural value of scientific thought and method is imparted to the student, and the tendency of scientific workers to regard only their special field from a scientific point of view counteracted. Only as scientific workers are prepared to regard the whole domain of life from a scientific point of view and to support as a body those who at particular points are seeking to extend the application of scientific method and the scientific spirit, substituting facts for prejudice, opinion or guesswork in determining action, can we hope for decisive advance. Both the organisation and the functioning of the State must become more scientific, impartial, business-like and less purely political, and the scientific expert is unlikely to receive his fitting place in the new order without organised support from his fellows as well as keen and intelligent criticism.

Prof. Findlay has done well to remind us that science is more than a body of results and truths. Great as are the benefits which mankind has derived from scientific discoveries, from the new knowledge which science has made available, there are greater services to be rendered. Science has yet to teach man how to use that knowledge, to impart generally that attitude, outlook or method of acquiring knowledge which is essential if mankind, individually or collectively, is to adapt himself to the new conditions. Science alone, indeed, will not save mankind from disaster, invaluable as can be its contribution to the fundamental thinking required. But the balanced wisdom and judgment so imperatively demanded to-day can only be attained as science is regarded not as a storehouse of facts to be consulted from time to time but as one of the great human endowments, to be ranked with art and religion, and the guide and expression of man's fearless quest for truth. This outlook can only receive adequate recognition as more and more in their own personality scientific workers exemplify the unifying power of the spirit of science and its contribution to the ordering of every sphere of conduct on a basis of truth and not prejudice.



### Properties of the Atom

*The Interpretation of the Atom.* By Prof. Frederick Soddy. Pp. xviii+355+20 plates. (London: John Murray, 1932.) 21s. net.

FEW discoveries, if any, have influenced so rapidly and deeply physics, chemistry and many kindred sciences as that of the spontaneous disintegration of radioactive elements. The development following this discovery attracted also the lay mind, which was struck by the idea of evolution of inorganic matter and by the far-reaching conclusions in the field of geology and cosmology, to which the application of the science of radioactivity led. The layman's interest was enhanced by the spectacular sides like that of electroscopic discharge at the approach of the experimenter carrying radium in his pocket or suitcase, by the radium clock, and, by no means least, by the possibility of the medical application of radium rays against both tedious and fatal diseases.

The general reader interested in the great advances in our knowledge of the nature of matter and its manifold applications has every reason to be highly indebted to Prof. F. Soddy for his "Interpretation of Radium", first published in 1909. It is a most instructive task to compare the above mentioned book with "The Interpretation of the Atom", prepared by Prof. Soddy to take the place of the first mentioned volume, which has long been out of print. Even the reader familiar with atomic physics and chemistry will be struck when reading this account of the unparalleled progress made by these sciences in the last three decades. Part I deals fully and systematically with the remarkable series of spontaneous disintegration of the atom, while in Part II the general progress of atomic chemistry is discussed. A chapter on cognate geological and astronomical aspects and the cosmic radiation concludes the volume.

Prof. Soddy is known as a thinker and writer of unusual originality, who does not hesitate to oppose himself, even to ideas accepted by most of his contemporaries—a characteristic quality which, coupled with genius and lucidity, is undoubtedly responsible for his greatest achievement, the introduction of the conception of isotopes. The reader will therefore not be astonished to find Prof. Soddy in pronounced opposition to the mathematical presentation of physical theories in the age of great successes of

quantum mechanics, and to learn that he is not among those who can "bow down and worship the square root of minus one". "The Interpretation of the Atom" is primarily intended for the general reader, but it will undoubtedly prove to be a helpful guide to scientific students of all grades; while the man of science interested in the history of this subject will also find matter of interest to him.

The development of scientific thought and progress often follows roundabout paths, which even the onlooker has difficulty in following; not a few scientific workers are inclined, therefore, to the view that the official history of the development of scientific thought not seldom differs materially from the actual course of events. Two examples may be cited, Bohr's fundamental conception of the atomic structure, and the development of the notion of atomic numbers, both outstanding events in natural philosophy, and the development of which are usually described in a way which differs materially from the actual facts. We mostly read that Bohr's conception was due to the effort to explain the appearance of spectral series. It would go too far to pretend that Bohr (who not long before passed his examination with first class honours) would not know of the existence of spectral series, but these were certainly not in the forefront of his thoughts when he first embarked on the philosophy of the atom. It was only at a later date, that in discussing experimental results obtained by one of his Copenhagen colleagues, he noticed the possibility of applying his new conception to explain the appearance of spectral series.

The actual development was as follows. Bohr was deeply struck by Rutherford's conception of the nuclear atom, realising simultaneously, however, the impossibility of reconciling this conception with the requirements of the classical theory of radiation. The most direct step would have been to discard Rutherford's conception; Bohr chose another path and introduced Planck's quantum idea in place of the classical conception, when interpreting the stability of the nuclear atom. By doing so he was led at once to the fundamental distinction between the nuclear and electronic properties of the atom, to the identity of the atomic number and nuclear charge and also to the conclusion that the emission of the disintegration  $\beta$ -particles has its origin in the nucleus. The latter led him to the conclusion



that, for example, when an atom of thorium loses consecutively one  $\alpha$ - and two  $\beta$ -particles, the thorium atom reappears, and he arrived thus at the displacement laws, as a special case of a much wider generalisation. Bohr discussed this result widely without publishing it. These laws were, as is well known, published later by different men of science as an empirical summary of the experimental results of Fleck and others. That the sequence of the elements in their natural system, that is, the atomic number, is identical with the number of the nuclear charge, was published by Bohr at an early date when basing his first calculations on the assumption that the hydrogen nucleus has one, the helium nucleus two, elementary charges, and so on.

The above narrative of the introduction of the conception of the atomic number would, however, not be complete without mentioning that this conception emerged, simultaneously with Bohr's deductive line of thought, in the Manchester physics laboratory on inductive lines. Geiger and Marsden checked completely Rutherford's theory of large scattering of  $\alpha$ -particles and found the nuclear charge of gold to be about 100. This result was not at all unexpected, as early theories of  $\alpha$ -ray scattering and stopping had suggested already that there should be half as many electrons in the atom as its weight. When Moseley started his work which became the foundation of a new and important branch of physics, the conception of atomic number was thus clearly developed. We owe to Moseley's genius a simple method of determining the atomic number of each element and of fixing exactly the number of elements between hydrogen and uranium. From the fact that the nuclear charge of gold was found to be 100, and also from the chemical evidence, it followed already that the number of unknown elements could only be a very restricted one. The actual number was, however, fixed by Moseley.

The introduction of the conception of the atomic number impressed contemporary scientific workers so deeply that its rival conception, that of atomic mass, seemed for a while to be deposed from its long reign. Through Aston's work and the development of later years, contemporary interest is again focused on atomic mass and thus equal rights are secured for these two fundamental properties of the atom.

Every reader interested in the problems and the progress of natural science will find Prof. Soddy's book most fascinating reading. G. HEVESY.

### Chromosome Mechanics

- (1) *Recent Advances in Cytology*. By Dr. C. D. Darlington. Pp. xviii + 559 + 8 plates. (London: J. and A. Churchill, 1932.) 18s.
- (2) *Chromosomes and Plant-breeding*. By Dr. C. D. Darlington. Pp. xiv + 112. (London: Macmillan and Co., Ltd., 1932.) 7s. 6d. net.

THE discovery that the chromosomes are the bearers of the hereditary units (genes) has led to a renewed interest in their study by cytological methods. There has developed a vast literature, much of it based on correlated studies of cytology and experimental genetics. Dr. Darlington has worked through this literature, and has attempted in the larger of the two works under notice not only to describe the more important recent results but also to provide a unified general scheme of chromosome behaviour.

This general scheme is based on several fundamental hypotheses. The first of these is that like chromosomes (or parts of chromosomes) are regularly attracted in pairs, and that the attractive force is satisfied when two like parts come together, so that more than two are not attracted. This leads directly to an interpretation of the difference between mitosis and meiosis. At mitosis each chromosome is already split into two daughter chromatids at prophase. These lie side by side and thus satisfy the attractive force. At meiosis the division is delayed, and attraction therefore causes homologous chromosomes to conjugate. Division now follows, and there result four chromatids instead of two chromosomes; these are no longer attracted except in pairs, and at each level there results a separation into two groups of two chromatids each. Observation shows, however, that this separation does not occur between the same pairs of strands at each level, so that there are chiasmata, or crossed strands, at certain points. Darlington argues that it is these chiasmata that maintain the unity of the quadruple structure until metaphase, and thus insure regular segregation. In the absence of chiasmata the chromosomes merely fall apart into two separate pairs, and these segregate at random at the first division.

According to Darlington, each chiasma results from a crossing over. The initial separation of two chromatids from two others is reductional at every level, that is, the two chromatids derived by division of a single chromosome always remain associated. If two that are not sisters have



undergone mutual exchange at a given level, there results a chiasma at that level.

These are Darlington's main theses; meiosis is mitosis with delayed division of the chromosomes, chiasmata result from crossing over, and metaphase pairing is due to chiasmata that prevent separation of divided homologues. He interprets the whole range of chromosome cytology and genetics on the basis of these views. There is a logical and detailed marshalling of an almost overwhelming body of evidence, much of it based on Darlington's own novel and extensive investigations. This evidence relates not only to careful analysis of the normal behaviour of a very wide variety of animals and plants, but also more especially to unusual cases—polyploids, extra-chromosome types, hybrids, and mutant differences in chromosome behaviour.

The reviewer finds himself strongly inclined in favour of two of the main hypotheses—those concerning the nature of meiosis and the effect of the chiasmata in holding homologues together until metaphase. The first of these is contrary to the observations of some cytologists, who have reported that the chromosomes divide before the meiotic conjugation; but Darlington's view has an attractive logical simplicity that makes it difficult to think of the phenomena in any other terms. Acceptance of these hypotheses involves also acceptance of the more fundamental hypothesis of attraction by twos and not by larger numbers. But it does not necessitate acceptance of Darlington's interpretation of the origin of chiasmata. This hypothesis leads to certain contradictions with the genetic data, which to the reviewer seem fatal to the hypothesis. The occurrence of regular pairing in the male *Drosophila*, in which there is no crossing over, makes it clear that chiasmata are not necessarily associated with crossing over—a conclusion avoided by Darlington only by the expedient of very special and improbable accessory hypotheses. It follows that chiasmata are not due to crossing over, and one may turn to the alternative view, referred to by Darlington as the "classical hypothesis". On this interpretation the initial separation is not always reductional, that is, at certain levels sister chromatids separate. If the separation is in different planes at successive levels, a chiasma will result between these levels. If the initial separations are permanent, crossing over will result (after, not before, the chiasma is formed), but it is possible that, at times, the original separation plane may be only temporary, the chiasmata

simply unravelling without leading to crossing over. On such a basis it appears to be possible to give a self-consistent account of the genetic and cytological phenomena.

Evolutionary discussions occupy much space in Darlington's book. His view is that chromosomes are especially favourable for the construction of evolutionary schemes, because their materials control the gross structure of the organism but are not themselves controlled by the rest of the organism, and for several other reasons. The discussion of the evolution of chromosomes and chromosome systems is interesting and at times stimulating; but to one who has studied the period in the history of zoology when the making of hypothetical phylogenies was popular, there is a familiar sound to the argument. There are many who will hope that we are not to see a revival of the fashion of constructing elaborate hypothetical histories that must for ever remain hypothetical.

This is a difficult book. It is closely argued, and so full of facts and ideas as to require slow and careful reading. It will be indispensable for the student of cytology or genetics, but the more general reader will find the smaller book easier to assimilate. This, as its title indicates, is written for the plant breeder; but anyone interested in the new results obtained by the cytological study of polyploid and hybrid plants will find here an admirable and readable summary.

A. H. STURTEVANT.

### Modern Physic

- (1) *The British Pharmacopœia, 1932.* Published under the direction of the General Council of Medical Education and Registration of the United Kingdom. Pp. 1 + 713. (London: Published for the General Medical Council by Constable and Co., Ltd., 1932.) 18s. 6d. net.
- (2) *The Extra Pharmacopœia of Martindale and Westcott.* Revised by Dr. W. Harrison Martindale. Twentieth edition. In 2 vols. Vol. 1. Pp. xlviii + 1216. (London: H. K. Lewis and Co., Ltd., 1932.) 27s. 6d. net.
- (1) **T**HE duty of preparing "The British Pharmacopœia" was laid upon the General Medical Council by the Medical Act of 1858 and the Medical Council Act of 1862. Since then five pharmacopœias have been issued at irregular intervals varying from three to eighteen years. The present issue is the sixth and in future



revision will take place every ten years. It is explained in the preface that the "Pharmacopœia" includes only the more important "standard articles, which are in use throughout the Empire" and with characteristic British elasticity in governance, provision is made for the issue of supplements or addenda by Governments of overseas parts of the Empire, who may desire to sanction the use of drugs with a local reputation. This is a happy solution of a long-standing difficulty.

The Commission upon which the actual work of preparing the "Pharmacopœia" devolved, was assisted in its labours by a group of sub-committees on clinical medicine, pharmacy, pharmacology, pharmacognosy and pharmaceutical chemistry, whilst the decision for or against biological standards for ergot, cod liver oil, digitalis and strophanthus, arsenobenzene derivatives and similar products, chemical control of which is still doubtful or impossible, necessitated the appointment of eight subsidiary committees, one for each subject of potential biological standardisation.

The revision of a pharmacopœia involves three branches of work, the elimination of drugs which have become redundant or obsolete, the selection of such recent contributions to *materia medica* as have found a sure footing in clinical medicine, and the definition of each item in the final list. In the new "Pharmacopœia" the omissions are far more numerous than the additions. They are chiefly galenical preparations, some of which are replaced by more modern examples of the pharmacist's art, some crude vegetable drugs, a number of compounded medicines and a few synthetic, pharmaceutical chemicals. No serious objection can be raised to any of these omissions, especially as the articles concerned will still figure in the British Pharmaceutical Codex, the revision of which is now in progress. Indeed this process of elimination might have been carried further. Eucalyptus oil (cineole, 70 or more per cent), cajuput oil (cineole, 50 to 60 per cent) and eucalyptol (cineole, 97.5 per cent) are presumably all included for the sake of their cineole content, this being the component indicated by the prescribed assay, and if so, two of them are redundant.

The additions include several well-known alkaloids, quinidine, ephedrine, ergotoxine and emetine, which have found new and important medicinal applications since 1914, a number of synthetic drugs, including a choice of local anæsthetics, and

hypnotics and the indispensable antisyphilitics, nearsphenamine and sulpharsphenamine. The most notable addition is the group of biological products including insulin, liver extract, Schick control, Schick test toxin, diphtheria prophylactic, antityphoid-paratyphoid vaccine, gas-gangrene antitoxin, and antidysentery serum. Apart from this biological innovation, it cannot be said that any striking change has been made in the list of officially recognised drugs. Some notable candidates for recognition have probably been omitted because they are patented products, others because their present reputation may be based on pioneering enthusiasm and they have still to run the gauntlet of extended clinical trial, which will eventually bring them to their proper places in practical therapeutics.

The list of official drugs, which emerges by the operation of these two kinds of selection, is essentially a matter for comment by clinicians, but if a chemist may venture two opinions upon it they are, that the list is what a list of officially-recognised drugs should be—safe, sound, and not too conservative—and that it is satisfactory because due weight has been given to the pharmacological and chemical evidence for and against each drug.

It is in the third branch of its labours, the definition of the selected products, that the Commission has most clearly improved upon preceding pharmacopœias. Much more attention is given to tests for identity and for degree of purity, to the analysis of chemicals and to the assay of potent galenical and biological preparations. In the 1914 Pharmacopœia the appendices amounted to over eighty pages: in the new issue nearly twice that space is occupied, due mainly to the inclusion of more descriptions of biological, chemical and physical methods for the determination of the quality of drugs, using that term in a broad sense. These appendices now form a useful and interesting manual of methods of assay, which may even find a place for the Pharmacopœia in laboratories not directly concerned with medicinal products.

Daily use of the sixth "British Pharmacopœia" will inevitably reveal minor weaknesses, but taken as a whole it is a satisfactory and in many ways a model contribution to the world's collection of national pharmacopœias. The nation has every reason to be grateful for the labours of the Pharmacopœia Commission, for the time and knowledge which the committees of experts have



expended and for the accumulated results of technical experience which manufacturers have given just as freely. The least it can do in return is to provide for that continuity of investigation which will lighten the work of preparing the Pharmacopœias of the future.

(2) When a technical work has reached its twentieth edition in the course of less than half a century, it may be assumed that the author knows much better than any merely ephemeral reviewer, what his particular public requires and in what form to give it to them. This is the case of the "Extra Pharmacopœia". The book is fittingly noticed here because it provides the

medical practitioner with the information he needs about the latest developments in therapeutics and thus facilitates that extensive clinical experimentation with new *materia medica*, the results of which alone can finally determine their real value. It thus serves the cause of medical progress and at the same time admirably fulfils its main purpose as a handy and singularly complete reference book for the multifarious needs of the pharmacist and the medical man. In these respects the twentieth edition is as good and as up to date as its predecessors were in their day, and those who know the "Extra Pharmacopœia" need no further commendation. T. A. H.

### Short Reviews

The Outline Series. *The Physical Nature of the Universe*. By J. W. N. Sullivan. Pp. 143. *Theories and Forms of Political Organisation*. By G. D. H. Cole. Pp. 160. *Modern Theories and Forms of Industrial Organisation*. By G. D. H. Cole. Pp. 159. *An Introduction to the Study of Sex*. By Prof. F. A. E. Crew. Pp. 160. *An Introduction to Psychology*. By Prof. F. Aveling. Pp. 176. *An Introduction to Finance*. By Prof. T. E. Gregory. Pp. 144. *An Introduction to Economics*. By Maurice Dobb. Pp. 143. *The Arts of Painting and Sculpture*. By Roger Fry. Pp. 160. *An Introduction to Psycho-Analysis*. By Prof. J. C. Flügel. Pp. 159. *The Theory and Practice of Architecture*. By Prof. C. H. Reilly. Pp. 144. *Principles of Literary Criticism*. By Prof. Lascelles Abercrombie. Pp. 160. (London: Victor Gollancz, Ltd., 1932.) 1s. 6d. each.

ONE of the more hopeful signs, indicating the approach of an age in which knowledge and power are more closely and harmoniously related, is the reception afforded to the various summaries or outlines of modern knowledge which have appeared in recent years. The publication in separate parts of eleven of the essays by acknowledged authorities which formerly appeared as a composite book under the title "An Outline of Modern Knowledge" is evidence of this demand and the publishers are to be congratulated on the step they have taken in place of issuing a new edition of the composite work.

The publication as individual essays is free from several objections which may be brought against the combined treatise. The essays can be seen as the introductory monographs which they really are and the impression of a reference book is destroyed. The lack of proportion in the original book is less conspicuous in the separated monographs and could indeed easily be remedied by the publication of supplementary volumes to fill the more serious gaps, so far as they are not found in the reprinted monographs themselves.

*Handbuch der Pflanzenanalyse*. Herausgegeben von G. Klein. Band 2: *Spezielle Analyse*. Teil 1: *Anorganische Stoffe; Organische Stoffe, I*. Pp. xi + 973. (Wien: Julius Springer, 1932.) 99 gold marks.

A KNOWLEDGE of the constituents of plants is becoming both of increasing importance and difficulty, as their number continues to grow, and it is, therefore, of value to have a work of reference which, on one hand, lists the various products according to some logical scheme, whilst on the other, it describes the methods for their identification and analysis. Working in conjunction with the index of nearly ninety pages, it is possible rapidly to have the requisite information about any desired compound.

The book is necessarily the result of collaboration, no less than twenty-three different authorities being responsible for the several sections. The first quarter of it deals with the inorganic constituents of plants including the nitrogen compounds, also the analysis of plant ash and gas: it is done with great attention to detail but in a suitably concentrated form. There follows the organic section divided up into groups of allied substances as is customary: it is this part which will be found of immense value to all active workers in the domain of plant chemistry.

The matter is highly condensed but contains just the information which is usually needed, and the text is not overburdened with countless references to the original literature, which the seeker must find in certain other works indicated, should he require them. Taking the section headed "Phenols" for example: the systematic occurrence in indicated plants is given for 61 phenols, 10 quinones, 11 anthraquinones. The general properties and colour reactions of phenols are described with a note as to the properties and derivatives of each individual phenol, the whole giving the complete state of knowledge in this particular field, which it would otherwise take a great deal of reading to survey.



*Climate: a Handbook for Business Men, Students and Travellers.* By Dr. C. E. P. Brooks. Second edition, revised. Pp. 199. (London: Ernest Benn, Ltd., 1932.) 10s. 6d. net.

AN early second edition testifies to the general utility of Dr. Brooks's handbook. All parts of the globe are dealt with, and a useful feature at the end of each regional division is a table furnishing for a number of selected places data of temperature, humidity, rain, snow and thunder. There are very few illustrations, and, perhaps, it is a recommendation that the book is not encumbered by a lot of commonplace maps and diagrams.

The treatment is essentially statistical, but Dr. Brooks knows his subject too well to allow his outlook to be blinded by the data which he wields. This is an important matter because climatology as a science has suffered badly from the mishandling or misinterpretation of the very data on which it largely depends.

The book is, however, not so free from loose statements as is to be expected in a second edition. For example, a statement, to the effect that it is the relative humidity which gives the 'feel' of the air, seems to us to be faulty. The 'feel' of the atmosphere is an intricate complex of temperature, wind, radiation, moisture and probably, also, obscure influences like electricity; but, so far as humidity is concerned, it is surely the absolute humidity or vapour pressure as controlling the rate of evaporation from the body which is the important factor, not the relative humidity except at saturation point with fog. Thus on an enervating summer day of high vapour pressure the relative humidity is often much lower than on a bracing winter day of low vapour pressure.

L. C. W. B.

*Faith, Hope and Charity in Primitive Religion.* By R. R. Marett. Pp. vii+181. (Oxford: Clarendon Press; London: Oxford University Press, 1932.) 10s. net.

DR. MARETT'S Gifford lectures for 1931-32, an expanded form of lectures delivered under the auspices of the Lowell Institute of Boston in the previous year, have as their theme the evaluation of the religious experiences of peoples of the lower culture, or as Dr. Marett prefers to call them, savages. It must not be thought, however, that Dr. Marett would regard anthropology as one of the normative sciences and that he would attempt to apply an ethical scale to primitive ideas of behaviour. His evaluation is biological in the sense that its aim is to test survival value. The various activities of the savage are passed in review one by one and analysed with the view of the isolation of their emotional content—savage religion being a matter of the emotions rather than of intellect or of action. Dr. Marett then proceeds to show that the religious emotions which colour the whole range of savage activity on the whole make for the virtues or qualities which he designates "Faith, Hope and Charity" and regards

as the effective element in the contribution of religion to the advancement and survival of man. A brief summary does less than justice to the acuity of Dr. Marett's vision—it may be suspected that at times he finds his material a thought intractable. Nor is it possible to do more than refer to the insight shown in the many valuable suggestions on controversial points which he throws off, almost casually, in the course of his argument.

*Thermionic Vacuum Tubes and their Applications.* By Prof. E. V. Appleton. (Methuen's Monographs on Physical Subjects.) Pp. vii+117. (London: Methuen and Co., Ltd., 1932.) 3s. net.

THE student with a good knowledge of general physics will find this volume very helpful in studying radio-frequency phenomena. Modern thermionic tubes have so many important applications in physics and electrical communication that a knowledge of their action and how they are constructed is essential to almost every research physicist and electrical engineer. The author writes carefully and clearly, so the ordinary reader easily grasps the laws which govern the emission of electricity from hot bodies and how to apply Richardson's formulæ to make calculations. He then explains the internal action of the two electrode tube (diode) and states some of its applications. Finally he discusses the three electrode tube (triode) and describes its applications as an amplifier, a rectifier and an oscillation generator. The book can be recommended to the experienced amateur in radio communication as a scientific introduction to the subject as well as to the physicist and mathematician who intend to read the relevant parts of advanced treatises well before following up some line of research.

*The Practical Treatment of Diabetes.* By Dr. T. Izod Bennett. Pp. ix+107. (London: Constable and Co., Ltd., 1931.) 6s. net.

THIS book is a brief and severely practical account of the modern method of treating the diabetic. References to theory are few and are limited to such details as are absolutely necessary to explain the therapeutic steps. A short chapter is devoted to diagnosis, the second and third to general principles of treatment and dieting, the fourth to the use of insulin, and the remainder of the book to complications and special problems and considerations. As described by Dr. Izod Bennett, the restoration of a diabetic to such condition that he is sugar-free on sufficient diet appears an easy matter, and the general practitioner who has not had to deal with many cases will learn with surprise that this object can be attained almost invariably within three weeks. How it can be done is clearly set out in some fifty pages of this book, which, as a practical guide, lacks no essential features. Specimen diets during treatment, and food tables showing the great variety finally available, are included.



## Mount Everest

By Col. H. L. CROSTHWAIT, C.I.E.

**M**OUNT EVEREST, everyone knows, is the highest mountain in the world. It was discovered, and its height determined, during the operations of the Great Trigonometrical Survey of India in the course of carrying out the geodetic triangulation of that country in the years 1849-50. The figure adopted, namely, 29,002 ft. above mean sea level, was derived from the mean of a large number of vertical angles observed to the peak from six different stations situated in the plains of India south of Nepal. These stations were at distances varying from 108 to 118 miles. It was not until some months afterwards, when the necessary computations had been completed, that the great height of Everest was first realised. The actual discovery was made in the computing office at Dehra Dun.

The determination of height above mean sea level by the method of vertical angles, observed from one station only, involves the assumption of a coefficient of refraction—always a doubtful quantity, especially where great differences of height are concerned as in the present case—and also a knowledge of the amount of separation of the geoid and the spheroid. Suffice it to say, however, that the subsequent extension of observations to the mountain so as to include stations situated within the hills, and the adoption of a more probable coefficient of refraction, made the summit some 29,149 ft., but the estimated separation of the geoid and spheroid, due to deformation caused by local attraction, would reduce this amount, the net result being to assign to the peak a probable height of about 29,050 ft. above mean sea level. There are also certain other corrections which can be estimated theoretically but these are not taken into account in ordinary trigonometrical levelling.

By height above mean sea level is implied the distance of the summit above the geoid immediately beneath it. Accepting this definition, it is not possible to determine accurately the height when access cannot be had to the summit for purposes of observation. Taking into account that there are still doubtful quantities involved, it has been considered best to allow the time honoured figure of 29,002 ft. to stand, anyhow until sufficient data are available to enable a more exact solution of the problem.

It may be asked why so little was known about the highest mountain in the world beyond its position and height, until comparatively recently, considering it was discovered eighty-two years ago. This was, without doubt, due to its great distance from civilisation and above all to the strict political isolation maintained by the two countries, Nepal and Tibet, on the border of which it is situated. The shortest way, some 110 miles, to reach the mountain from India

would be through Nepal, but even if the Nepalese Government were willing to permit the passage of its country, the route would be through trackless leach-infested jungles impossible for pack transport. Added to this, the snow line is about 2,000 ft. lower on the south side than on the north, for it is subject to the full force of the monsoon and is probably more deeply eroded and, in consequence, more inaccessible than from the Tibet side. For these reasons successive expeditions have taken the longer route, about 350 miles from Darjeeling via the Chumbi valley, Kampa Dzong and Sheka Dzong, made possible since the Tibetan objection to traversing its territory has been overcome.

This route possessed the advantage of passing through country where pack transport was available, and could be used up to the base camp. Further, it lies at an average elevation of about 14,500 ft., so the long march has a certain beneficial effect in acclimatising the party before the base of operations is reached.

Though the project to climb Mount Everest had been long in the minds of several mountaineers, the first definite move in the matter appears to have been due to Major Rawling and Captain Noel, about the year 1912-13. Both these officers had had experience of Tibetan travel. Then followed the years of the War in which Rawling was killed. The project was revived in 1920, when permission was obtained from the Tibetan Government to approach the mountain through its country. A Committee, consisting of three members each of the Royal Geographical Society and the Alpine Club, was formed to collect funds, select personnel, purchase instruments and equipment and generally to manage the business of an expedition to Everest. The chairman of this Committee was Sir Francis Young-husband.

There have now been three expeditions including the one in 1921, which was of the nature of a reconnaissance. The other two were serious attempts to reach the summit—they were undertaken in the years 1922 and 1924. As already announced, a fourth expedition will leave England early this year.

The expedition of 1921, led by Col. C. K. Howard-Bury, consisted of Dr. A. M. Kellas, C. Raeburn, G. H. L. Mallory, G. H. Bullock, mountaineers, and A. F. R. Wollaston, doctor and naturalist. Since the local topography of the mountain and its neighbourhood was quite unknown, Majors Morshead and Wheeler, of the Survey of India, with three Indian surveyors, and Dr. Heron, of the Indian Geological Survey, joined the expedition in India. Unfortunately, that veteran mountaineer, Dr. Kellas, died at Kampa Dzong on the way out.



The party started from Darjeeling on May 18 and after the long detour through Tibet, already mentioned, reached Tingri, a place about 45 miles north-north-west of Everest, a month later. On June 23, Mallory and Bullock began the exploration of the western and northern sections of Everest. Approach was soon found to be, if not impossible at least very difficult, from the west and north-west. They then turned their attention to the great Rongbuk Glacier which drains the northern slopes of the mountain. It was seen to consist of at least two important branches—one trending away to the west, and the main glacier coming down from the northern face of Everest itself.

As the result of these explorations the following facts were established, that the key of the mountain appeared to be an important saddle, the Chang La (North Col), 22,990 ft., situated at the head of the main Rongbuk Glacier, about  $1\frac{3}{4}$  miles from the summit of Everest, and that it could only be reached with the greatest difficulty from the main glacier. It then became necessary to seek another way of approach to the Chang La. They decided to try what could be done from an easterly direction. They therefore marched round to a new base which, in the meantime, Howard-Bury had established in the Kharta Valley, at the head of which lies the Hlakpa La (22,200 ft.). This point they eventually reached in the face of very adverse weather. It was found to lead to a hitherto unsuspected eastern branch of the Rongbuk glacier, draining into the main valley through a narrow gorge, which had been missed during the first reconnaissance. Mallory, Bullock and Wheeler crossed the East Rongbuk glacier and succeeded in reaching the summit of the Chang La itself on September 24. In doing this they had the most difficult climb, especially for laden men, that had so far been encountered. "Beyond the Col (Chang La) an easy succession of rock and snow slopes could be seen leading to the north-east shoulder (27,390) of Everest."

The weather and the exhaustion of the party prevented any further advance. This closed the season of 1921. The results may be briefly stated. A practical route had been discovered, via the Chang La, which had been reached from the

Kharta valley, but there was an easier way by the East Rongbuk glacier which avoided the ascent of the Hlakpa La and consequent descent of about 1,200 ft. in order to reach the foot of the Chang La. The best time for high climbing appeared to be the months of May and early June.

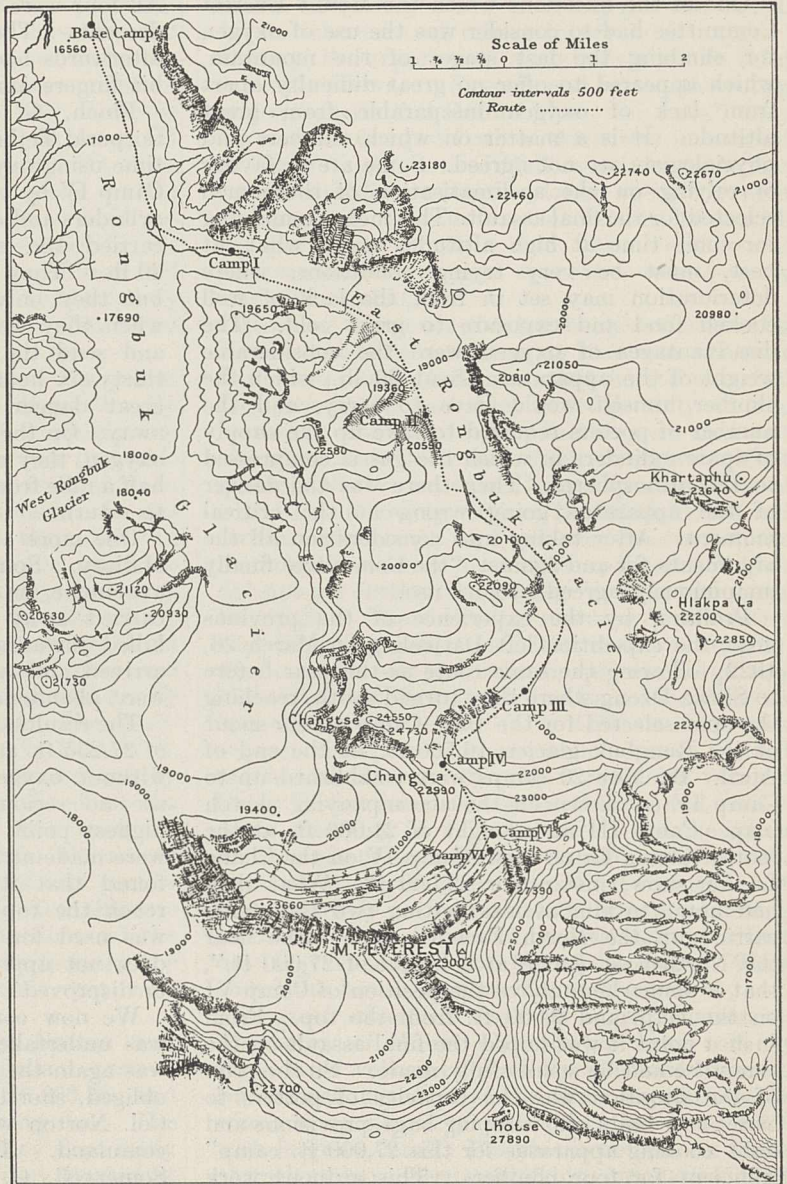


FIG. 1.—Everest and the surrounding country. By courtesy of the Royal Geographical Society

In the course of this reconnaissance, 600 square miles in the immediate neighbourhood of Mt. Everest were mapped photographically on the 1-inch scale, which proved of great use in subsequent expeditions.

A way had now been found to make a real attempt to reach the summit. The expedition of 1922 comprised Brig. Gen. the Hon. C. G. Bruce, as leader, Col. E. L. Strutt, as second-in-command,



Mallory, T. H. Somervell, Dr. T. H. Wakefield, Prof. G. I. Finch, Major (now Brigadier) E. F. Norton, mountaineers, Dr. T. G. Longstaff, doctor and naturalist, J. B. L. Noel, photographic and cinema expert. In India the party was joined by the late Lieut.-Col. H. T. Morshead, C. G. Crawford, Cpts. Morris and G. Bruce.

One of the questions which the Mount Everest Committee had to consider was the use of oxygen for climbing the last stages of the mountain, which appeared to offer no great difficulty apart from lack of oxygen inseparable from great altitude. It is a matter on which climbers and physiologists are not agreed. Some are in favour of relying on the acclimatisation of those men selected for the final assault. This means remaining for some time at high altitudes under what, at best, must be very trying conditions, where deterioration may set in from the lack of well cooked food and exposure to great cold. The disadvantages of oxygen were the considerable weight of the apparatus, about 30 lb., which the climber himself would have to carry, and the number of porters required to take up the supply of spare cylinders in which the gas is compressed to 120 atmospheres. Then there was the danger of the apparatus going wrong at the critical moment. After taking into consideration all the arguments for and against, "the Committee finally unanimously agreed" to its use.

Profiting by the experience of the previous year, the expedition left Darjeeling on March 26, 1922, following the same route as the year before to Sheka Dzong where they turned south, reaching the spot selected for the Base Camp at the snout of the Rongbuk glacier, 16,560 ft., at the end of April. By May 20 camps were established up to Camp IV as shown on the accompanying sketch map. Camp III at a height of 21,000 ft. at the foot of Chang La on rock, Camp IV on the Chang La, on snow, just under 23,000 ft. What they had now "to aim at was getting two tiny tents carried up the North Face to some niche near the North-East Ridge at a height of 27,000 ft.", that is somewhere above the position of Camp VI on the map, and 2,000 ft. from the top. From such a point it was hoped the final assault on the summit could be successfully made. "So the crux of the situation was the capacity of porters to carry two tents and sleeping bags, provisions and light cooking apparatus for this 27,000 ft. camp" sufficient for four climbers. This arduous work was to be carried out by a specially selected corps of forty Nepalese porters.

The first assault was made on the morning of May 20 from Camp IV, where four climbers—Mallory, Somervell, Norton and Morshead—had slept the night before, but they were only able to reach Camp V, 25,000 ft., and had to spend the night there. The next day was fine and they succeeded in reaching a height of 26,985 ft. just below the north-east shoulder of Everest (marked 27,390 ft. on the map). They were "within one mile of the summit and there appeared

to be no serious obstacle in this last remaining lap—only it was more than could be accomplished in one day from a camp at 25,000 ft." They were compelled to turn back on account of the slow progress made and the lateness of the hour. It was between 10 and 11 p.m. before the party reached the shelter of Camp IV on the Chang La. All four were more or less frost bitten during the descent. The worst case was Morshead, who afterwards had to have the top joint of three of his fingers amputated.

Finch, G. Bruce, and the Gurkha Lance-Corporal Tejbir, then made another attempt, this time using oxygen. They were accompanied from Camp IV by twelve porters carrying spare oxygen cylinders and camp gear. The climbers themselves carried the oxygen apparatus weighing about 30 lb. They hoped to pitch a camp at 26,000 ft., but they only succeeded in reaching 25,500 ft. when they were forced by the weather to camp and send the porters back to Chang La. For thirty-six hours the storm lasted, and there was great danger of the whole camp being blown away. On the third day, still using the remaining oxygen, they reached a height of 27,235 ft., about half a mile from the top, when they were compelled to return.

One more attempt was made early in June by Mallory, Somervell and Crawford, but an avalanche, on the steep ascent to the Chang La, carried away seven of the porters, who were killed instantaneously. The monsoon had now arrived and all further attempts for the season were abandoned.

The results of the 1922 expedition were—heights of 27,235 ft. and 26,985 ft. were reached with and without oxygen; it was ascertained that there are no serious physical obstacles between the highest point attained and the summit. Camps were made at 25,000 ft. and 25,500 ft., but it was found that it was not possible from there to reach the top and return in one day. Oxygen was used for the first time, though its efficacy does not appear to have been definitely proved or disproved.

We now come to the third expedition, which was undertaken in 1924. This year Gen. Bruce was again the leader, but owing to illness he was obliged, shortly after the start, to hand over to Col. Norton who had been appointed second-in-command. The other members were Mallory, Somervell, G. Bruce, Odell, Beetham, Hazard, Irvine, Shebbear, Major R. W. G. Hingston, and Noel who was in charge of the photographic equipment which was to contribute so much to the finances of the expedition.

Darjeeling was left on March 25, the old Base Camp at the foot of the Rongbuk glacier being reached on April 29. The three camps in the glacier valley had then to be established and stocked, and the route to Camp IV on the Chang La made practicable for laden porters. This done, Camp V, 25,500 ft., would have to be similarly established and stocked and finally



Camp VI, at 26,500 ft., and possibly another camp (not marked on the map) at about 27,200 ft. "All this had to be done before the actual attempt could be made."

Camps I and II were established and stocked with Tibetan labour, while all above this were worked by the specially enlisted Nepalese porter corps, fifty-two strong. Early in these operations the occurrence of violent winds and snow impeded the work, obliterating the way which had been prepared a short time before. On the night of May 6-7, the thermometer fell to  $21\frac{1}{2}^{\circ}$  F. below zero. There were many sick porters at Camp III who had to be sent down to Camp II. In these circumstances it was not easy to keep up the morale of the porter corps. This first attempt got no further than Camp III. It was beaten by the weather and in the end the whole expedition had to retreat to the Base Camp; even this was only carried out with considerable difficulty. "So ended Round One with the mountain."

After a complete reorganisation of the porter corps a fresh start was made on May 17. By May 19 the expedition was in full occupation up to Camp III. The next operation was to tackle the route to Camp IV, which has already been mentioned as the most difficult obstacle. It was here that the seven porters lost their lives in 1922, so the greatest care had to be taken to guard against a similar accident, by finding a way clear of avalanches. This was found by Norton, Mallory and Odell. It proved to be a most exhausting operation, accompanied by several narrow escapes, especially for Mallory, who nearly lost his life by a fall into a crevasse. The establishment of Camp IV was undertaken by Somervell, Hazard and Irvine, using the way marked out by Norton and Mallory. Ropes were fixed at the worst places and a rope ladder was used for negotiating the chimney. Then came the rescue by Norton, Mallory and Somervell of four porters stranded at Camp IV. Incidents like this are most trying and exhausting for members of the climbing party just before they have to make the supreme effort to reach the summit, yet such occurrences cannot be avoided.

The next effort was made by Norton and Somervell with the help of three gallant porters. They pitched a tent at Camp VI, 26,800 ft., and sent the porters back to the Chang La. The night was spent at this height and they slept fairly well. The next morning, June 4, they started at 6.45 for the summit which was about a mile off and 2,200 ft. above them. The going was good, the day perfect. At 27,500 ft. they both began to feel symptoms of distress. Norton felt very cold and had trouble with his eyes; Somervell also was in trouble with his throat and had to stop often and cough. "Now seven, eight or ten complete respirations were necessary for each single step forward." They struggled on, however, to about 28,000 ft., when Somervell could go no further. Norton went on to 28,126 ft., when his progress became very slow. It was then 1 P.M.

when he, too, was forced to give up. The cause of their failure was most likely due to want of fitness following the strenuous time they, with other climbers, went through in rescuing the marooned porters, and other exertions which should be avoided if the final climb is to be successful.

The last and final attempt was now to be made. Two climbers without oxygen had failed. It was the turn of others to try with oxygen: Mallory, the experienced mountaineer whose third expedition it was to Everest, and Irvine, the young undergraduate and Oxford blue. On June 7 they set out for Camp VI while Odell was in support at Camp V. On arrival Mallory returned his four porters to Odell and he and Irvine spent the night at Camp VI. In a note which he sent back with the porters to Odell he said, "the weather was perfect but the oxygen apparatus was a nasty load for climbing."

Nothing is known of what happened after this except that Odell saw them at 12.50 P.M. the next day much nearer their camp than he had expected they would be had they started early in the morning. Shortly afterwards the mist shut out the view and Odell saw them no more. That evening Odell returned to Camp IV, where Hazard was. The following day, as the climbers did not return, Odell, with two porters, reascended the mountain intending to visit Camp V and VI, but did not get further than Camp V, where he spent the night. The following morning the weather had changed, a strong and bitter wind was blowing. As he could not persuade the porters to go any higher he sent them back to Camp IV, going on himself alone to Camp VI. This time he took oxygen, though he does not seem to have derived much benefit from it. He eventually reached Camp VI but found no sign of Mallory and Irvine. After searching in vain further up the mountain for a couple of hours, he too was obliged to return. In a storm of gale force he reached Camp IV; it was evidently a forerunner of the approaching monsoon. Here Hazard was awaiting him. Next day they evacuated the Chang La camp. Thus ended the last assault on Mount Everest.

A great adventure deserves a great narrative. The story of Mount Everest has been told in three large volumes splendidly illustrated by the leaders and members of the three expeditions, in which every aspect of the subject has been dealt with in great detail. But this is not all, for these narratives have been admirably summarised and woven into a single story entitled "The Epic of Mount Everest", by Sir Francis Younghusband.

What are the chances of success in 1933? A great deal, in fact almost everything, depends on the weather, and in weather we include wind. The very best laid plans may be wrecked at the last moment by one of those sudden changes which occur in the high Himalaya without warning. Wireless might be used to receive weather reports from the Indian Meteorological Department, but whether they could give indications of the local changes is more than doubtful.



The climbers must be absolutely fit and have had an opportunity of acclimatisation, undisturbed by any incident calling for great exertion on their part, such as having to rescue porters from dangerous positions. Yet such incidents are liable to occur.

The margin between success and failure must always be small—that is what makes it such a great adventure. Many favourable conditions must conspire to take the climbers to the summit; without these, success is doubtful.

We have no information as to the plans of the new expedition but we fancy the same camps will be occupied up to, and including, Camp IV on the Chang La (22,990 ft.) with, perhaps, some form of portable hut at Camp III as has been suggested. Higher up an attempt may probably be made to establish three camps in order to climb the remaining 6,000 ft.

As regards oxygen, since 1924 a much lighter form of apparatus has been constructed, weighing only about 12 lb.\* While a high degree of acclimatisation will be aimed at by the climbers selected for the final assault, no doubt the latest

\* See NATURE, 128, 1037, Dec. 19, 1931.

form of light oxygen equipment will be provided, so that it can be used if required for the last portions of the ascent. Aptitude for acclimatisation appears to vary with the individual. With some persons, deterioration, due to remaining at high altitudes, may set in before acclimatisation has been fully attained; this has always to be reckoned with. We think, given reasonable luck, Everest will be climbed. If fortune smiles the summit will be reached.

The new expedition will be led by Mr. Hugh Ruttledge, formerly of the Indian Civil Service, who has had a great deal of Himalayan experience. The other members of the expedition are Mr. F. S. Smythe, leader of the successful Kamet expedition, with three of his companions—Capt. Burney, Dr. Raymond Green, and Mr. E. E. Shipton; Mr. Noel Odell, Mr. C. G. Crawford, Mr. Shebbear, members of former Everest expeditions; Messrs. Wyn Harris, J. Longland, G. Wood-Johnson, and Capt. Hugh Boustead, and possibly Dr. W. McLean as second doctor; Mr. L. R. Wager, of the Arctic Air Route Expedition, 1930-31, and Mr. T. Brocklebank.

### Scientific Centenaries in 1933

By ENG.-CAPT. EDGAR C. SMITH, O.B.E., R.N.

THE year which has just closed saw the commemoration of the centenaries of many famous men, among whom were Scott, Goethe, Leeuwenhoek, Locke and Warren Hastings. Of especial interest to men of science was the commemoration of the tercentenary of Wren, while the celebration at Cologne of the centenary of Otto attracted considerable attention in the engineering world.

The closing month of the year also saw the commemoration of four other men distinguished as engineers or inventors. On December 7, the American Society of Mechanical Engineers at its annual dinner paid tribute to the memory of John Edson Sweet (1832-1916), a founder of the Society and once professor of engineering at Cornell, and to the memory of Alexander Lyman Holley (1832-1882), a singularly gifted man, whose monument in Washington Square, New York, describes him as "Foremost among those whose genius and energy established in America and improved throughout the world the manufacture of Bessemer steel". Eight days later, on December 15, a ceremony took place at the base of the Eiffel Tower to commemorate the centenary of the birth of its constructor, Gustave Eiffel (1832-1923), while on December 23 various tributes were paid to the memory of Sir Richard Arkwright (1732-1792) who reduced to practice the principle of roller drawing in spinning machines, and was the founder of the factory system of cotton manufacture as we know it to-day. Lecky, the historian, speaking of the wealth which accrued to Great Britain through the cotton mill and the

steam engine, and the power this wealth gave the country for carrying on the great French wars, declared that Arkwright and Watt deserved statues beside those of Wellington and Nelson, but so far no monument has ever been erected by his countrymen to Arkwright.

Earlier in the year, at Camborne, Prince George unveiled a statue of the Cornish engineer, Richard Trevithick, the centenary of whose death, falling on April 22 this year, will be commemorated by the engineering world on a scale in keeping with Trevithick's place as a pioneer. Trevithick died at Dartford, Kent, a poor man and for half a century was almost forgotten. The publication of his life by his son in 1872 did much to rescue his achievements from oblivion, and in 1888 a memorial window was erected to him in Westminster Abbey.

The forthcoming celebration is being supported by the leading engineering societies of Great Britain, and the arrangements are in the hands of a committee of which Sir Murdoch Macdonald is chairman. There will be memorial services in Dartford Parish Church and Westminster Abbey, an eminent engineer will deliver an address on Trevithick's work as an inventor, and the committee hopes to be able to erect tablets to Trevithick at his birthplace, Illogan, Cornwall, and also at Pen-y-daren, South Wales, and near Euston Road, London, to record his early attempts to introduce steam locomotion on roads and railways. Trevithick's reputation has never stood higher than it does to-day. He may indeed be proclaimed the father of the high-pressure steam engine.



Many other engineering centenaries also occur this year. A far less well-known inventor who died three months before Trevithick was Frederick König (1774-1833), whose four patents of 1810-14 led to the construction of the flat-bed printing press in which the paper was pressed against the type by a revolving cylinder. A red letter day in the history of printing was November 28, 1814, when the *Times* was first produced on a König machine driven by a steam engine.

Two centuries ago, on February 11, 1733, John Perry died at Spalding at the age of sixty-three years. For many years he was comptroller of maritime works under Peter the Great. He constructed harbour works in Great Britain and as the inscription on his tomb in Spalding Parish Church records, he was "Employed by ye Parliament to stop Dagenham Breach which he Effected and thereby Preserved the Navigation of the River of Thames and Rescued many Private Familys from Ruin".

Engineers born a hundred years ago include Sir Richard Tangye (1833-1906), the best known of the brothers who built up the great Cornwall Works at Birmingham; Thomas Edwards Vickers (1833-1915), another engineer and captain of industry of world-wide fame; James Robson (1833-1913), a pioneer of the gas engine; Henry Wilde (1833-1919), one of the leading inventors of the dynamo and Rudolph Haaek (1833-1909) who at Stettin built the first ironclad constructed in Germany, and helped to lay the foundation of the German shipbuilding industry.

Turning to other fields of human endeavour, it is not necessary to stress the interest which is attached to the bicentenary of the birth of Joseph Priestley (1733-1804) who was born at Birstal, Leeds, and died at Northumberland, Pennsylvania. The statues of Priestley at Leeds, Birmingham and Oxford, testify to the esteem in which his memory has been held, and it may be recalled that it was at the celebration on August 1, 1874, of the centenary of his discovery of oxygen, on the piazza of his dwelling-house in Northumberland, that the American Chemical Society was founded, one of many instances of the value of such commemorations. Priestley was one of the few Englishmen elected a foreign associate of the Institute of France, the secretary of which, Cuvier, in his *éloge*, referred to him as "le père de chimie moderne qui ne voulait pas reconnaître sa fille".

Among Priestley's intimate friends was the geologist and chemist, Richard Kirwan (1733-1812), who, like Priestley, received the Copley medal of the Royal Society. Kirwan was in correspondence with many of the leading savants of Europe, his London house was the meeting-place of the learned and after he returned to his native country, he became president of the Royal Irish Academy.

The year 1733 also saw the birth of Jean Charles Borda (1733-1799), the eminent French mathematician and astronomer; of Dr. Thomas

Hornsby (1733-1810), the successor of Bradley as Savilian professor of astronomy at Oxford and the first Radcliffe Observer, and of the famous German traveller, Carsten Niebuhr (1733-1815), the pupil and friend of the astronomer, Tobias Mayer.

Somewhat later than these eighteenth century worthies came Joseph Nicephore Niepce (1765-1833), the French chemist, whose statue at Chalons recalls his achievement of obtaining sun prints on metal plates; Thomas Allan (1777-1833), the Edinburgh mineralogist; Adrien Marie Legendre (1752-1833), the French mathematician, writer of many works and the contemporary of Lagrange and Laplace. Legendre's "Elements of Geometry" was translated into English by Thomas Carlyle.

To the names of these three men who died in 1833 may be added that of Dr. William Babington (1756-1833), whose statue in St. Paul's Cathedral is regarded as a fine example of portraiture in marble. Babington was physician for many years to Guy's Hospital, and it was at his house that the meetings took place which led to the foundation of the Geological Society. Active to the last, when seventy-six years of age, he presided over the Priestley centenary festival on March 26, 1833, but died of influenza three days later. He is buried in St. Mary Aldermanbury in the City.

Coming nearer our own times, it is but natural that with increase of opportunity, the lists of men who make notable contributions to discovery and progress should grow longer. "Life," said Emerson, "is girt round with a zodiac of sciences, the contributions of men who have perished to add their point of light to our sky. These road makers on every hand enrich us." To this ever-increasing group of men belong many born in 1833, among them Sir Henry Roscoe (1833-1915); the German mathematician, Rudolph Clebsch (1833-1872); and the meteorologist, Robert Henry Scott (1833-1916), the successor of FitzRoy at the Meteorological Office. On April 15 was born Maurice Loewy (1833-1907), the constructor of the equatorial coudé and the successor of Tisserand as director of the Paris Observatory; on May 5, Ferdinand, Baron von Richthofen (1833-1905), the geologist and geographer; on March 16, Hilary Bauerman (1833-1909), the metallurgist and benefactor of the Iron and Steel Institute and the Royal School of Mines; and on June 29, Peter Waage (1833-1900), the distinguished Norwegian chemist, student of Bunsen, successor of Strecker and collaborator with Guldberg.

Then, too, on October 15 and October 21, 1833, respectively, occurred the births of Frederick Guthrie (1833-1886), through whose efforts the Physical Society of London was founded, and of Alfred Bernhard Nobel (1833-1896), the Swedish engineer, chemist and inventor of explosives, by whose will of November 27, 1895, the bulk of his great fortune was used for founding the famous Nobel prizes for physics, chemistry, medicine, literature and peace.



### Empire Broadcasting

IN the field of radio communication, the last few weeks of the year 1932 were conspicuous for the inauguration of a regular broadcasting service between Great Britain and the various portions of the British Empire. The developments which took place in this connexion during 1932 are somewhat striking, and they are recorded in some detail in the B.B.C. Year Book for 1933. From the previous edition of this Year Book, it appeared that little progress was likely in connexion with the Empire broadcasting scheme drawn up by the British Broadcasting Corporation owing to lack of support by the Colonial and Imperial Conferences of 1930, and the responsible authorities in the overseas countries concerned. In November 1931, however, the B.B.C. announced its intention of developing the Empire broadcasting scheme on its own initiative, and the rapid progress made during the ensuing twelve months is illustrated by the fact that the regular service from the new station erected at Daventry for the purpose began on December 19.

As an aid in the development of this new broadcasting service, the B.B.C. had the benefit of about five years' experience with an experimental short wave station erected at the Marconi Company's works at Chelmsford. Owing to the fact that the distances from Great Britain to the various Dominions and Colonies are in the range 2,000-13,000 miles, it is necessary to make use of the short wave-length band of approximately 12-60 metres for radio communication. The Chelmsford station operated on a wave-length of 25 metres, and enabled a large amount of technical data to be obtained in connexion with short wave broadcasting. A little consideration of the matter will show, however, that one transmitting station working on a single wave-length cannot provide a satisfactory Empire broadcasting service. In the first place, account must be taken of the wide differences in local time in the various countries concerned, and it is obvious that the broadcast reception must be possible in general during the leisure hours of the inhabitants of those countries. Secondly, as a result of experience, not only in broadcasting but also with ordinary telephonic and telegraphic radio communication on short waves, it is known that the choice of the best wave-length varies with the distance to be covered, and whether the portion of the earth over which the communication takes place is in sunlight or darkness. Following on the latter condition, it is frequently found that diurnal and seasonal variations in the ionosphere, without which long-distance short wave communication would apparently not be possible, make it necessary to have a choice of at least two wave-lengths in order to maintain regular communication between two fixed points. Lastly, a directive antenna system at either or both ends of the communication link, makes such a vast improvement in general efficiency that the arrangement is always employed

where possible in commercial short wave communication.

Based upon the considerations outlined above, the British Empire has been divided up into five zones and the new station at Daventry is designed to supply a direct broadcasting service to listeners in each zone, a two-hour programme being given daily between 6 P.M. and midnight local time, with the hours 8-10 P.M. as a focus wherever possible. For each zone a separate antenna array has been erected at Daventry, each array being so oriented as to give a not too highly concentrated beam of radiation in the desired direction. In the case of the first array, for Australasia, the transmission is limited to a single wave-length of 25.5 metres, but the radiator and reflector units of the array are reversible so that the waves can be transmitted around the earth in either direction. In the case of the other four zones, two or three wave-lengths are available as required. The approximate constitution of these zones, with the wave-lengths available, and the periods in G.M.T. at which the transmissions take place in Great Britain are given in the following table :

Zone.	Countries.	Wave-lengths (metres).	Approximate programme period (G.M.T.).
1	Australasia, including New Zealand, Borneo, New Guinea and the Pacific Islands . . . . .	25.5	9.30-11.30 A.M.
2	India, with Burma and the Federated Malay States . . . . .	17, 25 and 32	2.30- 4.30 P.M.
3	South Africa, with East Africa, Palestine, Sudan and Somaliland . . . . .	14 and 32	6.0 - 8.0 P.M.
4	West Africa, Nigeria and Gold Coast, with Tristan da Cunha and Falkland Islands . . . . .	32 and 48	8.0 -10.0 P.M.
5	Canada, Newfoundland and West Indies . . . . .	19, 32 and 48	1.0 - 3.0 A.M.

In addition to the directional antenna arrays, six omnidirectional aeriels have been provided and these will be used for transmitting any special programmes which it may be desired to receive at any hour in any part of the world.

These arrays and aeriels are supplied by feeders or transmission lines from two transmitters housed in the new station building at Daventry. Each of these transmitters is of modern design and construction, and comprises a crystal-controlled master oscillator followed by the necessary frequency multiplying, modulating and energy amplifying stages: these terminate in a final amplifier which consists of four 15 kw. valves connected in push-pull arrangement, the output circuits of which are coupled to the aerial feeder.

The programme supplied through this station will comprise items largely of an original or topical nature, having entertainment or news interest of a type not normally obtainable in the countries where reception takes place. Owing to the difficulties of arranging repeat performances, particularly at the more inconvenient times shown in the above table, the B.B.C. will make extensive



use of modern electrical methods of programme recording for use in the transmitters. As an example of the use of the station, reference may be made to the occasion of the broadcasting of the King's Christmas message on December 25 last, when the vision of Sir Ambrose Fleming and other pioneers of radio communication, of a single human voice addressing listeners over the whole surface of the earth, was realised. In addition to being transmitted by all the B.B.C. stations serving Great Britain, it was sent through the two Empire transmitters at Daventry. One of these was connected to the Indian zone array, for which zone the transmission took place at the normal time. The other short wave transmitter was operated on a wave-length of about 20 metres,

and supplied an omnidirectional aerial, so as to broadcast so far as possible in all directions. In addition, the programme was recorded by Blattnerphone and used for re-transmission in the various zone programmes later in the day.

In addition to the direct reception from Daventry on listeners' private receiving sets, it is likely that the broadcasting authorities in the Dominions will arrange for the relaying of some programmes through their local stations operating on medium wave-lengths. From the point of view of the B.B.C., the whole Empire service will be experimental for a period of about six months, during which arrangements will be made to collect reports of reception from selected listeners in all parts of the Empire.  
R. L. S.-R.

## News and Views

### New Year Honours

THE New Year Honours List includes the following names of scientific workers and others associated with scientific work: *Baron*: Sir Thomas Horder, Bt., senior physician to St. Bartholomew's Hospital. *Knight of the Thistle*: The Right Honourable Sir Herbert Maxwell, Bt., chairman of the Royal Commission on Scottish Historical Monuments, president of the Society of Antiquaries of Scotland, 1900-13. *K.C.B.*: Sir Frederick Leith-Ross, chief economic adviser to His Majesty's Government. *K.C.I.E.*: Major-General J. W. D. Megaw, Director-General of the Indian Medical Service. *K.C.V.O.*: Mr. F. J. Willans, surgeon apothecary to H.M. Household at Sandringham. *Knights*: Mr. C. A. Cochrane, chairman of the Council of Armstrong College, University of Durham. Mr. H. H. Dalrymple-Hay, consulting engineer, for his inventions and services in connexion with the construction of tube railways. Prof. F. T. G. Hobday, Principal and Dean of the Royal Veterinary College. Mr. A. J. C. Huddleston, lately economic adviser to the Sudan Government. Mr. J. L. McKelvey, for services to surgery in the Commonwealth of Australia. Mr. E. R. D. Maclagan, Director and Secretary, Victoria and Albert Museum. Mr. W. Perry, president of the Royal Agricultural Society, New Zealand. Mr. R. S. Rait, Principal and Vice-Chancellor of the University of Glasgow since 1929. *C.H.*: Rev. John Scott Lidgett, president of the Methodist Church, Vice-Chancellor of the University of London in 1930-31 and 1931-32. *C.M.G.*: Dr. J. J. C. Bradfield, Government engineer, Sydney Harbour Bridge, State of New South Wales. Prof. D. B. Copland, professor of commerce, University of Melbourne. Mr. L. Ennis, constructing engineer for Messrs. Dorman, Long and Co., Sydney Harbour Bridge, New South Wales. Mr. W. B. Johnson, director of Medical and Sanitary Service, Nigeria. Mr. W. J. U. Woolcock, formerly general manager of the Association of British Chemical Manufacturers, chairman of the Committee of Non-official Advisers associated with the industrial advisers of the United Kingdom

delegation at the Ottawa Conference. *C.I.E.*: Major-General. W. C. H. Forster, Surgeon-General with the Government of Bombay. Lieut.-Col. R. B. Seymour Sewell, director of the Zoological Survey of India. Mr. C. G. Trevor, chief conservator of forests, Punjab and North-West Frontier Province. Col. J. N. Walker, director of the Medical Department and Sanitary Commissioner, his Exalted Highness the Nizam's Government, Hyderabad, Deccan. *C.B.E.*: Mrs. Alice Baker, one of the founders of the Thomas Baker, Alice Baker, and Eleanor Shaw Medical Research Institute, Melbourne, Commonwealth of Australia. Dr. F. H. A. Marshall, reader in agricultural physiology in the University of Cambridge. Dr. S. W. Smith, chief assayer, Royal Mint, and president of the Institute of Mining and Metallurgy. Dr. H. A. Tempany, director of agriculture, Straits Settlements and Federated Malay States. Prof. H. E. Whitfield, Vice-Chancellor of the University, State of Western Australia. *O.B.E.*: Dr. J. T. Bradley, chief medical officer, Seychelles. Mr. A. V. Elsdon, War Department chemist, Royal Arsenal, Woolwich. Mr. A. McCallum, senior inspector for agricultural education, Department of Agriculture for Scotland. Mitharam Pribhdas Mathrani, executive engineer, Left Works Division, Lloyd Barrage Circle, Sukkur, Bombay. Dr. S. A. Neave, assistant director, Imperial Institute of Entomology. Mr. J. Smith, director of animal health and acting secretary for agriculture, Northern Rhodesia. Mr. H. W. O. Taylor, executive engineer, Right Works Division, Lloyd Barrage Circle, Sukkur, Bombay. Mr. R. S. Taylor, principal medical officer, Somaliland Protectorate. *M.B.E.*: Mr. J. Coelho, assistant Crown surveyor and assistant engineer, Public Works Department, Gibraltar. Mr. W. M. Schutte, agricultural engineer to the Government of Bombay. Mr. H. N. Williams, assistant engineer, Irrigation Department, Iraq.

### Calendar of Nature Topics

For the past nine years calendars have been published in our columns recording week by week notes of historic interest relating to people and



institutions, discoveries and inventions, customs, festivals, geographical exploration and other matters appropriate to a scientific "Book of Days". We began in 1924 with "Early Science at the Royal Society", and during last year appeared a "Calendar of Geographical Exploration", which was contributed by Miss R. M. Fleming and most admirably fulfilled its purpose. With this issue begins an annual cycle of a different kind relating to natural history in a wide sense, as was understood, for example, by Gilbert White in the notes and letters which make up his famous "Natural History of Selborne". Prof. James Ritchie, Regius professor of natural history in the University of Aberdeen, will be chiefly responsible for the weekly notes in this "Calendar of Nature Topics", and Dr. C. E. P. Brooks will deal with meteorological events of topical interest. In addition, we hope to receive occasional notes on such subjects as agriculture, botany, marine biology, fisheries and similar branches of pure and applied natural history from other contributors.

It is not intended that this year's Calendar shall be of the usual type, recording aspects of Nature or country life week by week in Great Britain, but that it shall take a much wider outlook. The main idea will be to bring together, in chronological sequence throughout the year, observations and conclusions representing ascertained knowledge to-day on the subjects of the notes; and the range of the natural occurrences or phenomena may be that of the whole world. It is unlikely, therefore, that there will be any lack of suitable material; nevertheless, suggestions of topics of interest for inclusion in this new Calendar, or short notes which might be used, would be helpful and should be sent to Prof. Ritchie at the University of Aberdeen. It need scarcely be said that any such communications should be sent well in advance of the dates to which they refer.

#### Centenary of Legendre, 1752-1833

THE centenary occurs on January 10 of the death of the eminent French mathematician, Adrien Marie Legendre, whose labours over a period of sixty years were contemporary with those of Lagrange and Laplace, with whom he formed part of "that constellation of mathematical talent of which Paris was for more than two generations the main centre". Legendre was eighty years of age when he died, having been born at Toulouse on September 18, 1752. He was educated at the Collège Mazarin and at the age of twenty-five became a professor at the military school in Paris. He published his first important memoir, on attractions, in 1783, and in that year he was elected a member of the Paris Academy of Sciences. Four years later, with Cassini and Mechain, he was appointed to conduct the geodetical operations for connecting the Observatories of Paris and Greenwich. Through this he visited London, and was made a foreign member of the Royal Society. Unlike many of his contemporaries, he passed through the Revolution unscathed and by his writings and his work on commissions continued to add to his reputation.

In 1795 he became a member of the staff of the famous École Normale. His chief works were his "Géométrie" (1794), which was translated into English by Thomas Carlyle, his "Théorie des Nombres" (1798), "Calcul Intégral" (1811-1826) and "Fonctions Elliptiques" (1825-26). A few weeks before his death he added to the last of these another volume, which contained some of the researches of the younger mathematicians, Abel and Jacobi, the value of whose work Legendre quickly recognised. Among the best-known pupils of Legendre were Cauchy and Arago. The death of Legendre took place at his house at Auteuil.

#### Sir Henry Roscoe, 1833-1915

AMONG those whose efforts aroused Great Britain to a realisation of the value of scientific education few did more than Sir Henry Enfield Roscoe, whose birth took place in London on January 7, 1833, a century ago. The son of a judge and a grandson of William Roscoe the historian, he got his second christian name from a great-grandfather, Dr. Enfield, a colleague of Priestley's at Warrington. He was sent first to Liverpool High School and afterwards to University College, London, where he came under the influence of Graham and Williamson. Later, he spent some time under Bunsen, working in the historic old laboratory at Heidelberg where "beneath the stone floor at our feet slept the dead monks, and on their tombstones we threw our waste precipitates". Returning from Germany, Roscoe at the age of twenty-four years was appointed to succeed Frankland at Owens College, Manchester, a position he held with conspicuous success for thirty years. He was one of the foremost in engendering a spirit of research and many of his students afterwards rose to high rank. His collaboration with Dittmar, Harden and Schorlemmer, the first professor of organic chemistry in Great Britain, led to the publication of many notable works some of which are still sought after. One of his achievements as an experimentalist was the isolation for the first time of vanadium. He was elected a fellow of the Royal Society in 1863 and awarded a Royal medal in 1874; he served as president of the Society of Chemical Industry in 1881, and as president of the Chemical Society in 1882. He was elected member of parliament for South Manchester in 1885; in 1887, the year in which he retired from Owens College, he was president of the British Association. He was a member of various Royal commissions, and from 1896 until 1902 was Vice-Chancellor of the University of London. His eightieth birthday was marked by the presentation of his bust to the Chemical Society. He died on December 18, 1915, at Woodcote Lodge, West Horsley, Surrey, and was buried four days later in Brookwood Cemetery.

#### North Atlantic Gale

THE last day of the old year and the first few days of the new have proved remarkably tempestuous on the North Atlantic. During the near approach to Ireland on December 31 of an exceptionally intense



cyclonic depression, a destructive gale occurred in Ireland. At Valentia Observatory the pressure tube anemograph registered a gust of 96 miles an hour, which is the highest gust recorded there for at least sixteen years. Barometric readings in Iceland were unusually low during the three first days of 1933. On January 3, pressure at sea-level was less than 928 millibars (27.4 in.) near the centre of a depression lying off the south-west coast of Iceland, but it is not possible to say by how much it fell below that value. That depression was certainly among the deepest of which we have any record since daily synoptic weather charts of the North Atlantic were first begun. On those prepared and published by the Danish and German Admiralties, there is only one depression which looks to have had such a low reading, that of February 24, 1903, which had been preceded five days earlier by another only slightly less intense.

#### Earthquake in South-East Africa

THE strong earthquake that occurred shortly after 8.30 A.M. on December 31 in south-east Africa possesses some interest as it visited a region in which destructive shocks are almost or quite unknown. Its epicentre seems to have been in Zululand, for damage to buildings was caused at Eshowe and other places. The shock was felt all over Zululand and Natal, in various parts of the Transvaal and the Free State, and from Lorenzo Marquez on the north to the Transkei on the south. Its disturbed area must therefore have contained about a quarter of a million square miles, which is more than that shaken by the great Japanese earthquake of 1923.

#### Ancient Man in Palestine

It is reported that Miss Dorothy Garrod, director of the Joint Expedition of the School of Archaeology in Palestine and the American School of Prehistoric Research, has discovered further remains of Palestine man. A massive and powerful lower jaw has been found in the cave of the Oven at the foot of Mount Carmel. In an announcement of the discovery by Dr. Grant MacCurdy, of Yale University, director of the American School of Prehistoric Research, it is stated that the character of the newly discovered jaw fully conforms to the view, based upon the evidence previously discovered in the caves of Mount Carmel, that Palestine man, while presenting Neanderthaloid characters, is of a distinct type. It is also announced that a cap or veil made of dentalia shells has been discovered in an adjacent cave. It will be remembered that in the course of the excavations of 1931, Miss Garrod found a cap of dentalia shells still attached to a skull from a mesolithic series in one of the Mugharet el-Wad caves.

#### Cave Paintings in the Pyrenees

FURTHER details of an interesting discovery of the prehistoric painting of a horse in a cave in the Pyrenees, briefly announced some weeks ago, are now supplied by Science Service, Washington D.C. The cave, to be known as La Grotte de la Bastide, is situated near the village of La Bastide, Hautes

Pyrenées, and was discovered by M. Norbert Casterat, pupil of Count Bégouen. At the entrance of the cave were intact Magdalenian hearths, and on the walls were a number of engravings and polychrome paintings, including human figures, and as the central object, a polychrome painting of a horse. The horse is described as 'superb' and is an artistic production comparable with the famous horse of the Altamira cave at Santander. The figure is more than six feet long, and is executed in red with black muzzle. The mane is erect; the eye, ear and nostril being delicately engraved. High lights are indicated on shoulders, stomach and flanks. Judging from this description, the painting would appear in every way to be an exceptionally fine example of cave art.

#### Lightning Investigation

MR. W. H. F. TREDRE, honorary technical secretary of the Educational Section of the South African Institute of Electrical Engineers, Kelvin House, 100 Fox Street, Johannesburg, has favoured us with some interesting particulars relating to the organisation which has been established for the study of lightning in South Africa. The movement was initiated by Mr. T. P. Pask in a paper read before the South African Institute of Electrical Engineers in April 1930; as a result a committee was formed under the chairmanship of Mr. Pask. The present organisation consists of a main committee and three subsidiary committees dealing with each of the subjects research, statistics and education. With regard to the research, the chairman is Dr. B. F. J. Schonland, of Capetown—the scope of the work it is proposed to undertake includes the collection of photographs of lightning strokes and their effects taken by means of revolving lenses of the type suggested by Prof. Boys, of klydonograms and cathode ray oscillograms of lightning waves, point discharge work, etc. The activities of the statistical section may be illustrated by the fact that there are 3,500 observers throughout the Union who are collaborating by making notes on the history of storms. These observers are working under the supervision of Mr. G. W. Cox, acting chief meteorologist of the Union. The educational section will disseminate information on protective measures through the medium of the Press, schools, pamphlets, etc. During the 1933 session it has been arranged for certain of the investigators to read papers on the subjects of their work before the South African Institute of Electrical Engineers. It is anticipated that interesting results will be obtained at the end of the present lightning season.

#### Electrification of Railways in Britain

IN a paper by F. Lydall to the Institute of Transport read on December 12, the electrification of railways is considered under two headings, 'suburban passenger' and the 'general' electrification usually referred to as main line electrification. The main characteristics of the former type of traction are rapid acceleration and increased terminal capacity due to the elimination of locomotives and the ability



of the trains to run equally well in either direction. The practically universal adoption of the multiple unit system for suburban traffic, where several coaches throughout the train are provided with motors, proves that the flexibility this gives to the make-up of the train is of great value in practice. It is usual to divide the trains into units, each unit consisting of one motor coach and several trailer coaches. In the new express service from London to Brighton, the trains are made up of six or twelve coaches, two or four of which are motor coaches, each being equipped with four 225 horse power motors. Over a new portion of an American railway where the stops are 1.55 miles apart, the average speed including stops is 31 miles per hour; on another portion of the line where the stops are 2.9 miles apart the average speed is 40 miles per hour. The increase over the speed of steam trains in Great Britain is about 50 per cent. This speed could be easily increased; it is merely a question of cost. Mr. Lydall considers that on main lines it would be found advisable to work not less than one third of the passenger train mileage by multiple unit stock. By electrification the average speed of passenger trains in Britain could be raised by 25 per cent. The combination of greater comfort, higher speed, and more frequent service would attract many more passengers, and the latter two would also enable the railways to recover much of their goods traffic which at present goes by road transport.

#### Motor Car Lights on the Road

WHEN motor cars pass each other at night time, there is often a blinding glare in the drivers' eyes. We learn from *Science Service* that, in the United States, the Bureau of Standards has been conducting an extended research on head-lights to discover how glare can be avoided. Dr. Dickinson of the Bureau of Standards concludes that the most important difficulty in obtaining safe head-lighting is the great disparity in brightness between beams from different lamps. One head-light beam is frequently ten times as intense as another. The driver with the dim lights experiences an almost complete lack of visibility when his car plunges into the bright light of the approaching car. Dr. Dickinson suggests that if the lights were kept so that no head-lamp was more than two or three times brighter than another, most of the glare problem would be solved. Most drivers rely on what they can see of the curb rather than what they see of the oncoming car. Hence the light is increased for a hundred feet in front of the car and the beam is widespread horizontally and slightly depressed. Few motorists realise that it is more dangerous to pass a car that is standing still than one that is running fairly fast. A driver in judging whether the road is clear relies on what he has seen during the past few seconds by the light of the oncoming car. But the road immediately at the back of a car at rest is not illuminated in this way and so danger may lurk there unseen. Exposed lights along the roads sometimes increase the risks of night driving. They often make objects almost invisible which could easily be seen by the head-lights alone.

#### Early Days of the Turbine

In his inaugural address as chairman of the North-Eastern Centre of the Institution of Electrical Engineers, Mr. C. Turnbull gave interesting reminiscences of some of the initial difficulties Sir Charles Parsons met in perfecting the steam turbine. His experiments with early forms of the turbine were in entirely new and unexplored regions of engineering. Everything had to be found out. Steel discs were run under stresses that no one could calculate and no one knew whether they were safe or not. The early high-speed turbines ran at 4,800 revolutions a minute. But thanks to the wonderful care always taken at Parsons's works, accidents were very rare. When driving dynamos at high speeds, the armature reaction caused great difficulty. Several solutions were adopted for turbo-alternators. In one way the brushes were moved automatically with the load by steam pressure and the variation of the strength of the field was counteracted by special windings. A further difficulty was that owing to the springing of the shaft, the connexions between the armature and the commutator used to give trouble. This was overcome by the use of flexible connectors, a device first proposed by Parsons. It has proved of the greatest value. Details are given of the famous *Turbinia* and the heart-breaking experiences with the destroyers *Viper* and *Cobra*. Mr. Turnbull tells how Parsons refused to give up and how his perseverance ultimately led to success. Another great invention that came from Parsons's works was the invention of means for balancing high-speed machinery. The early days of the steam turbine were hard days and the labour expended seemed to lead to nothing. At one time it was doubtful if the steam turbine would ever become practical. The story of Parsons's life should prove very encouraging to young and old inventors.

#### The New Helm or Steering Orders

THROUGH the work of the International Safety at Sea and Load Line Convention, and the passing of the Merchant Shipping Act, 1932, and in accordance with the subsequent instructions of the Board of Trade, on January 1 the 'direct' system of helm orders came into use on all British vessels. For centuries the order to "Starboard the helm" or "Port the helm" has caused the ship's head to go in the opposite direction, the practice having come down through the centuries when tillers were in use. Under the new regulations the order "Starboard" will be given, when it is intended that the wheel, the rudder blade and the head of the ship should go to starboard, and the order "Port" will be given when it is intended that the wheel, the rudder blade and the ship's head should go to port. Though it is expected that little difficulty will be experienced in changing over from the 'indirect' system to the 'direct' system, for a time the orders will be given in the words "Wheel to Starboard" and "Wheel to Port", thus enabling the helmsman to adapt himself gradually to the new system. Like most innovations of the kind, the change in



established practice has not been introduced without considerable criticism and opposition, but it is probable that in a very short time it will be regarded as an eminently sensible and desirable alteration.

#### Research at the Port Erin Biological Station

A SEPARATE report on the work of the Port Erin Biological Station has been discontinued and a survey of the research done is now published in the "Report for 1931 (No. 40) on the Lancashire Sea-Fisheries Laboratory at the University of Liverpool and the Annual Report of the Marine Biological Station (No. 45) at Port Erin, Isle of Man", 1932, edited by the late Prof. James Johnstone and Dr. R. J. Daniel. In this report a large amount of original work is also published. This covers a wide field and deals with the abdominal musculature of Crustacea, herring investigations, hydrography and the fauna and flora of the Isle of Man. The Port Erin Station has recently (1931-32) had a new laboratory added, fully equipped for practical teaching and with about thirty work places. New engines and pumps have been installed. The plaice hatchery and lobster culture are still continued. Besides liberating lobsterlings hatched and reared in the laboratory, a number were placed singly in glass rearing jars and fed on crab, boiled and ground to a fine meal. Nearly half of the number survived and cast their shells four or five times, making eight or nine casts between the period of hatching and the end of the first year. The newly hatched young are fed on fresh plankton; after the fourth moult (lobsterling) they are fed on crushed crab, small pieces of fish being added after the fifth month. These interesting experiments are to be continued on a larger scale next year. Dr. R. J. Daniel has completed his comparative work on the abdominal muscles of the Malacostraca and has drawn up an elaborate phylogenetic table to express the relationships that exist between the main ventral system of musculature.

#### A New Source of Rubber

IN order to avoid the necessity of importing rubber from tropical countries, the Soviet Government has organised investigations of native plants likely to contain this valuable product in their latex. Amongst various plants studied, several species of *Chondrilla* (Compositæ) occurring mainly in the southern sandy regions, proved to be very promising and their cultivation is being carried out on an extensive scale. Green parts of the plant are cut and rubber prepared from the latex. The quantities obtained must be rather small, since only up to 2 per cent of the green mass represents rubber. Recently, however, it was found that certain insects feeding on roots of *Chondrilla* can be utilised for extracting rubber from the latex (Veltischev and Luppova, *Priroda*, No. 10, 1932). One of these is a caterpillar of a pyralid moth, *Bradyrhoa gilveolella* Tr., which feeds on the roots and constructs round its body a tube formed of condensed latex and sand grains. Up to thirty and more such tubes can be found on the roots of a single plant, and the tubes contain 9-17 per cent

of rubber. Another useful insect is the larva of a buprestid beetle, *Sphenoptera foveola* Gebl., which also feeds on roots of *Chondrilla* and causes a large outflow of latex solidifying round the root. These swellings contain up to 4 per cent of rubber. Neither insect produces any serious effect on the infested plant, and healthy plants can be infested artificially in order to increase their productivity. Experiments are being made to test the practical and economic side of this method of obtaining rubber.

#### Cultivation of Green Crops

BULLETIN No. 53 of the Ministry of Agriculture and Fisheries ("Cabbages and Related Green Crops". London: H.M. Stationery Office, Price 9d.) has recently been published. It traces the botanical origin of the various green crops, and deals in detail with the soils, rotation, manuring, harvesting and marketing most suitable for cabbages, savoys, Brussels sprouts, cauliflowers and several miscellaneous green crops. A very interesting section deals with the saving of seed in the counties the climate of which is most suitable for this purpose. Pests and diseases are not mentioned in the present pamphlet, since they have been described very fully in other publications of the Ministry.

#### Astrolabes and Their History

ASTROLABES are not as generally available for study in the museums of the world as their scientific importance and artistic qualities would merit, but all who may desire to become better acquainted with this instrument in its various forms are now given the opportunity. Subscribers are invited for a comprehensive work, entitled "The Astrolabes of the World", based upon the series of instruments in the Lewis Evans Collection in the Old Ashmolean Museum at Oxford, in the Science Museum at South Kensington, and in several other public and private collections in Europe and America. The early Greek treatise on the astrolabe, by Philopon, and the Syriac treatise by Sabokt—both dating from the seventh century—will appear in English for the first time. Illustrations are given of Chaucer's astrolabe, now clearly identified by the character of the rete as depicted in MSS. and many instruments contemporary with Columbus and Drake, are figured. The subject is of fundamental importance to all students of the history of astronomy, geography and surveying, and indeed to the history of science generally, for it may truly be said that the astrolabe kept alight the torch of the scientific method of observation and of computation of results, in many countries, and through many dark ages, when larger instruments and well equipped observatories did not exist. It is hoped that the principal reference libraries may obtain copies of this monumental work, which it is proposed to issue in two quarto volumes, containing more than 600 pages and 155 plates, of which 12 are in collotype, and 216 text figures. The price to subscribers is ten guineas. Subscription forms may be obtained from Dr. R. T. Gunther, Curator of the Lewis Evans Collection, in the Old Ashmolean, Broad Street, Oxford.



### World Power Conference

THE preparatory work of the organising committee at Stockholm of the next World Power Conference, which will take place in 1933 in Scandinavia, is proceeding steadily. The first plenary World Power Conference was held in London in 1924, the next in Berlin in 1930. There have also been sectional meetings with special programmes, for example, at Basel in 1926 and London in 1928. The Scandinavian Conference will be such a special meeting, dealing with the energy problems of large industry and transport. Participation and collaboration of fifteen countries outside Scandinavia is assured and more than 170 reports are announced. Some forty reports to be published at the meeting deal with problems of energy supply in large-scale industry, such as combined power and heat supply, the rôle of large-scale industry in national power schemes, etc. Many of the technical papers deal with the problems of long distance gas transmission, while other papers are devoted to more special power problems concerning the iron and steel industry, pulp and paper, and cement, sugar, textile and other steam heat consuming industries. Energy questions of transport provide the subjects for 62 reports; railway and marine transport, the peculiarities of city and suburban traffic are to be discussed with due emphasis on the new aspects which have been introduced by electric traction and Diesel engines.

### Medical Research in South Africa

THE annual report of the South African Institute for Medical Research, by the director, Sir Spencer Lister, summarises the work of the Institute during 1931. Methods of dust estimation and studies on underground humidity in the air of the Witwatersrand mines have been pursued. The pneumonia attacking the native labourers in the copper mines of Northern Rhodesia has been investigated, and has been found to be caused by the *Streptococcus pyogenes* and other organisms, but rarely by the pneumococcus. This change of type of the organisms causing pneumonia has also been found in the Kimberley diamond mines. Much experimental work has been done on cancer, and Dr. des Ligneris has found that a micro-organism, *Salmonella gallinarum* of fowl typhoid, if cultivated in the tumour filtrate of the Rous fowl sarcoma for several generations, appears to have the power on inoculation of prolonging the life of fowls with the Rous sarcoma by about fifteen per cent.

### The March of Influenza

ACCORDING to a report of Science Service, Washington, D.C., a considerable outbreak of influenza is in progress in several States of the Union, particularly in the south and west, the United States Public Health Service reporting 14,291 cases during the week ended December 3. In Great Britain outbreaks are reported in Southampton and Birmingham, and during the week ended December 17 in 117 great

towns, including London, of England and Wales, 85 deaths from influenza were certified. In the same week Glasgow reported 28 deaths from this disease.

### Announcements

THE following have been elected officers of the Royal Society of South Africa for 1933: *President*: Dr. W. A. Rogers; *Treasurer*: Dr. L. Crawford; *General Secretary*: Dr. B. F. J. Schonland.

THE Royal Society Mond Laboratory at Cambridge will be opened by the Chancellor of the University, the Right Hon. Stanley Baldwin, on February 3. It will be recalled that the hydrogen liquefaction plant of the Laboratory was described in NATURE for February 13, 1932, p. 224.

WE regret to learn of the death on December 25 of Prof. Paolo Enriques, professor of zoology in the University of Padua and president of the last International Congress of Zoology; he was just starting for Naples to pursue his researches in the Zoological Station. Also of Prof. James Johnstone, professor of oceanography in the University of Liverpool, formerly director of the Marine Biological Station, Port Erin, aged sixty-three years.

CATALOGUE No. 552 of Messrs. Francis Edwards Ltd., High Street, Marylebone, W.1, includes a miscellaneous collection of books, autographs and manuscripts, falling under such headings as Africa, America, Economics, Geography, History, First Editions, Scripture, Shakespeare and the like. There are also special series such as the publications of the Hakluyt Society and books from special presses such as the Kelmscott and Doves Presses. Among the books listed under Africa to be noted especially are Angas "The Kaffirs" with the coloured lithograph plates (£21) and a copy of the 1727 folio edition in Dutch of Peter Kolben's famous and invaluable account of the Cape of Good Hope (£15). The most notable item offered, however, is George Lily's map of Britain, 1546, of which the only other known, and slightly inferior, copy is in the British Museum, and was one of the six treasures selected from the British Museum for the International Geographical Congress in 1928. Apart from Ptolemy's atlas, this is the first printed map of Great Britain (£105).

APPLICATIONS are invited for the following appointments, on or before the dates mentioned:—A secretary of the Iron and Steel Institute and editor of the *Proceedings*—The Chairman, Appointments Committee, Iron and Steel Institute, 28, Victoria Street, S.W.1 (Jan. 21). A full-time tutor for the practical course in social science at the University of Cape Town—The Secretary, Office of the High Commissioner for the Union of South Africa, 73, Strand, W.C.2 (Jan. 31). A professor of textile industries at the University of Leeds—The Registrar (Feb. 28). A principal of the School of Metalliferous Mining (Cornwall)—The Secretary to the Governors, Camborne (March 31).



Letters to the Editor

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, nor to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

Disintegration of Light Elements by Fast Protons

SINCE the publication of our paper<sup>1</sup> on the disintegration of elements by fast protons, we have examined some of the light elements more carefully, using much thinner mica windows than we had previously employed on the high voltage tube. With the present arrangement, we can count particles which have passed through only 6 mm. air equivalent of absorber on their way from the target to the ionisation chamber.

In the case of lithium, we have found, in addition to the  $\alpha$ -particle group of 8.4 cm. range, another group of particles of much shorter range. The number of these is about equal to that of the long range particles and their maximum range is about 2 cm. The ionisation produced by them indicates that they are  $\alpha$ -particles. It will be of interest to examine whether any  $\gamma$ -rays are emitted corresponding to the difference of the energies of the  $\alpha$ -particles in the two groups, but on account of the smallness of the effect to be expected, a sensitive method will be necessary.

In the case of boron, the number of particles observed increases rapidly as the total absorption between the target and the ionisation chamber is reduced. The maximum range of these particles is about 3 cm. and in our earlier experiments we determined the number of particles only after passing through the equivalent of 2.9 cm. of air, so that we were very nearly at the end of the range. Decreasing the absorber to 6 mm. of air gives an enormous increase in the number of particles. In this way about twenty-five times as many particles have been obtained from boron as from lithium under the same conditions. We estimate that there is roughly one particle emitted per two million incident protons at 500 kilovolts. The ionisation produced by the particles suggests that they are  $\alpha$ -particles, and the energy of the main group would support the assumption that a proton enters the B<sup>11</sup> nucleus and the resulting nucleus breaks up into three  $\alpha$ -particles. There also seem to be present a small number of particles with ranges up to about 5 cm.

J. D. COCKROFT.  
E. T. S. WALTON.

Cavendish Laboratory,  
Cambridge.  
Dec. 22.

<sup>1</sup> *Proc. Roy. Soc., A*, 137, 229; 1932.

The Neutron and Neuton, the New Element of Atomic Number Zero

SINCE neutrons were first recognised by Chadwick in the rays from the beryllium nucleus, it may be of interest to note that in 1915 the hydrogen-helium theory<sup>1</sup> considered this nucleus to consist of two doubly charged helium nuclei and a condensed or nuclear hydrogen atom, now called a neutron. In a paper written early in 1919, the formula of the beryllium nucleus was given as  $\alpha_2(\eta\beta)$  which in more

recent symbols is  $\alpha_2(pe)$ , where the parentheses were used to emphasise the idea that the proton  $p$  and the electron  $e$  are united to form a neutral group or neutron.

The suggestion that neutrons exist as separate atoms was made independently at practically the same time by Lord Rutherford (June 3, 1920) and myself (April 12, 1920).

The basis for my assumption of the existence of neutrons, was that it would be difficult for  $\alpha$ -particles, on account of their double positive charge, to pass through the region of repulsion (now called the potential barrier) around nuclei of high positive charge in order to unite with the nucleus, but that electrically neutral particles "could easily pass into and through this region". "Such atoms might have masses 1, 2, 3 and 4, and possibly other values, and they would contain no non-nuclear electrons, so they would have no chemical, and almost none of the ordinary physical properties, aside from mass."<sup>2</sup>

While the question of stability is not discussed in this paper, it may be stated that at that time I did not consider any neutron of higher mass than 2 to exist more than momentarily except in a moderately heavy nucleus, but that the first quadruple neutron present in other nuclei is that in argon 40, the nuclear formula of which may be written  $\alpha_9^{++}(pe)_4^0$  or  $\alpha_9^{++}(\alpha e)_2^0$ .

Since neutrons of unit mass (according to Chadwick about 1.006), and possibly those of mass two also, probably exist throughout space, and are concentrated by gravitation in the planets, and still more in the stars, they may be considered to constitute collectively an element. Since the atomic number of an element is determined by the magnitude of the charge on the nucleus of an atom of the element, the atomic number which corresponds to a neutron is zero; that is, the neutron is a nucleus with a zero charge. As a name for this new element, neutronium, neutronon, or neutron have been suggested to me, but the name 'neuton' is more simple and preserves in it the suggestion of neutrality and also the final 'on' of the chemically indifferent elements.

To what extent the atoms of neutron partake in the partition of heat energy between molecules in general, is an interesting problem, since the collisions of the neutrons would be with nuclei and with electrons, rather than with atoms and molecules.

It is not improbable that the general formula for any nucleus,  $(p_2e)_z(pe)_i$ , proposed independently in 1921 by Masson and by me, may be shown to have a theoretical significance. If  $n$  represents a neutron, then this formula may be written  $(pn)_zn_i$  in which  $z$  is the atomic, and  $i$  the isotopic number. For the neutron  $z$  is 0 and  $i$  is 1, for the proton  $z$  is 1, and  $i$  is -1, for oxygen 16,  $z$  is 8 and  $i$  is 0, and for the principal isotope of argon  $z$  is 18 and  $i$  is 4. It is evident that if all of the electrons are present as neutrons, then  $z+i$  gives the number of neutrons,  $z$  the number of extra protons, and  $2z+i$  the total number of protons. The numbers  $z$  and  $i$  are the most important in the classification of atomic species, and the value of  $i$  defines specifically the particular isotope, either known or unknown, of any element, either radioactive or non-radioactive.

WILLIAM D. HARKINS.

University of Chicago.  
Nov. 8.

<sup>1</sup> Harkins and Wilson, *J. Amer. Chem. Soc.*, 37, 1396; 1915.  
<sup>2</sup> Harkins, *J. Amer. Chem. Soc.*, 42, 1996 and 1964; 1920.



### Kinetics of the Decomposition of Molecules of Intermediate Complexity

In a large class of gaseous chemical reactions, the mechanism is generally supposed to be the following. Molecules are brought into an activated state by collision. Most of the activated molecules are deactivated again, but during their existence there is a definite probability of their chemical transformation. As is well known, the relation between reaction rate and pressure under these conditions is such that the reciprocal of  $\tau$ , the half life of the reacting substance, gives a curve of type 1 or 2 (see Fig. 1) when plotted against the initial pressure<sup>1</sup>. (The precise shape of the curve before it has become horizontal depends upon how the above mentioned probability varies with the total energy of the molecule<sup>2</sup>.)

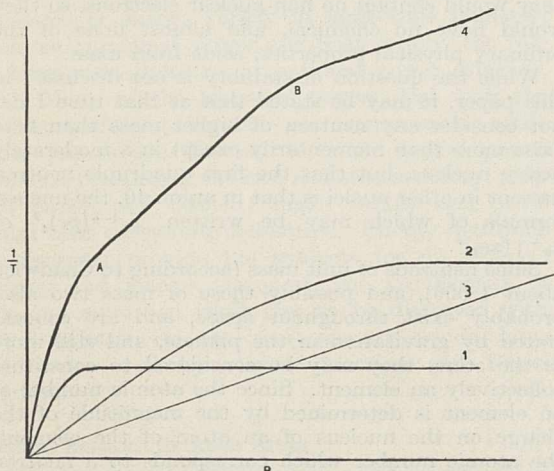


FIG. 1

In a molecule of moderate, but not too great, complexity, it seems possible that there may be several different modes of activation, corresponding to particular divisions of part of the energy among a limited number of vibrational (or rotational) states. To a first approximation, each of these modes may be associated with a separate probability of transformation, because, in the absence of collisions, internal redistribution may be difficult. Thus the total rate of reaction will be roughly the sum of several virtually independent reactions, each rate varying according to a curve of the type 1, 2, or 3. Since each of these reaches its limiting rate at a different pressure, the total rate may vary with pressure according to a segmented curve of type 4, with fairly pronounced changes of direction at A, B, and so on.

The simplest types of molecule may give curves which do not bend, at least up to high pressures, moderately simple molecules may give curves with a limited number of segments of decreasing slope, while complex molecules with many degrees of freedom give curves in which the segments merge into a single line without any noticeable changes of direction at particular stages.

The equation of the segmented curve in real examples will be very complicated, since the assumption of virtually independent reactions is to some extent an idealisation. Further, the variation of all the transformation probabilities with total energy may also complicate matters.

The object of this note, however, is simply (1) to

suggest the desirability of exploring the hypothesis that the most general form of curve for molecules of 'intermediate complexity' is of the segmented type, and (2) to state that experiments on the decomposition of nitrous oxide at fairly low pressures (already published<sup>3</sup>) and further experiments on the decomposition of acetaldehyde (in progress) yield indications of the real existence of these different types of activated state.

C. N. HINSHELWOOD.

C. J. M. FLETCHER.

Balliol and Trinity College

Laboratory, Oxford.

Dec. 8.

<sup>1</sup> Hinshelwood, "Kinetics".

<sup>2</sup> Rice and Ramsperger, Kassel.

<sup>3</sup> Musgrave and Hinshelwood, *Proc. Roy. Soc., A*, 135, 23; 1932.

### 'Hexuronic Acid' (Ascorbic Acid) as the Antiscorbutic Factor

IN view of the facts that (1) hexuronic acid is the name of a class of substances rather than that of one individual compound, and that (2) the material described as hexuronic acid isolated from adrenal cortex and now from Paprika contains a molecule of water less than is required for a hexuronic acid, we wish to ascribe the name ascorbic acid to the crystalline substance  $C_6H_8O_6$ , which has been the subject of earlier communications from our laboratories.

A. SZENT-GYÖRGYI.

W. N. HAWORTH.

Universities of Szeged and Birmingham.

Dec. 19.

### Methylnornarcotine, Glycuronic Acid, and Vitamin C

THE view that vitamin C is identical with methylnornarcotine has been advanced by Rygh<sup>1,2</sup>, who claims that narcotine occurs in unripe fruit and disappears with corresponding formation of vitamin C during ripening. According to Rygh, guinea-pigs receiving a scurvy-producing basal diet together with a suitable daily supplement of synthetic methylnornarcotine lose weight and die but without any of the typical symptoms of scurvy. Other workers<sup>3,4,5,6</sup> have been unable to confirm this observation or to find narcotine in unripe fruit, and Dalmer and Moll<sup>5</sup> have shown that methylnornarcotine as prepared by Rygh is not a single chemical substance.

In a later communication Rygh<sup>7</sup> has changed his ground and taken up the position that vitamin C is a complex, of which one component must be methylnornarcotine while the other may be any uronic acid. Thus according to Rygh, the recently demonstrated anti-scorbutic activity of hexuronic acid is due to the contamination of the hexuronic acid by methylnornarcotine, giving a mixture of the two components necessary for the make-up of vitamin C. This hypothesis was drawn from the observation that guinea-pigs were not only protected from scurvy but also grew normally if in addition to the basal diet they received daily 10  $\gamma$  of "30 per cent methylnornarcotine" and  $\frac{1}{2}$  mgm. of glycuronic acid, although the glycuronic acid alone neither prevented scurvy nor supported growth.

I have attempted without success to confirm these



observations, using a specimen of glycuronolactone kindly given by Dr. E. L. Hirst, and two specimens of "30 per cent methylornarcotine", one prepared by Rygh and the other prepared in this laboratory. Young guinea-pigs were fed upon a scurvy-producing basal diet, and given a daily supplement of methylornarcotine, or of glycuronolactone, or of both together, in the amounts specified by Rygh.<sup>7</sup> On the sixteenth day the animals were losing weight rapidly, so they were killed and examined for (a) hæmorrhage at the knee-joint, (b) rib-beading, and (c) suprarenal staining with dilute silver nitrate solution after Moore and Ray.<sup>8</sup> All those animals which had been receiving any of the supplements showed signs of marked or severe scurvy indistinguishable from the condition of the negative controls, while the positive control animals (which had received 10 gm. of cabbage daily) were free from scurvy. The lower jaws of all the guinea-pigs were removed for histological examination of the teeth, and full details of the experimental observations will be published elsewhere when this examination has been completed.

W. J. DANN.

The Dunn Nutritional Laboratory,  
University of Cambridge and  
Medical Research Council,  
Milton Road, Cambridge.  
Dec. 7.

- <sup>1</sup> Rygh and Rygh, *Z. physiol. Chem.*, **204**, 114.
- <sup>2</sup> Rygh, Rygh and Laland, *Z. physiol. Chem.*, **204**, 105.
- <sup>3</sup> Smith and Zilva, *Chem. Ind.*, **51**, 166.
- <sup>4</sup> Grant, Smith and Zilva, *Biochem. J.*, **26**, 1628.
- <sup>5</sup> Dalmer and Moll, *Z. physiol. Chem.*, **209**, 211.
- <sup>6</sup> Dann, Forsyth, Harris, Mills and Innes, *Lancet*, **2**, 237; 1932.
- <sup>7</sup> Rygh and Rygh, *Z. physiol. Chem.*, **211**, 275.
- <sup>8</sup> Moore and Ray, *NATURE*, **130**, 997, Dec. 31, 1932.

### Union of Pycniospores and Haploid Hyphæ in *Puccinia Helianthi* Schw.

THE discovery<sup>1</sup> that, in a heterothallic rust like *Puccinia graminis* Pers., or *P. helianthi* Schw., the transfer of pycniospore-containing nectar from a monosporidial (haploid) pustule of one sex to a similar pustule of the opposite sex induces the development of æcia in the pustule receiving the nectar has stimulated interest in the process by which the diploidisation is effected.

In the examination of free-hand sections of monosporidial pustules of *P. graminis* and *P. helianthi*, I have observed that usually two types of hyphæ protrude through the ostiole of a pycnium: (1) the stiff tapering slightly-curved paraphyses, which have been frequently figured; and (2) flexuous hyphæ which show considerable variation in length, diameter, regularity of outline, and a few other features. In some of the pycnia—probably the older ones—of a pustule, these flexuous hyphæ may show rather profuse development; in others, only a few of them, sometimes none, are discernible. They may be shorter, but usually they are as long or longer than the paraphyses, not infrequently two or three times as long. They may branch, but they rarely show septations. Some may be swollen at the tip. Occasionally a short spur or peg, of less diameter than a branch, juts out at a side or tip.

Several pycniospores in union with such hyphæ have been observed in sections of haploid pustules of *P. helianthi* in which the nectar had been previously intermixed, so that presumably both (+) and (-) pycniospores were present on the surface of each

pustule and in close proximity to the protruding hyphæ.

Fig. 1 shows such a union. The pycniospore is empty; and the hypha has lost most of its cytoplasm. Presumably the nucleus of the pycniospore has passed through the connecting tube into the hypha and proceeded down it, to associate itself in conjugate relationship with some nucleus or the mycelium.

With regard to the short spurs or pegs on these hyphæ, it is assumed that a hypha of one sex, in response to the presence in its immediate vicinity of a pycniospore of the opposite sex, sends out a short tube to establish contact with that pycniospore.

A nucleus in the act of passing from a pycniospore into a hypha has not been seen, but empty pycniospores found connected by short tubes to these hyphæ furnish strong circumstantial evidence that nuclei migrate from pycniospores to these hyphæ by way of fusion tubes.

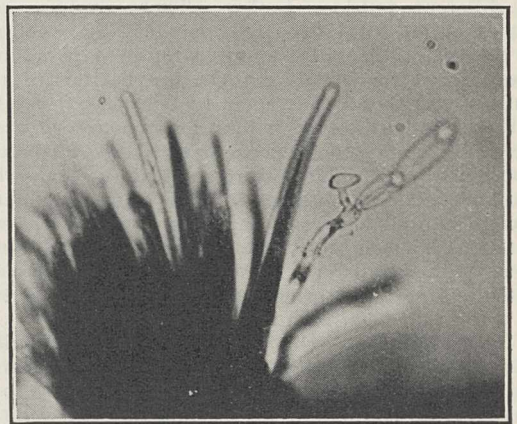


FIG. 1.—The union of a pycniospore and a flexuous hypha in a haploid pustule of *P. helianthi*. The pustule was fixed in formalin acetic alcohol 13½ hours after the intermixing of nectar was done.  $\times$  approx. 1,500. Photograph by A. M. Brown.

Hyphæ which emerge through stomata and between epidermal cells were observed by Andrus<sup>2</sup> in haploid pustules of *Uromyces appendiculatus* and *U. vignæ*, and by Allen,<sup>3</sup> in haploid pustules of *Puccinia triticina*. Andrus regards these hyphæ as the tips of functioning trichogynes. Allen designates them "receptive hyphæ". However, neither of these investigators found direct evidence of fusions between 'spermatia' (pycniospores) and trichogynes or receptive hyphæ, although both assume from their studies that direct fusions do occur.

There is little doubt that, in haploid pustules of *P. helianthi* (or of *P. graminis*), the function of the protruding hyphæ is to establish contact between mycelia of one sex and pycniospores of the opposite sex and thus to serve as an avenue by which the nuclei of the pycniospores reach the internal mycelia of the pustules. The type of union so far observed simulates that of oidium and hypha in the Hymenomyces.

J. H. CRAIGIE.

Dominion Rust Research Laboratory,  
Winnipeg, Manitoba.  
Nov. 17.

- <sup>1</sup> Craigie, J. H., *NATURE*, **120**, 765, Nov. 26, 1927.
- <sup>2</sup> Andrus, C. Frederic, *J. Agr. Res.*, **42**, 559-587; 1931.
- <sup>3</sup> Allen, Ruth F., *J. Agr. Res.*, **44**, 733-754; 1932.



Breeding of Oysters (*O. edulis*) at Port Erin

THE success obtained by the Department of the Ministry of Agriculture and Fisheries in breeding oysters (*O. edulis*) in the experimental tanks at Conway and Lympe<sup>1</sup> suggested that a similar use might be made of the large outdoor tanks or ponds at the Port Erin Marine Biological Station. In normal summers the sea temperature in Port Erin Bay rarely rises above 59° F. seawards of the beaches, owing to the steepness of the beaches and the mid-sea position of the Isle of Man; the maximum is reached at about the end of August<sup>2</sup>. The stagnant water in the ponds, however, follows air temperature much more closely than the sea, and this year gave surface readings during July and the first three weeks of August ranging mostly between 62° and 65° F.; a range favourable for oyster breeding.

In February, a hundred Whitstable oysters were imported into the Port Erin tank system and distributed on April 14 experimentally on the bottom in different outdoor tanks. These oysters were examined on July 20. High mortality had occurred in the east tank where about a hundred plaice had been stored for breeding. On the bottom of this tank it was found that there had become deposited a black sludge bearing a luxuriant growth of green weed. Oysters which occurred in places where this sludge had accumulated were suffocated. Somewhat similar conditions obtained in parts of the west tank, though the sludge was less dense and the loss was not so heavy as in the east tank. Only one individual, however, among twenty-five had died in a small clean outside store tank through which a small circulation of water had been maintained.

The oysters from this latter tank (24 in number) were opened on July 20, when two individuals were found black sick, that is, carrying larvæ ready to be voided from the parent into the water. On July 13 the east tank had been refilled with water direct from the sea after the pond had been scrubbed out. In this pond most of the larvæ taken from the two black sick oysters were distributed on July 20. To this tank had also been added about a hundred plaice stored for breeding experiments in the following year.

On November 24 the tank was emptied and examined for oyster spat. A sprinkling only was found. Sixteen were found attached to the north wall of the tank in underhung places along with balanids, mostly remote from direct sunlight. Three occurred in the full glare of daylight on the bottom and near the middle of the tank; one settled on a varnished board and one on a stone, both in deep water near the outlet pipe; two occurred on mussel valves also on the bottom of the tank. The bottom and lower parts of the walls of the tank were covered with a growth of long delicate green weeds, 98 per cent of which were *Cladophora fracta*, Kütz., var. *flavescens* Batt. (*C. flavescens* Harv.), along with a little *Urospora isogona* Batt. and *Percursaria percurva* Rosenv.; there was very little accumulation of black mud. It is probable that a good fall of spat might have been obtained had settlers or a supply of culch been placed in the pond. The spat varied in size from 6 mm. long by 6 mm. deep to 20 mm. long by 18 mm. deep, and fell into two size groups, suggesting that two periods of settling occurred, possibly a settlement from each brood of larvæ.

Ordinary sea-water of a salinity about 33.5 per thousand<sup>2</sup> pumped into the tank direct from the sea

was used in this experiment; the salinity probably varied little during the first month of the experiment, as this was a period of drought and a little fresh sea-water was pumped into the tank from the sea daily. The plaice in the tank were fed on boiled mussels, the remains of which would contribute with the waste products from the plaice themselves towards manuring the water for the growth of those micro-organisms on which the oyster larvæ and spat thrived. A heavy growth of green weed is evidence of considerable production of motile reproductive bodies from these plants. These reproductive bodies may very well have formed a portion of the food of the larvæ and/or spat at some period. Scott's investigations<sup>3</sup> on the plankton of these ponds in 1924-26 indicate that in July and August the phytoplankton (diatoms and dinoflagellates only) may normally be relatively scarce, or even absent: no plankton observations were made in 1932. A few *Gobius ruthensparri* and about four specimens of various species of small flatfish in the pond may have been inimical to a larger spatfall by feeding on the larvæ, as Dodgson and Sherwood<sup>1</sup> have found. 106 living plaice were recovered from the experimental tank in good condition on November 25.

The experiment is interesting in proving that under such meteorological and other conditions as prevailed in the summer of 1932, (a) oysters will spawn in the tanks at Port Erin; (b) the tanks are suitable for the production of young oysters; and (c) when the method of cultivating oysters in tanks has been improved so as to become a sound economic proposition, it may be possible in favourable summers to produce oyster spat in great numbers at Port Erin. The experiment also encourages the reasonable hope that such tanks as may be built in the future for mussel purification in the north of England may become as useful as those at Conway for oyster breeding.

We are indebted to members of the staff for taking valuable routine temperature records.

J. H. ORTON.  
M. W. PARKE.  
W. C. SMITH.

Zoology Department,  
University, Liverpool.  
Dec. 8.

<sup>1</sup> R. Dodgson and H. P. Sherwood, Oyster Breeding Experiments; in Reports on Sea Fisheries, Ministry Agric. and Fish., England and Wales, 1919 *et seq.*

<sup>2</sup> J. R. Bruce, *J. Mar. Biol. Assoc.*, Plymouth, 15, 542; 1928.

<sup>3</sup> A. Scott, *Proc. and Trans. Biol. Soc. Liverpool*, 39 and 41, 1925-27.

## Reversible Stoppage of the Blood Circulation in Sabellids

SABELLIDS are marine polychæte worms, the blood system of which is peculiar, both anatomically and physiologically. Numerous capillaries are present, in the body wall, in the branchial crown, and projecting freely into the body cavity, all of them ending blindly. Most of the blood vessels in the body contract rhythmically. By peristalsis blood is forced along the continuous vessels, and at intervals of 10-20 seconds blood is expelled from the blind capillaries by regularly rhythmic centripetal contractions of their walls, to flow back again into these capillaries almost immediately. There may thus be said to be a true Galenic circulation in the capillaries. The blood contains the respiratory pigment chlorocruorin.



If a sabellid worm is put, under water, into a narrow glass tube, the rhythmic contractions of the blood vessels in its crown can be seen through the glass. Under these conditions the contractions continue for half an hour and then cease. But as soon as even the tip of the crown projects again beyond the end of the tube, the contractions recommence. Thus when worms in Nature have retired into their tubes for over half an hour their blood no longer circulates. Yet *Spirographis* can remain uninjured for eight hours inside its tube when the front end of the latter is artificially closed. After about eight hours the animal re-expands its crown through a new anterior lateral aperture which it forms by local digestion of the mucoid tube.

When a sabellid is put into sea water saturated with carbon dioxide, the pulsations of its blood vessels cease almost immediately. After the animal has been put back into pure sea water the pulsations recommence. Neither water lacking dissolved oxygen, nor water acidified with hydrochloric acid to the same pH as water saturated with carbon dioxide, stops the pulsations. The threshold pH for stoppage in water containing carbon dioxide is in the region of 6.0, varying slightly with species.

It has been concluded from a variety of experimental evidence that the natural inhibition of blood circulation when worms are in their tubes is due to an accumulation of excreted carbonic acid between the filaments of the closed crown, and that this carbonic acid does not act on the blood vessels through a nervous reflex, but it prevents the normal exit of carbonic acid produced in metabolism, which accumulates in the body and has a direct inhibitory action on the blood vessel walls.

A full account of this work will be published shortly.

H. MUNRO FOX.

Zoology Department,  
University of Birmingham.  
Dec. 6.

#### Photochemical Reaction of Hydrogen and Chlorine

I AM much surprised to read, in NATURE of December 17, that so fine an experimenter as Prof. A. J. Allmand has failed to inhibit the action of light on a mixture of hydrogen and chlorine, by drying. It is, with one exception, the easiest reaction with which to demonstrate the influence of traces of water on chemical action. So much so, that for many years it was one of my stock experiments in courses of elementary lectures.

Hydrogen and chlorine were generated by the electrolysis of hydrochloric acid, washed with water and conducted through a tube of phosphorus pentoxide for rough drying. The mixture then passed through a dozen thin bulbs blown in series on a tube of soft glass, in some of which had been placed phosphorus pentoxide. After about six hours, the wash water was saturated with chlorine, and half an hour later the bulbs were sealed off at their capillary joinings. The last bulb was exposed to the light of burning magnesium, and if it exploded after five seconds, the batch was assumed to be perfect. In lecture a pair of bulbs, one containing phosphorus pentoxide and the other not, were exposed to the same intensity of light and in no case did the dry gas ever explode, while the moist ones did so without exception. One of the dried

bulbs was exposed to bright sunlight for three days, and analysis of the gas afterwards showed that one third of the mixture was still in the uncombined state. Mellor and Russell<sup>1</sup>, in repeating this experiment, found that two thirds of the gas had resisted the action of light.

In describing these experiments to the Chemical Society, I did the experiment successfully; in fact, on the principle that 'seeing is believing' I have, almost without exception, demonstrated my results experimentally at the meetings at which the papers were read. Prof. Bodenstein and Prof. Allmand owe, I think, the failure of their experiments to the complexity of their apparatus. It is almost impossible, on account of the slowness of diffusion, to dry an apparatus which has any dead ends. Mere 'baking out' at 200° is insufficient, as I have shown over and over again, to get rid of deep-seated moisture in glass. Long continued contact of a gas with pure phosphorus pentoxide is the only way in which success can be attained.

At the risk of seeming egotistical, I would ask all who contemplate working in this field to read my paper<sup>2</sup> on "Manipulation in Intensive Drying". If they do so, they would, I feel sure, save themselves much fruitless effort.

H. B. BAKER.

Imperial College of Science,  
London, S.W.7.  
Dec. 22.

<sup>1</sup> *J. Chem. Soc.*; 1902.

<sup>2</sup> *J. Chem. Soc.*; 1929.

#### Limiting Mobilities of some Monovalent Ions and the Dissociation Constant of Acetic Acid at 25°

MACINNES, Shedlovsky, and Longworth in reply<sup>1</sup> to our recent letter with the above heading<sup>2</sup> have asserted, without experimental evidence, that our conductivity technique was subject to errors and that the discrepancies between the results are to be attributed to this cause. We would, however, point out that by using the cell constant determined with 0.01 *N* potassium chloride by Parker and Parker's method<sup>3</sup> we have been able to reproduce Kohlrausch and Maltby's results<sup>4</sup> for KCl, NaCl, and KIO<sub>3</sub> at 18° over the range 0.0001–0.01 *N* to within 0.1 per cent,<sup>5</sup> and this, it appears to us, gives definite support to the view that our experimental results are trustworthy to at least 0.1 per cent.

Two limiting cation transport numbers for KCl are given in our paper<sup>5</sup>, namely, 0.497 the old classical figure of Kohlrausch and Maltby<sup>4</sup>, on which basis all limiting mobilities have hitherto been calculated, and 0.490 the most probable figure deduced from the results of MacInnes and Dole<sup>6</sup>. It was our original intention to redetermine this constant but owing to the transfer of the senior author to Woolwich, this project was abandoned. We now employ the figure 0.490, which appears to be the most probable value deduced from the determinations of MacInnes and Dole and of Longworth<sup>7</sup>. The American authors state in their letter that their value for the limiting conductivity of the chloride ion, based on conductivity and also transport number measurements of KCl, NaCl, LiCl, and HCl at 25°, is 76.32 "within a few hundredths of a per cent"; the value deduced previously by us was 76.45 ( $n_k$  for KCl = 0.490).

The use of the empirical formula of Shedlovsky<sup>8</sup>



for extrapolation to infinite dilution seems unnecessary: the ordinary square root formula holds over a considerable concentration range when applied to Shedlovsky's results<sup>9</sup> for KCl, NaCl, and HCl at 25°. Further, the Shedlovsky equation is of limited applicability (it breaks down for KNO<sub>3</sub>, chlorates and iodates) and the values for  $\Lambda_0$  deduced from it for NaCl and KCl at 18° have actually been exceeded at experimental concentrations by Kohlrausch and Maltby<sup>10</sup> and by Wieland<sup>11</sup> respectively.

A. I. VOGEL.

The Woolwich Polytechnic,  
London, S.E.18.

G. H. JEFFERY.

University College,  
Southampton.  
Nov. 30.

<sup>1</sup> NATURE, 130, 774, Nov. 19, 1932.

<sup>2</sup> NATURE, 130, 435, Sept. 17, 1932.

<sup>3</sup> J. Amer. Chem. Soc., 46, 312; 1923.

<sup>4</sup> Wiss. Abh. Techn. Reichsanst., 3, 156; 1900. Ges. Abh., 2, 826; 1911.

<sup>5</sup> J. Chem. Soc., 1715; 1931.

<sup>6</sup> J. Amer. Chem. Soc., 53, 1357; 1931.

<sup>7</sup> Ibid., 54, 2741; 1932.

<sup>8</sup> Ibid., 54, 1405; 1932.

<sup>9</sup> Ibid., 54, 1429; 1932.

<sup>10</sup> Ges. Abh., 2, 886; 1911.

<sup>11</sup> J. Amer. Chem. Soc., 40, 146; 1918.

### 'Raw' Weather

WITH the return of winter the following psychophysiological question once more calls for solution:—Very hot but dry weather may be tolerable, while moderately hot but very damp weather may be almost unbearable. The explanation of this in terms of cooling by evaporation is known to everyone. Again, while very cold dry conditions may be pleasant and invigorating, damp and rather cold weather—what is generally described as raw weather—is very unpleasant even to normal people, while it is peculiarly bad for those suffering from rheumatism and the like. So far as I know no explanation of this last effect has been generally accepted; indeed, inquiries of many physicists and not a few physiologists have failed to produce any suggestions regarding even the general lines along which a solution might be found. Any complete explanation must also account for the fact that damp air with a moderate temperature is far from unpleasant, as exemplified by the mild south-westerly conditions often occurring in the British Isles.

G. M. B. DOBSON.

Robinwood, Boar's Hill,  
Oxford.

HEAT expands and softens the tissues, bringing more blood and lymph into the parts: cold tightens them up. It is, I suggest, this change which leads to pain in rheumatic people. A sudden thaw is most trying.

Cold moist air has a much higher conductivity than cold dry air, and acting on the skin produces the raw feeling and excites the nerve endings which reflexly cause the tightening-up effect.

The action of certain infra-red rays in producing reflexly congestion of the nasal air way or the opposite affords a striking example of how skin stimulation produces reflex effects on deeper organs.

LEONARD HILL.

### Isotope Effect in the Spectrum of Cadmium Hydride

IN an earlier paper<sup>1</sup>, I dealt with the structure of different band systems in the spectrum of cadmium hydride. In several respects, however, my analysis suffered from incomplete resolution of the spectrum, especially regarding the isotope splitting of the band lines. Recently I repeated the investigation, using a large concave grating in the third order (0.6 A./mm.). Much work was devoted to the analysis of an extensive system  ${}^2\Sigma^* \rightarrow {}^2\Sigma$ , covering a wide range of vibrational levels ( $v' = 0$  to 13,  $v'' = 0$  to 6) and thus forming a favourable case for an examination of the isotope effect. The band lines are here split into components belonging to Cd (114, 112, 110, 116), already known from the work of Aston.<sup>2</sup> Besides this, faint components appear belonging to isotopes Cd (118, 108), which have not been reported before. These components were found in every rotational line-group of a great number of bands, falling exactly in the position calculated ( $\pm 0.02$  cm.<sup>-1</sup>). I was not able to detect the components of the odd isotopes Cd (111, 113), due to their positions between the intense lines of Cd (110, 112, 114). Only in favourable cases could a diffuse blackening be distinguished between the components of Cd (110, 112), which may be related to Cd (111).

There are some peculiarities regarding the intensity distribution among the isotope components which may be of interest to mention. In bands belonging to the transitions  $v' \rightarrow 0$ , the lines of Cd (114) are somewhat more intense than those of Cd (112), while there is a considerable intensity difference between the lines of Cd (110) and Cd (116), in agreement with Aston's values. In transitions  $0 \rightarrow v''$ , the intensity distribution is changed in favour of the heavier isotopes. Due to this, I was able to trace Cd (118) only in the latter case, where it appeared stronger than Cd (108), while in transitions  $v' \rightarrow 0$  only Cd (108) could be observed. These relations can be accounted for partly<sup>3</sup> by influences of the Boltzmann factor  $e^{-hv/kT}$ .

Detailed account of the analysis of this spectrum will be given shortly.

ERIK SVENSSON.

Laboratory of Physics,  
University of Stockholm.  
Nov. 24.

<sup>1</sup> E. Svensson, *Z. Phys.*, 59, 333; 1930.

<sup>2</sup> F. W. Aston, *Phil. Mag.*, 49, 1191; 1925.

<sup>3</sup> G. Stenvinkel, *NATURE*, 126, 649; 1930.

### Chlorination of Sodium Benzoate

THE chlorination of benzoic acid in alkaline solution by means of sodium hypochlorite is often quoted as an example of the effect of ionisation on orientation. Lossen's experiments<sup>1</sup> have been repeated, and it is now found that the product of chlorination contains 48 per cent ortho-, 32 per cent meta- and 20 per cent para-chlorobenzoic acid. This is an unusual type of orientation.

J. C. SMITH.

The Dyson Perrins Laboratory,  
University, Oxford.  
Dec. 14.

<sup>1</sup> Friedländer, 7, 115; 1903.



## Research Items

**Burial of a Bari Rain-maker.** The burial of a rain-chief in the Bari country, Mongalla Province, Sudan, is described by Mr. A. C. Barton in *Sudan Notes and Records*, vol. 15, pt. 1. The rain-maker's last illness took place during a drought, and, as was ascertained by the performance of a special rite, had been caused by a more powerful rain-maker, who attributed to him the failure of his own efforts to bring rain. The grave was of a special type reserved for rain-makers, chiefs and influential freemen. It lay from east to west, and from the west, descent to the bottom of the excavation was by two steps cut in the earth. The interment chamber proper was cut laterally and frontally into the north and east sides of the excavation. The funeral ceremonies began with secret rites, to which only the close kin were admitted, in the house, which was closed immediately after death. These rites included the shaving and anointing of the corpse, the hair being placed in a calabash to be disposed of later in the bush. At the graveside, women who had not been present inside the house again anointed the body over its clothes, and the sons after anointing the back of the corpse down to the waist, again over its clothes, with ground and burnt semen returned to the house, observing a grass taboo, in walking, where they remained until earth had been thrown into the grave. A small son of a serf had been chosen as a serf of the dead, and when the corpse had been laid to rest in the chamber as on a bed, this boy remained by the corpse until it opened in final decay, when he came out of the grave and proclaimed the chief really dead. Large slabs of stone, sacking, etc., blocked the entrance of the cavity, so that no earth could fall on the chief, and above the grave were placed carved grave stakes, of which one had two prongs, a 'male' and a 'female', while the smaller is the 'sentinel'. These were brought from the father's grave and will remain on the chief's grave until required for his son's burial. A mourning feast and dance follow the burial.

**The Malabar House.** In commenting on a ballad of Kerala in the *Indian Antiquary* for November, Dr. M. D. Raghavan appends some notes on the Malabar house, which is highly conventionalised in plan and clearly has retained its main features unchanged for a very long period of time. The most characteristic dwelling-house of Kerala is called *nālu-pura*, literally 'four-houses', being built round the four sides of a courtyard which is open to the sky, each room being named relatively to its situation with regard to the courtyard, that is, southern room, northern room or the three western rooms. Every house, however small, is regarded conventionally as a *nālu-pura*, and hence a house of the smaller type, though facing east, is called *paḍiṅṅāra pura*, that being the western block consisting of three rooms with a verandah in front. Usually behind the central room of the western block there is a small room called the 'lean-to'; and beside the inner verandah is an outer verandah with a long ridged roof on a beam supported by high pillars. The central of the three western rooms is the principal room of the house, containing the valuables and sacred to all household ceremonies. The main entrance is through a portico which serves the purpose of a drawing-room. Each

house stands in a compound of its own, which is thickly planted with trees, and is enclosed by a massive bank of earth. A broad smooth walk, well rammed and plastered with cowdung, leads to the courtyard, of which the surface has been treated in the same way. The courtyard is used for drying paddy, pepper, etc., in the sun. It serves as a threshing floor, as the recreation-ground of younger members of the family, as an exercise ground in the use of arms, and as a place for ceremonial and social functions.

**Facial Growth in Children.** "Facial Growth in Children", by Corisande Smyth and Matthew Young (Medical Research Council. Special Report Series, No. 171), gives the results of a study of twenty characters of the face in 1,400 London children. The primary object of the investigation was to establish standards of normality. Measurements were made of some 1,200 selected children aged 8-14 years in the London County Council schools, 100 boys aged 9-10 years taken at random from a group of boys of the same age, and 100 children aged 2-5 years attending a welfare clinic. No measurements were made of children aged 5-8 years. This study confirms the findings of John Hunter, Tomes and Bolk that the dental arch does not increase in length after complete eruption of the milk teeth, but Smyth and Young find there is a definite increase in breadth of the dental arches after four years of age. As regards inter-relationships of the facial measurements, the most interesting result is the high association between the zygomatic breadth and breadth of the dental arches, an association denied by Korkhaus and other observers. There appears to be some tendency for a narrow face to be associated with a high palate but not necessarily with a narrow dental arch. Although all the results are based on selected children, that is, on those in whom normal occlusion has occurred, Smyth and Young consider they may be taken as fairly representative of London school children because of the close agreement found in the results for two groups of boys aged 9-10 years, one group selected because of normal occlusion, the other taken at random from the London schools.

**Influence of Living-Space upon Growth.** In the course of two years, experiments, fifteen in number, have been carried out by Dr. Jan Podhradsky with the object of deciding whether the size and shape of the living-space influenced in any way the growth and development of tadpoles of *Rana fusca* (*Bull. de l'Institut. Nat. Agron. Brno, CSR.*, Sign. C. 20, 1931). It was found that size of living-space had a bearing on growth and development so that they followed their normal course only within certain limits of space, above and below which growth was depressed. In a small living-space the adverse factor appeared to be mutual disturbance amongst the tadpoles; in a large living-space the isolation of individuals seemed to be largely responsible. Shape of living-space also had a measurable influence: narrow and high vessels depressed growth because they enforced and exaggerated vertical movements on the part of the tadpoles and caused greater reciprocal disturbance, as well as allowing only a low absorption of oxygen at the surface. These effects were intensified



with the growth of the tadpoles. It was found also that abnormally low water depressed growth and development, and this relation was thought to be due to the unusual accumulation of excretory products and the fouling of food.

**Age and Growth of Limpets.** N. Abe (*Science Reports*, Tôhoku Imp. Univ., vol. 7, No. 3, 1932) has shown that colonies of *Acmæa dorsuosa* formed in spring and summer break up in autumn and winter but the individuals do not migrate more than 5-6 metres and hence are subject to the same environmental conditions every year. He has measured the individuals of such colonies and also other examples in which the shell clearly shows the annual rings. In limpets which live in wet places the growth-rate is greater, the thickening of the shell is slower and the height of the shell is relatively less than in those from a drier locality. The ratio of breadth to length of the shell is practically constant in individuals more than three years old. The weight of the shell is greater than that of the body (soft parts) in the proportion of 1 : 0.8. The frequency distribution of age in the colonies is asymmetrical; individuals of four years of age are most numerous. Specimens older than twelve years are few and it would appear that the maximum age of this limpet is about seven-teen years.

**Style-Sac of Gastropods.** R. V. Seshaiya (*Rec. Indian Mus.*, vol. 34, pt. 2, 1932) notes that a crystalline style and style-sac have been recorded in ten families of prosobranch gastropods, and he now records them in two more families—*Cerithiidae* and *Assimineidae*. He refers to Randles' description (1902) of the posterior chamber of the stomach of *Turritella* in which the presence of a single fleshy fold and a crescentic groove is recorded, the groove being considered to be a vestigial cæcum and a very primitive feature. The author's examination of the stomachs of *Turritella* and of several other style-bearing gastropods does not support this view. The groove and the adjoining ridges or folds are functional structures and serve to accommodate the gastric shield and to direct the gastric contents towards the style.

**Nutritive Value of Pastures.** The fact that pastures which appear very similar may differ widely in nutritive value (stock-carrying and fattening capacity) has long remained without a satisfactory explanation, and an investigation of the problem has been made by E. J. Sheehy (*Sci. Proc. Roy. Dub. Soc.*, vol. 20). So far as the chemical composition of the dry matter of the organic portion of the herbage is concerned, no consistent difference was observed between good, mediocre and poor pastures in the same neighbourhood, and although a slight inferiority in the phosphate content of the inorganic portion did occur in the poorer herbage, the disparity was not large enough to account for its reduced feeding value. Further, the chemical composition of the dry matter of forin grass and plantain grown on soils carrying pastures of very different value, remained unaffected. The digestibility of such different types of pasture plants as perennial rye grass, Yorkshire fog and plantain were also found to be very much alike, so that differences in nutritive value could not be explained on this score either. The factor which proved to indicate the value of the pasture, however, was the percentage of dry matter, and in consequence the density of the sward is an important feature.

The latter is largely determined by the botanical personnel, the narrow-leaved grasses yielding a higher dry weight per unit area than broad leaved plants such as weeds. Clovers occupy an intermediate position. Fattening capacity is, therefore, definitely related to the dry matter content and density of the herbage, but stock-carrying capacity is also affected by the rate of growth, as upon this property the provision of abundant feed depends.

**Identification of Indian Sleeper Woods.** In *Forest Bulletin* No. 77 (Economy Series, of the Forest Research Institute, Dehra Dun, 1932) Mr. K. A. Chowdhury, wood technologist, has produced a most useful little guide to enable forest officers, railway passing officers and others to identify on the spot some of the more common Indian sleeper woods. This bulletin is the first of its kind. Capt. Trotter in a preface says that it is hoped to publish similar bulletins from time to time dealing with timbers of individual provinces, that is to deal with timbers according to localities rather than uses. In the present case that method of treatment would not have been so useful, as the map appended to the bulletin well illustrates. This map "shows the various species of sleeper woods that grow in the areas in which different railway groups are concerned". These groups are five in number, namely, Northern, Central and Terai, Eastern, Southern and Burma. The map serves two purposes—the first and most obvious, the species which can be obtained from a given locality, and the second and the more striking, it can help in identification, as a species may easily be eliminated which does not occur in a particular locality. A few simple details on wood structure and so forth lead up to the key for the identification of more than fifty species of important Indian sleeper woods. This key is drawn up in the simplest fashion and appears to be easily workable, but as the author states, "quick and accurate identification of timbers can only be achieved after much practice". A sharp knife and a hand lens magnifying 10-12 times are all that are required to assist the key. Incidentally, the bulletin serves once again to show the importance to India as a whole of the research work being carried out at Dehra Dun in connexion with the enormously valuable Indian forest estate.

**Spectroscopic Detection of Small Quantities of Elements.** The *Wiener Berichte* IIb 141 contains a paper by W. Späth on the detection of very small quantities of elements by the spectroscope. Droplets of solutions were evaporated on silver or copper electrodes and the spectra were excited by condensed spark or by a break-contact arc, according to whether spark or arc lines are the more persistent in a particular case. The preparation of very pure silver electrodes was a long and troublesome matter, and the methods finally adopted are described in considerable detail.  $10^{-10}$  gm. of cadmium was the smallest quantity which could be detected, using the arc line 2288 Å. and the spark line 2265 Å. In experiments with other metals,  $10^{-10}$  gm. manganese,  $10^{-7}$  gm. arsenic,  $10^{-7}$  gm. tellurium,  $10^{-9}$  gm. lithium and  $10^{-11}$  gm. strontium could be detected. The limit is apparently set by the presence of a continuous background in the spectra which masks very faint lines, and it is suggested that a spectrograph with higher dispersion combined with high light gathering power would enable yet smaller masses to be detected.



**Low Temperature Carbonisation of Coal.** In accordance with the policy adopted by the Government some years ago, the Department of Scientific and Industrial Research has examined the Turner plant for the low temperature carbonisation of coal installed at the Comac Oil Co. Ltd., Coalburn, Lanarkshire. The report on the test issued by the Department (H.M. Stationery Office, 9d. net) shows that the retort is of the continuous vertical type, internally heated by superheated steam. A peculiarity is the use of a fluctuating pressure claimed to facilitate transfer of heat from the steam to the coke. From 1 ton of coal were obtained 13.4 cwt. of coke, found to be a good domestic fuel, 21.3 gallons of tar and spirit, 2,170 cub. ft. of gas of total heating value 18.7 therms, and 334 gallons of liquor of no value, although as an effluent it must be regarded as a distinct liability. The alternations of pressure are regarded as a necessary feature of this process, but tests made with the plant adjusted to give steady and fluctuating steam pressures to the retort gave substantially the same results.

**Dewaxing and Acid Refining Mineral Oils.** At a Congress of Polish Petroleum Technologists two years ago, the De Laval S-N method of dewaxing was for the first time made public. The data then were based principally on tests with Polish oils from Schodnica and Urycz. Tests were being carried out on a small plant, but since that time a larger centri-

fugal separator has been employed successfully, and it has been possible to treat pipe-still distillates in addition to those produced by other methods. An account of this process was given by Dr. Nils Olof Backlund on December 13 at the Institution of Petroleum Technologists. Among interesting points made was the substitution of trichlorethylene as a more suitable solvent for separating the wax from the oil than the time-honoured benzene. Rate and degree of cooling of the oil-solvent mixture are of the utmost importance to the process. The advantages of the De Laval S-N trichlorethylene method compared with the benzene method include a smaller quantity of solvent used, a shorter period of cooling and the possibility of working at higher temperatures. Particulars were also given regarding acid treatment of petroleum products, and it was concluded that this process had not reached an entirely satisfactory stage. Fundamentally, acid treatment still remains a 'discontinuous process', and suffers from the disadvantages thereof when compared with efficiency of distillation, dewaxing and cracking in continuous plants. The author pointed out directions in which modernisation of acid-refining is desirable and gave an account of the De Laval S-N acid sludge separator, which represents a definite advance on anything so far designed. The main importance of this process, however, would seem to be in the field of lubricating oil refining, where it is destined to effect considerable economy in production costs.

### Astronomical Topics

**Astronomical Notes for January.** Mercury can be observed as a morning star early in the month; Venus is also a morning star, but far from the earth, and approaching superior conjunction; its disc is almost fully illuminated. Mars is approaching opposition, and is visible for most of the night; this is an aphelion position; the diameter on March 3 will be just under 14". Jupiter also reaches opposition in March, and will be near Mars for some months. Saturn is in conjunction with the sun in January; Uranus is still observable in the evening. Neptune is well placed for observation in the middle of Leo.

A star of mag. 5.6 is occulted by the moon on Jan. 9, disappearing at 8.28 P.M.  $\kappa$  Geminorum (mag. 3.6) disappears at 10.50 P.M. on Jan. 11, reappearing at 11.24, angle 221°; the moon is full on that day.

The following are the positions of Comet Dodwell-Forbes at the beginning of Jan. 14 and 24, according to the Whipple-Cunningham orbit:

Jan. 14 R.A. 0<sup>h</sup>38<sup>m</sup>34<sup>s</sup> S.Decl. 4° 52'; Jan. 24 R.A. 1<sup>h</sup>15<sup>m</sup>4<sup>s</sup> N.Decl. 4° 43'.

Comets Faye and Geddes may also be seen with moderate telescopes; there are ephemerides in the B.A.A. Handbook for 1933.

There are minima of Algol at convenient times for observation on Jan. 8 at 7.54 P.M. and on Jan. 28 at 9.42 P.M.; a full table is given in B.A.A. Handbook.

**Mass of Eros.** Soon after the announcement by W. H. van den Bos and W. S. Finsen that Eros appeared like a figure-of-eight in the 26½ in. Johannesburg refractor in January 1931, Prof. W. H. Pickering derived the mass of Eros on certain assumptions as to its figure. Dr. Knut Lundmark has made a further investigation based on the same material (*Lund. Obs. Circ.*, No. 7). The diameter of Eros was

taken as 23.4 km., and it was supposed to consist of two spheres in contact, each having a radius of 5.85 km.; the reciprocal of the mass in terms of the earth is 259,900,000. This gives a density only a quarter of that of the earth. If the distance of centres is increased to 18.6 km., the density becomes equal to that of the earth.

Comets of A.D. 868 and 1366. It was established by Dr. Hind that the second of these comets is in all probability identical with Tempel's Comet, 1866 I, associated with the Leonid meteors; Hind thought that the comet of 868 might also be identical with it. The *Japanese Astronomical Herald* for October, 1932, contains a re-investigation of the orbits of these two comets, by Dr. S. Kanda, based on the original observations; for the first comet he used observations made in Japan, Europe, and Korea; for the second he does not appear to have found any further observations than those used by Dr. Hind, and the new orbit is quite close to that of Hind.

<i>T</i>	868 March 4	1366 Oct. 18.54 U.T.
$\omega$	277°	164.8°
$\Omega$	305	218.5
<i>i</i>	65	149.8
<i>q</i>	0.42	0.9749
<i>e</i>	1.00	0.9059
Period	—	33.35 years (assumed)
Equinox	868.0	1366.0

It may be concluded that the first comet is not identical with Tempel, but that the second probably is identical. This identity had been assumed by the Computing Section of the British Astronomical Association in investigating the perturbations of the comet from 1366 until 1932. Search ephemerides are given in the B.A.A. Handbooks for 1932 and 1933.



### Electricity, Gas and Other Fuels as Heating Agents

IN a paper read by Mr. A. H. Barker to the Institution of Electrical Engineers on December 1, an explanation was given of the conditions under which electrical power can be used competitively for the heating of buildings. It is well known that, reckoned on the heat unit basis alone, electricity is the most expensive of all the sources of heat in common use, and that comparatively, gas is at present not very far behind it. Since the heat in a gas company's therm equals 29.4 electric units, it follows that if gas cost 6*d.* per therm and electricity 0.5*d.* per unit, the cost of the crude heat per therm delivered by the gas company would be 6*d.* and by the electric company 14.7*d.* In a few years' time we hope that more companies will be supplying at these cheap rates. If the thermal electric storage were employed the price of the electric heat would be reduced by about forty per cent. With oil at 80*s.* a ton and coke at 40*s.* a ton, the costs would be 2.25*d.* and 1.64*d.* a therm respectively. Looking merely at the costs of the 'crude' heat, the solid fuels are much cheaper.

The most fundamental difference between gas and electric heat is that with the former it is purified fuel which is transported to the spot where the heat is required, while with the latter it is energy only. There are three points arising from this. The street main is much larger and more difficult to accommodate with gas than with electricity but the house-pipes for gas are smaller and cheaper. In order to convert the gas energy into heat, it has to undergo the process of combustion with the disadvantages of high temperature and waste products of combustion. The use of gas causes less actual destruction of fuel than electricity and the heat from it is therefore cheaper. Gas is in fact crude fuel which has had all the ashes and smoke purified out of it at the sacrifice of the manufacturing costs and about twenty per cent of the energy of the crude fuel. Electricity carries the purification a stage further. In its manufacture, everything, including all the labour, is purified out of the fuel but there is a loss of about twenty per cent of the energy in the mains. There are obviously cases, where so far as its usefulness is concerned, this further stage of purification is a pure waste of money, just as it is a waste of money to soften water needed for sanitary fittings.

In Mr. Barker's opinion, gas and electric supply have each their own sphere of usefulness, in which one is either economically or functionally superior to the other. There is only a small area of supply in

which reasonable competition is legitimate. Both industries ought to be amalgamated, in their own and in the public interest. It is very difficult to assess the money value of their relative advantages and disadvantages in each particular case.

Apart from its cost, electrical energy is almost an ideal means for room warming. By its agency, pure heat can be delivered through light and flexible wires in any quantity, at any temperature and in any desired form to any particular spot. Turning on and off involves nothing but a mechanical motion of a switch and this can be readily done automatically by a simple and trustworthy form of thermostat. The use of any other fuel gives, along with the heat, products of combustion of a more or less deleterious nature. It is only in very special cases that heat derived from the combustion of fuels can be employed without the use of chimneys.

Gas possesses the advantage that it can be exactly regulated to requirements. It can be conveniently stored so that a sudden overload need not affect the supply. Breakdown is less probable than with the more complicated electrical plant. In some cases when combustion is effected completely, the products are innocuous and so can be allowed to mix with the air of the building and so secure—like the electrical fire—an efficiency of one hundred per cent. The drawbacks are that gas needs to be ignited and supplied with air before the heat can be developed. It has an objectionable smell and is dangerous if it escapes or is incompletely burnt.

The advantages of oil are that it is fluid and so can be pumped with little smell or trouble into a tank through a pipe-line. It is much easier to ignite, to regulate and to extinguish than coke, though more difficult than gas. It is very clean in operation, and when properly burnt highly efficient. Owing to the high degree of the combustibility of oil, there is a good deal of potential danger attached to it. It is apt also to give off smoke and odorous fumes. The advantages and disadvantages of coke and other solid fuels are well known. For example, they will allow any sort of combustible material to be destroyed in the furnace. It is probably the most economical form of heating but it involves greater labour than any other fuel. It produces dust, is dirty to deliver and clumsy to handle.

Mr. Barker deals exclusively with the cost of the fuel and the labour involved in handling it. When the heating required is intermittent, both electrical and gas heating have advantages over the other fuels.

### Mesolithic Age in Britain\*

IN 1926 the Royal Anthropological Institute held an exhibition illustrating the microlithic industries of Britain, to which all who were then known to be interested and engaged in forming collections of implements of this phase of the Stone Age were asked to contribute. The mesolithic period had been somewhat neglected by British archaeologists; and it is probable that it came as a surprise, even in archaeological circles, to find how considerable was the amount of material which it had been possible

to get together and the increase in the interest taken during the early years following the War in these remarkable products of man's skill and ingenuity.

In the period which has elapsed since that exhibition was held, further progress has been made in the study of the mesolithic age, and the time was fully ripe for a detailed discussion of the position of microlithic industries in relation to preceding and succeeding cultures. The opportunity for such discussion was afforded by a series of papers in the programme of Section H (Anthropology) when the

\*Based on certain papers read before Section H (Anthropology) of the British Association at York, September 6, 1932.



British Association met at York last summer. The conditions were exceptionally propitious, as not only were there within reach of York sites of sandy heath typical of the geographical environment preferred by Tardenoisian man, upon which, moreover, numerous finds of implements had been made, but also the fact that Mr. J. G. D. Clark was to open the session with a paper on the mesolithic age in Britain ensured that the otherwise preponderating attention to be given to the north of England in this series of communications would be placed in proper perspective.

The advances which have been made in the study of the typology of mesolithic implements now make it possible to work out the geographical distribution of characteristic forms with a relative certainty, if not with an absolute precision, while a number of pregnant suggestions emerges as to their derivation and development. Thus Mr. Clark holds that, while the Upper Palæolithic industries of Britain already showed microlithic tendencies, the Tardenois culture is to be regarded as intrusive in both its first and second phases, and late Tardenois, though in all probability a local development in its British manifestation—the 'trapezoid' implement is said to be peculiar to Britain—also has indications of continental influence. Thus in the Pennines the 'broad blade' industry, the non-geometric Early Tardenois industry, is certainly of continental derivation, while the Middle Tardenois, which extended as far as the Isle of Man, points to Belgium. At the same time, the view thus taken of late Aurignacian industries must be kept in mind in considering sites which show a sequence of cultures, such as those described by Mr. A. L. Armstrong.

The study of types leads Mr. Clark to divide Britain into two provinces, of which Province A is characterised by the absence of the tranchet axe or pick, while the microliths are present both in the early non-geometric forms and in the later geometric forms, some of them of extremely small size. In Province B, the south-east of England, on the other hand, the tranchet axe is found, but the place of the geometric forms of Tardenois industry is taken by the still surviving non-geometric forms.

In the working out of the sequence and relation of the phases of Tardenois cultures, the investigations of Mr. F. Buckley in the Pennine chain are especially significant, although the whole chain has not been covered and his conclusions are drawn only from certain selected sites, such as Standedge Ridge, Yorks, where the whole chain narrows down to a single ridge, along which mesolithic man must have passed in avoiding the valleys. Various mesolithic sites under the peat have been excavated. These sites contain the relics of two distinct peoples or races of Tardenois folk. Of these one is known as the folk of the 'broad blade' industry, the other as the people of the 'narrow blade' industry. The implements of the former are predominantly of the non-geometric type and include many pointed blades, while among those of the latter are numerous small geometric tools. This people used open-air encampments and wandered freely over the hills; but the 'broad blade' folk travelled along the watershed ridge and erected huts or wigwams on their camping sites. The hearths have yielded wood remains, giving some data as to tree distribution in mesolithic times.

An important contribution to the discussion of

mesolithic problems, comprehensive in its view, was made by Mr. A. L. Armstrong's account of his investigation of the Tardenois and pre-Tardenois cultures of north Lincolnshire in the light of evidence afforded by a number of sites in that area. Here a series of stratified sections and occupied sites exhibits a continuous sequence of industries, embracing the Upper Palæolithic and the whole of the Mesolithic periods. Mr. Armstrong has recently discovered Aurignacian flint implements in glacial gravels at Hardwick Hill, east of the Trent. These are heavily rolled, owing, it is suggested, to the wave action of an estuary or glacial lake, and point to the existence here of palæolithic man before the last glaciation—possibly a band of hunters who had penetrated the swamps and taken up their residence on the dry uplands of the Cliff Range and, probably, also on the Wolds. They appear to have inhabited this region through the last phases of the glacial epoch and to have remained until the appearance of mesolithic peoples, the Azilian and Tardenois. The latter eventually dominated Lincolnshire, according to the indications of a number of stratified sites.

Of these sites the earliest is a late-Developed Aurignacian (Creswellian) station, discovered by Mrs. E. H. Rudkin, and excavated in February last, on the western escarpment of the Lincolnshire cliff above Willoughton. At Sheffield's Hill, near Scunthorpe, a similar occupation site, but of later date, gives evidence of the final phase of the developed Aurignacian, upon which early Tardenoisian was imposed. At Risby Warren, Scunthorpe, where systematic researches have been carried out for eleven years, there is stratified evidence of occupation levels ranging from developed Aurignacian, which is quite free from Tardenois influence, to the earliest neolithic, full neolithic and bronze ages. The Tardenois culture is represented by several horizons and can be classified broadly as early and late. This site, Mr. Armstrong claims, in virtue of its abundance of stratified material and its numerous occupation zones, representing the whole of the Tardenois period, is to be regarded as the type station of Tardenois culture in England.

### University and Educational Intelligence

WALES.—The University Court at its meeting on December 15 decided to award the degree of D.Sc. *honoris causa* to Prof. Francis Ernest Lloyd, professor of botany in McGill University, and Prof. Robert Robinson, Waynflete professor of organic chemistry in the University of Oxford.

THE Institute of Sociology, Le Play House, 65 Belgrave Road, London, S.W.1, has now been incorporated as a company limited by guarantee. This is the final step in a scheme for permanently establishing and endowing the Institute, which was initiated in 1920 through the generosity of the late Mr. and Mrs. Branford. Under an order of the Chancery Court, the whole of Mr. Victor Branford's estate, subject to the temporary reservation of a portion for the benefit of relatives, passes to the Institute. The present officers of the Institute are Dr. R. R. Marett (president), Rector of Exeter College, Oxford; Mr. C. H. Rigg (honorary treasurer), and Mr. A. J. Waldegrave (chairman of council).



## Calendar of Nature Topics

### January freeze-the-pot-by-the-fire

January, the coldest month of the year in England, is proverbially associated with snow and ice. In the French Revolutionary Calendar of 1793, the period from December 21 to January 19 was the month 'Nivôse' or 'snowy'. During the twentieth century, however, January has not lived up to its name, but has been much more open, mild and stormy, with few prolonged frosts. At Greenwich the mean January temperature during the decade 1921-30 was 41.3° F., more than 2° F. above the long-period normal and probably 5° or 6° higher than in some of the decades of the late eighteenth and early nineteenth centuries. This persistent period of mild winters has extended over the whole of western and central Europe; it is associated with a greatly increased frequency of south-westerly winds and may almost be regarded as a change of climate.

### Life in the Southern Atlantic Ocean

"January 1—Wilson's petrels, two kinds of prion petrels, albatrosses and a bosun bird were observed to-day. Sun-fish (*Orthogoriscus mola*) were also seen; at 2.30 p.m. a boat was lowered to get one. After several ineffective attempts at harpooning we managed to stun one with shot. Davidson after a while drove the harpoon into the gills, and we then made fast to one of its fins and towed it to the ship. Three or four sucker-fish accompanied it to the boat, and on cutting the sun-fish up, one was discovered in the gills. A parasitic copepod (*Argulus*) was found externally, as well as a polyclad. There was also a parasitic copepod on the gills and a barnacle on the lip. In the intestines numerous tape-worms were found and another leech-like parasite. There was in all probability about 10 lbs. weight of tape-worms in the gut. Its weight by the dynamometer was half a ton. Several others were seen twice as large. Brown saw a globe-fish with a small fish attendant on it. *Salpa* were seen frequently floating past." From "Zoological Log of S.Y. *Scotia*", on January 1, 1903, in lat. 39° 01' S.; long. 53° 40' W.

The lethargy of the sun-fish has often been referred to. The individual mentioned above, now exhibited in the Royal Scottish Museum, Edinburgh, was regarded by its captors as a tiny specimen compared with others seen the same day "about the size of a small haystack", and of it they said, "Its stupidity was amazing; unable to swim faster than a boat could row, all it had to do to escape was to sink—and this they can do quite well,—but although struck by a harpoon a dozen times before one held, it made no attempt to escape. . . . When cut up it was easily seen why the first harpoons would not hold, as under the skin was a layer two or three inches thick of a hard cartilaginous material. The dissection was performed mainly with axes. The central nervous system was very interesting on account of its minute size relative to the body, the spinal cord being only about half an inch long and barely coming outside the cranial cavity. This degeneracy is doubtless correlated with the feeble musculature and swimming powers. Intelligence and mobility have become superfluous, the size and thick hide being sufficient protection against most

enemies." From "The Voyage of the *Scotia*", by R. N. Rudmose Brown, R. C. Mossman, and J. H. Harvey Pirie.

### Hurricanes of the Southern Hemisphere

January 7.—The greatest frequency of hurricanes or revolving storms in the southern hemisphere occurs about the second week in January, though they may be experienced at any time during the southern summer. Four areas are subject to these storms, the islands of Polynesia, especially the Samoa, Fiji and Tonga groups, the Coral Sea between Queensland and the Fiji Islands, the north-west coast of Australia and the South Indian Ocean between the Chagos Archipelago and Madagascar. The Australian storms are locally known as 'Willy-willies', and in addition to causing loss of shipping, frequently result in disastrous floods. The majority of the hurricanes in the southern hemisphere originate between lat. 5° and 15° S., travel at first towards west-south-west, recurve in about 20° S. and finally pass away to the south-east, decreasing rapidly in intensity.

### "Furze or Gorse (*Ulex europæus*) flowering"

This record made by Gilbert White at Selborne on January 8 is a reminder of the winter activity of gorse which makes it an important item in the economy of the countryside. The closely cropped conical bushes, which in many places dot a pasture like old-fashioned bee-hives, are evidence of the part it plays in the winter food-supply of rabbits and sheep. Before roots were commonly available for the winter feeding of farm stock, gorse partly took their place: "The sowing of whins for feeding of cattle takes mightily about London just now [1725] . . . this improvement comes from Wales, where it has been practised these hundred years." In Scotland rough whins from waste ground were used in place of the more tender sown crop, and these had to be broken and pulped before being served to the cattle. The apparatus used was a cumbersome whin-mill, the essential part of which consisted of a huge stone roller dragged by an ox or a horse round a paved circuit, upon which the whins were laid. Remains of such whin-mills are still to be seen at occasional farmhouses in Scotland, although whins have long since dropped out of use. In the south of Ireland, however, on hillside farms where hay is scarce, whins are still used for feeding horses during the winter months. The seed is sown on spare ground, and the crop, cut in the following year, is passed through an ordinary chaff-cutter before being served.

### The Hibernation of Frogs

In early January 1932, Francis B. Bent (as recorded in the *Observer*, May 1, 1932) emptied a pond and cleaned it out. The pond was ten to fifteen feet deep and the normal depth of water was four feet, but in the clay ooze at the bottom there were discovered thirty or forty frogs. In the same month H. C. Davies (*Field*, May 8, 1932) ran the water out of a small spring-fed pond in order to dig the mud out. In so doing he dug out, not an isolated frog, but dozens. "Their appearance was not attractive—discoloured and skinny—but all alive, though showing very little energy."

Although the older naturalists believed in the hibernation of frogs in winter in the mud of ponds, doubt has recently been thrown upon the possibility



of survival of air-breathing, lung-possessed creatures in such circumstances. However, in the height of the mating season, when activity is not at its lowest, one has seen beneath the clear water of a pond mated frogs remain for long periods inactive on the bottom, and in face of such experiences as are related above it seems probable that in cold weather the lowering of activity in these cold-blooded animals reduces metabolism to so low a pitch that the oxygen required can be obtained by transpiration through the skin. The problem still to be solved in regard to cold-blooded hibernators, as P. A. GORER has pointed out, lies in the physiological changes which enable the tissues of an adapted animal such as the common frog (*Rana temporaria*) to recover from cooling which is not excessive, while such recovery is impossible in unadapted animals.

## Societies and Academies

### LONDON

Royal Meteorological Society, Dec. 14. C. S. DURST: "The thermal balance of a water drop or ice particle suspended in the atmosphere." From the examination of the long wave radiation received and given out by a water drop or ice particle, it is shown that such a particle will lose heat if it is above a certain critical temperature and gain heat if it is below, from which it follows that if a particle exists in the stratosphere it will gain heat. It is assumed that the base of the stratosphere is saturated and consideration is given to the conditions under which particles could be formed. If a small air mass were raised in the stratosphere the particles formed in it would be melted in a very short time and the temperature of the air would once more be that of its surroundings, the entropy of the air having been increased in the process.—E. W. BLISS: The tabulation of world weather (5). (Discussion by Sir Gilbert Walker.) (*Mem. Roy. Meteor. Soc.*, 4, No. 36.) In order to form more definite ideas regarding the oscillations named the North Atlantic, the North Pacific, and the Southern, series of figures have been derived to express the variations of each, and from these have been obtained their relations with pressure, temperature, and rainfall over wide regions as well as the relations of the three oscillations with each other and with sunspots. The southern oscillation in the southern winter is extremely persistent, and its departure has a correlation coefficient of 0.84 with that of the following summer.—C. S. DURST: "The breakdown of steep wind gradients in inversions." On certain occasions when inversions have formed, a violent eddying arises, which is shown on an anemometer as an abrupt change in the type of trace. This change over occurs when the wind gradient becomes great. On the ground that the eddies formed in these circumstances are different in character from those formed with an adiabatic temperature gradient, a suggestion is put forward for the mechanism of the diurnal variation of wind.

### DUBLIN

Royal Dublin Society, Nov. 22. J. H. J. POOLE: An investigation of the behaviour of neon discharge tubes in a flashing capacity circuit by means of a cathode ray oscillograph. The effects of leakage currents in the oscillograph were eliminated by using the oscillograph

in conjunction with a valve anode resistance amplifier. For small shunting capacities the flashing may be extremely irregular, and quite considerable currents pass through the tube before the flash occurs. The presence of radium lowers the striking potential and, by decreasing the maximum dark current, increases the regularity of flashing. The effect of the shape of the electrodes has also been investigated. For concentric cylindrical electrodes, at the filling pressures used, the difference between the striking and extinction voltages is less when the inner cylinder is negative. H. M. FITZPATRICK: The trees of Ireland, native and introduced. A catalogue of the tree species growing in Ireland giving the dimensions attained by each in different parts of the country with, in the case of exotics, an account of their natural distribution and introduction into cultivation. 150 broad-leaved and 215 coniferous trees are recorded. G. T. PYNE and J. J. RYAN: The colloidal calcium phosphate of milk. Some samples of milk out of a large number tested developed a marked alkalinity to phenolphthalein on addition of oxalate. As the wheys prepared from the same milks did not do so, it appeared that the alkalinity must arise from the interaction of the (potassium) oxalate with the casein calcium phosphate complex of milk, presumably owing to the conversion of insoluble tri-calcium phosphate into the strongly alkaline tri-basic potassium salt. The amounts of tricalcic phosphate required to account for the observed alkalinities approximated to those usually accepted for the entire colloidal phosphate of milk, suggesting that the greater part of this colloid must consist of the tri-basic salt. The bulk of the casein calcium phosphate complex was removed by prolonged high speed centrifuging from two very different types of milk (as regards their reaction with oxalate) and submitted to analysis. The results appeared to show that the bulk of the colloid in each case consisted of tricalcium phosphate, and that the variations in the behaviour of different samples to oxalate was thus connected with the relative quantity of the colloid present rather than with variations in its composition.

### PARIS

Academy of Sciences: Nov. 14. CH. MAURAIN and J. DEVAUX: Electrical conductivity and atmospheric condensation nuclei during a voyage to Greenland. There is a general resemblance between the electrical conductivity of the air in the polar regions and that on mountains at high altitude, possibly due to the purity of the atmosphere and the dryness. The measurements were too few to enable any deductions to be drawn as to the effects of the meteorological conditions. MARIN MOLLIARD: Aseptic tuberisation and morphological characters resulting from the action of saccharine food on the onion, *Allium cepa*. E. MATHIAS: Death by the return stroke (lightning). J. CANTACUZENE and A. TCHERKIRIAN: The presence of vanadium in certain tunicates. Vanadium has been found in nine species of tunicates: the proportion is higher in young animals than in adults. POTRON: The Riemann spaces admitting a group of isometric transformations with  $n(n+1)/2$  parameters. MARCEL BRELOT: The study of the point singularities of subharmonic functions. PIERRE HUMBERT: Bessel-integral functions. D. POMPEIU: A theorem, analogous with that of Rouché, relative to the zeros of holomorphic functions. NICOLAS APRAXINE: A calculating machine worked electrically. B. GALERKIN:



The general solution of the problem of elastic equilibrium of a hollow circular cylinder and of a part of the cylinder. R. DE FLEURY, H. PORTIER and S. BENMAKROUHA : The comparative and reciprocal influences of individual values, for each alloy and for each state of the alloy, of the modulus of elasticity, the elastic limit and the density on the dimensions of beams and elements of framework under bending. LOUIS DE BROGLIE : The electromagnetic field of the light wave. L. GOLDSTEIN : The quantum theory of the diffusion of electrons. ANDRÉ MARCELIN and D. G. DERVICHIAN : The direct measurement of superficial pressure of superficial solutions formed by soluble substances. P. ROUARD : The reflecting power of metals in very thin plates. The reflecting power varies with the thickness of the film, passing through a minimum depending on the wave-length of the light. CH. BEDEL : The temperature coefficient of the electrical resistance of silicon and a thermoelectric phenomenon of unipolar substances. A. SANFOURCHE and B. FOCET : The calcium salt of a complex ferrophosphoric acid. F. GALLAIS : Potassium iodomercurate. LÉON JACQUE : The alteration of steels by hydrogen. The modification of the micrographic structure of steel submitted to the action of hydrogen under pressure and at temperatures between 400° and 700° C., appears to be the result of two simultaneous phenomena : the elimination of the carbon of the steel by the hydrogen, and a diffusion of the carbon from the unaltered regions towards the decarbonised regions. The process is a reversed cementation. The change depends on the composition of the steel, chrome-nickel steels, for example, being less altered under the same conditions. M. LESBRE : An imperfect silver-guanidine complex. R. LEVAILLANT : The action of acid chlorides on orthoformic esters. The preparation of symmetrical esters of sulphuric acid. The reaction  $\text{CCl}_3\text{COCl} + \text{HC}(\text{OC}_2\text{H}_5)_3 = \text{CCl}_3\text{CO}_2\text{C}_2\text{H}_5 + \text{C}_2\text{H}_5\text{Cl} + \text{HCO}_2\text{C}_2\text{H}_5$  gives a 90 per cent yield of the ethyl trichloroacetate. The reaction is a general one, and can be extended to the sulphonchlorides. G. DARZENS : A new method of glycidic synthesis of aldehydes. LESPIEAU and WIEMANN : The synthesis of allodulcitol. Y. MILON : The antiquity of the depression of the gulf of Morbihan. G. DUBAR and H. TERMIER : The facies of the Lias underlying the Toarcian in the Moroccan middle Atlas. J. GAUZIT : An attempt at the estimation of atmospheric ozone by visual photometry. The method detailed, which has the advantage over other methods in use of taking less time, measures the thickness of the ozone layer in the atmosphere with an uncertainty of less than ten per cent. PH. JOYET-LAVERGNE : Oxidising power, chondriome and cytoplasmic sexualisation in the Fungi. J. BEAUVÉRIE and Mlle. S. MONCHAL : The life of green plants in a confined atmosphere. Plants contained in glass vessels, with moist earth, and sealed with paraffin wax, can live and grow for several years. Examples are given of plants which have remained in good condition for three or four years thus sealed up. MICHEL GRACANIN : Contribution to the study of the relation between transpiration and the resorption of ions. MARC SIMONET : New interspecific hybrids in *Iris* and their cytological study. ARMAND DEHORNE : New observations on the asexual multiplication of an annelid of the genus *Dodecaceria*. ETIENNE RABAUD and L. VERRIER : The evacuation of the gases from the air bladder and the working of the pneumatic canal. PAUL WINTREBERT : The two phases of segmentation and the subdivision theory in amphibians.

## Forthcoming Events

Monday, Jan. 9

ROYAL GEOGRAPHICAL SOCIETY, at 8.30.—B. Roberts : "The Cambridge Expedition to Vatna-Jökull, 1932".

Tuesday, Jan. 10

ROYAL ANTHROPOLOGICAL INSTITUTE, at 8.30.—Dr. N. Gordon Munro : "The Ainu Bear Ceremony" (Film).

Thursday, Jan. 12

KING'S COLLEGE, LONDON, at 5.—Prof. R. J. S. McDowall : "The Integration of the Circulation" (succeeding lectures on Jan. 19, 26 and Feb. 2).

## Official Publications Received

### GREAT BRITAIN AND IRELAND

The H.E.A. Year Book : the Annual Publication of the Horticultural Education Association. Vol. 1, 1932. Pp. 92+xl. (Wye: South-Eastern Agricultural College.) 3s. 6d.

County Borough of Southport : Meteorological Department : The Fernley Observatory, Southport. Report, and Results of Observations for the Year 1931. By Joseph Baxendell. Pp. 31. (Southport.)

Brompton Hospital Reports : A Collection of Papers recently published from the Hospital. Vol. 1, 1932. Pp. iv+144. (London.) 2s. 6d.

Proceedings of the Royal Irish Academy. Vol. 41, Section B, No. 8 : Recent Views bearing on the Problem of the Irish Flora and Fauna. By Dr. R. Lloyd Praeger. Pp. 125-145. (Dublin: Hodges, Figgis and Co.; London: Williams and Norgate, Ltd.) 1s.

True Temperance Scientific Committee. Monograph No. 8 : In Chase of Truth of Alcohol. By Prof. Henry E. Armstrong. Pp. 32. (London: Donington House.) 1s.

The Scientific Proceedings of the Royal Dublin Society. Vol. 20 (N.S.), No. 30 : A Suggested Mode of Radiotherapy when Long-continued Feeble Gamma Radiation may be Desirable. By Dr. J. Joly. P. 469. (Dublin: Hodges, Figgis and Co.; London: Williams and Norgate, Ltd.) 6d.

### OTHER COUNTRIES

International Hydrographic Bureau. Report of the Proceedings of the Third International Hydrographic Conference held at Monaco, 12-23 April, 1932. Pp. 435. (Monte Carlo.) 2.50 dollars.

Colony of Mauritius. Annual Report on the Royal Alfred Observatory for the Year 1930. Pp. 4. (Mauritius.)

Miscellaneous Publications of the Royal Alfred Observatory. No. 11 : Pilot Balloon Observations at Mauritius. By R. A. Watson and N. R. McCurdy. Pp. 17+3 plates. No. 12 : The Cyclone Season 1929-1930 at Mauritius. By R. A. Watson and N. R. McCurdy. Pp. 3+43 plates. (Mauritius.)

Indian Central Cotton Committee : Technological Laboratory. Technological Bulletin, Series A, No. 22 : Technological Report on Banilla Cotton, 1930-32. By Dr. Nazir Ahmad. Pp. ii+17. (Bombay: Times of India Press.) 8 annas.

The Quarterly Journal of the Geological, Mining and Metallurgical Society of India. Vol. 4, No. 1, August. Pp. 27. (Calcutta.) 6 rupees.

Paleontologische Navorsing van die Nasionale Museum. Deel 2, Stuk 5 : Voorlopige Besrywing van Vrystaate Soogdiere. By Dr. Ir. E. C. N. Van Hoepen. Pp. 63-66. (Bloemfontein.)

Publications of the Observatory of the University of Michigan. Vol. 5, No. 2 : The Orbit of Comet Peltier-Whipple, Second Paper. By Allan D. Maxwell. Pp. 4. (Ann Arbor, Mich.)

U.S. Department of the Interior : Geological Survey. Professional Paper 166 : Physiography and Quaternary Geology of the San Juan Mountains, Colorado. By Wallace W. Atwood and Kirtley F. Mather. Pp. vi+176+34 plates. Professional Paper 167 : Lower Triassic Ammonoites of North America. By James Perrin Smith. Pp. v+199+81 plates. 70 cents. Professional Paper 171 : Geology and Ore Deposits of the Pioche District, Nevada. By Lewis G. Westgate and Adolph Knopf. Pp. viii+79+8 plates. 85 cents. Professional Paper 173 : Geology and Ore Deposits of the Stockton and Fairfield Quadrangles, Utah. By James Gillyly. Pp. vi+171+32 plates. (Washington, D.C.: Government Printing Office.)

### CATALOGUES, ETC.

The Protexray Tube. Pp. 32. (London: Cuthbert Andrews.) F/2 Spectrograph. (Lispec 33.) Pp. 4. Vacuum Thermocouples for Measuring Weak Alternating Currents. (Brug 31.) Pp. 2. (Delft: P. J. Kipp en Zonen.)

Calendar for 1933. (London: The Chemical Trade Journal.) John G. Stein and Co., Ltd. Diary for 1933. Pp. 64+Diary. (Bonnybridge.)

### Editorial and Publishing Offices :

MACMILLAN & CO., LTD.

ST. MARTIN'S STREET, LONDON, W.C.2

Telephone Number : WHITEHALL 8831

Telegraphic Address : PHUSIS, LESQUARE, LONDON