

Biblioteka Główna i OINT  
Politechniki Wrocławskiej



100100319236

Wpł. Ngdz  
18. I 13

A 610 II  
AM







Nature,  
December 13, 1900 ]

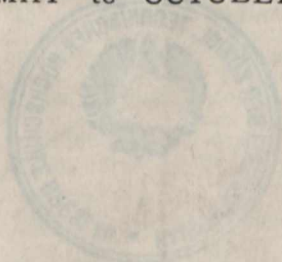
# Nature

A WEEKLY

ILLUSTRATED JOURNAL OF SCIENCE

VOLUME LXII

MAY to OCTOBER 1900



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

1912. 1942.

London

MACMILLAN AND CO., LIMITED  
NEW YORK: THE MACMILLAN COMPANY

Nature

ILLUSTRATED JOURNAL OF SCIENCE

RICHARD CLAY AND SONS, LIMITED,  
LONDON AND BUNGAY.



# INDEX

- ABBE (Prof. C.), the History of Modern Weather Prediction, 499
- Abbott (Dr. G.), on the Concretionary Structures of the Magnesian Limestone of Durham, 587
- Aberdeenshire, West, on the Physical Character of the Population of, J. Gray, 635-6
- Abney (Sir William), Colour Photometry (iii), 273
- Abruzzi (Duke of), the Ascent of Mount St. Elias, Alaska, 1, 529
- Abt (A.), Thermolectric Force of some Metallic Oxides and Sulphides, 335
- Academies, the International Association of, 249
- Acetylene: The Purification of Acetylene, 110; a Handbook for the Student and Manufacturer, Vivian B. Lewes, 522
- Achard (Ch.), Anti-coagulating Power of Serum in Pathological State, 216
- Ackroyd (W.), on the Distribution of Chlorine in West Yorkshire and on the Limiting Standard of Acidity for Moorland Waters, 566
- Acland (Sir H. W. D., F.R.S.), Death of, 602; Obituary Notice of, 627
- Acoustics: an Illustration of Doppler's Principle, Prof. R. Richarz, 35; a New Instrument to Measure and Record Sounds, Dr. Benjamin F. Sharpe, 80; the Photography of Sound Waves, Prof. R. W. Wood, 342; the Distance to which the Firing of Heavy Guns is Heard, Dr. Charles Davison, 377; J. W. Mallet, 523; High Note Production by Galton's Whistle, M. T. Edelmann, 381; Acoustical Triangulation, A. J. Mundy, 422; New Effect produced by Stationary Sound-waves, R. Davis, 568
- Acquisition of Language, Homochronous Heredity and the, Prof. R. Meldola, F.R.S., 572
- Acrospeira mirabilis*, on the Life History of, R. H. Biffen, 613
- Action of Water upon Glass, the, Edmund F. Mondy, 246
- Adams (Prof. F. D.), the Flow of Marble, 335
- Aëronautics: the Mechanics of Flight, Lord Rayleigh, 108; Count von Zeppelin's Navigable Balloon, 180, 231, 396; Count Zeppelin's Air-ship, 626
- Aether and Matter, Joseph Larmor, Prof. Geo. Fras. Fitzgerald, F.R.S., 265
- Aflalo (F. G.), a Walk through the Zoological Gardens, 466
- Africa: Preliminary Notes on the Results of the Mount Kenya Expedition 1899, H. J. Mackinder, 12; Spider-silk manufacture in Madagascar, M. Nogue, 17; Grandidier's Expedition to Madagascar, 35; the Winds of Kimberley, J. R. Sutton, 35; a New Edible Tuber from the Soudan, Maxime Cornu, 72; a Possible Prevention of Horse-sickness, Dr. G. C. Purvis, 83; the Cape Colony Fruit-moth, Mr. Barrett, 119; Death and Obituary Notice of Miss M. H. Kingsley, 134; Locust Destruction, W. C. Robbins, 134; the Carboniferous Strata of Nossi-Bé, M. Villiaume, 168; Effect on Lower Nile of "Sudd" Cutting on Upper Nile, 180; Palæolithic Man in Africa, Sir John Evans, F.R.S., 190; South African Philosophical Society, 216, 264, 464; Sette Anni di Caccia Grossa é Note di Viaggio in America, Asia, Africa, Europa, Count Felice Scheibler, 244; Theriodont Reptile from Bavians River, Cape Colony, Prof. H. G. Seeley, F.R.S., 262; the Snake-stone, E. H. L. Schwarz, 302; Bushman Drawings, E. H. L. Schwarz, 336; Mud Island in Walfisch Bay, 336; Mr. Cleverly, 464; Ghizeh Zoological Gardens, 374; Change of Feeding Habits of Rhinoceros-birds in British East Africa, Prof. E. Ray Lankester, F.R.S., Capt. Hinde, 366; the White Rhinoceros on the Upper Nile, Oldfield Thomas, 599; Neogenic Regions of Lower Egypt, C. Deperet and R. Fourtau, 408; the Ndonga District, H. A. Byatt, 422; Palæolithic Implements from Stellenbosch, L. Péringuey and G. S. Corstophine, 464; Egyptian Gold, Daniel Berthelot, 464; the Fauna of South Africa, Mammals, W. L. Sclater, 521; the Preservation of Big Game in Africa, E. N. Buxton, 550; Report of the British Association Committee on the Climate of Tropical Africa, 590; Proof of old Semitic Influence in South Africa, K. Meinhof, 606
- Agamennone (Dr. G.), the Action of Horizontal and Vertical Pendulums in Seismography, 62
- Age of the Earth, the, Prof. Eugene Dubois, 498; the Geological Age of the Earth, J. Joly, F.R.S., 235
- Agnosticism, Naturalism and, James Ward, 25
- Agriculture: Irrigation and Drainage, F. H. King, 5; the Farmstead, Prof. J. P. Roberts, 53; Strontium and Barium unfit to replace Calcium in Phanerogams, Dr. U. Suzuki, 136; the Destruction of the "Moth-borer" Caterpillar, 182; Rural Wealth and Welfare, Geo. T. Fairchild, 245; "Frost Fighting," A. G. McAdie, 274; Solubility of Calcium Phosphate in Soil Water in Presence of Carbon Dioxide, Th. Schloesing, 312; Recent Investigations on Rust of Wheat, William G. Smith, 352; Michigan Board of Agriculture, Annual Report, 1898-99, 365. Agricultural Chemistry: Death of Sir John Bennet Lawes, Bart., F.R.S., 456; Obituary Notice of, Prof. R. Warington, F.R.S., 467; Agricultural Botany, John Percival, 570; Year-book of the United States Department of Agriculture, Prof. R. Warington, F.R.S., 597; Further Investigations of Xenia in Maize, Herbert J. Webber, 601; the Bobolink as a Rice Pest, F. E. L. Beal, 605
- Ainu *inao*, on the Japanese *Gohei* and the, W. G. Aston, 635
- Air: the Carbonic Anhydride of the Atmosphere, Prof. E. A. Letts, R. F. Blake, 387; the Air of Rooms, Francis Jones, 387
- Air, Water and Food, Ellen H. Richards, Alpheus G. Woodman, 620
- Aitken (John, F.R.S.), Dynamics of Cyclones and Anticyclones, ii., 95; Atmospheric Electricity, 366
- Aitken (R. G.), New Planetary Nebula, 606; New Double Stars, 630
- Alaska, the Ascent of Mount St. Elias, Duke of Abruzzi, 1, 529
- Albatross* in the Pacific, Explorations of the, 307
- Albatross, Tenacity of Life of the, Prof. John Perry, F.R.S., 621; Captain Wm. J. Reed, 621
- Albinism and Natural Selection, Walter Garstang, 620
- Alexander (W. B.), the Climate of St. Christopher, 35
- Algae, Codium, 63
- Algebra, Machine for Solving Algebraic Equations, Georges Meslin, 253
- Algeria: Vinification dans les Pays Chauds—Algérie et Tunisie, J. Dugast, 74
- Allbutt (Prof. T. C., F.R.S.), Historical Aspects of the Discovery of the Circulation of the Blood, 630
- Allchin (J. H.), a Swallow-cum-Sparrow Nest, 532
- Allen (J. A.), the Wood Bison, 35
- Allingham (William), A Manual of Marine Meteorology, 268
- Alloys: Heat of Formation, J. B. Tayler, 70; Want of Uniformity of Action of Copper-zinc Alloys on Nitric Acid, Dr. J. H. Gladstone, 70; Properties of Gold and Copper Alloys, Prof. Sir W. C. Roberts-Austen, F.R.S., and T. K. Rose, 93; the Solidification of Alloys, Fred. T. Trouton, F.R.S., 523

- Alnus Glutinosa*, on the Structure of the Root-nodules of, T. W. Woodhead, 613
- Alpine Tunnels, the Great, Francis Fox, 281
- Althaus (Dr. Julius), Death of, 157
- Amateur's Practical Garden Book, the, C. E. Hunn, L. H. Bailey, 101
- Amdrup Arctic Expedition, Return of, 577
- America: La spedizione di sua Altezza Reale il Principe Luig. Amadeo di Savoia, Duca degli Abruzzi al Monte Sant' Elia (Alaska), 1897, Dottore Filippo de Filippi, I., 529; the Highest Andes, E. A. Fitzgerald, Edward Whympfer, 38; Bulletin of American Mathematical Society, 69, 189, 260, 381; Transactions of American Mathematical Society, 260, 519; American Journal of Mathematics, 92, 381; American Journal of Science, 92, 210, 286, 432, 568, 638; Our Native (American) Birds, D. Lange, 100; the Geography of the Region about Devil's Lake and the Dalles of the Wisconsin, Prof. R. D. Salisbury, W. W. Atwood, 172; Sette Anni di Caccia Grossa e Note di Viaggio in America, Asia, Africa, Europa, Count Felice Scheibler, 244; the New York Meeting of the American Association, 269; Maryland Weather Service, 292; American Institute and English Institution of Electrical Engineers at Paris, 415; Missouri Botanical Garden, Eleventh Annual Report, 495
- Amsterdam Royal Academy, 47
- Amsterdam Royal Society, 96
- Analytical Chemistry, an Introduction to, G. G. Henderson, M. A. Parker, 292
- Analytical Portraiture, Francis Galton, F.R.S., 320; Photographic side of Mr. F. Galton's Suggestions, 374
- Anatomy: Death of Prof. G. V. Ellis, 16; Erinnerungen aus meinem Leben, A. Kölliker, 169; Death of Dr. Karl Lange, 198; Death and Obituary Notice of Prof. Corrado Tommasi-Crudeli, 228; Handbuch der Anatomie und Vergleichenden Anatomie des Centralnervensystems der Säugetiere, Dr. Edward Flatau, Dr. L. Jacobsohn, 267; Morphological Anatomy of Vertebrates; the Air-chambers in Mammalian Skull, Dr. S. Paulli, 323; the Brain of the Pond-Tortoise, Dr. B. Haller, 324; an Introduction to the Study of the Comparative Anatomy of Animals, G. C. Bourne, 364; Descriptive and Illustrated Catalogue of the Physiological Series of Comparative Anatomy contained in the Museum of the Royal College of Surgeons of England, 385; Genesis of the Vertebrate Column, Herbert Spencer, 620
- Ancient Records of Meteor Showers, M. D. Eginitis, 203
- Anderson (Dr. John, F.R.S.), Death of, 394; Obituary Notice of, 529
- Anderson (Prof. R. J.), Crooked-Keeled Breast-bone in Fowls, 159
- Anderson (Dr. T. D.), New Variable in Auriga, 161
- Andes, the Flora of the, H. H. W. Pearson, 46
- Andes, the Highest, E. A. Fitzgerald, Edward Whympfer, 38
- André (Ch.), Apparent Semi-diameter of Sun, 464
- André (G.), Action of Sulphur Dioxide and Hydrogen Sulphide on Pyridine, 216
- Andrews (C. W.), a Monograph of Christmas Island (Indian Ocean), Physical Features and Geology, 193
- Andrews (William), the Migration of Swifts, 436
- Anemometer Tests, Prof. C. F. Marvin, 280
- Angiopteris Evecta*, on the Structure of the Stem of, Miss R. F. Shove, 612
- Animal Cults of the Natives of Sarawak, on the, and their Bearing on the Problems of Totemism, Dr. C. Hose, W. McDougall, 634; Mr. Hartland, 635
- Animals, an Introduction to the Study of the Comparative Anatomy of, G. C. Bourne, 364
- Annalen der Physik, 92, 211, 338, 381, 568, 639
- Annandale (N.), on the Appearance and Habits of Some Malay Insects, 590
- Ant, Red, Web-spinning habits of, E. G. Green, 253
- Antarctica: Magnetic Observations during *Belgica* Expedition, 108; *Racovitzia Glacialis*, new Antarctic fish, Louis Dollo, 350; the Antarctic Regions, Dr. Karl Fricker, Dr. Hugh Robert Mill, 624; Through the First Antarctic Night, 1898-99, Frederick A. Cook, Dr. Hugh Robert Mill, 624
- Antelopes and their Recognition Marks, R. I. Pocock, 584
- Anthill, Artificial, at Paris Exhibition, C. Janet, 490
- Anthropology: the Races of Europe, a Sociological Study, William Z. Ripley, Prof. A. C. Haddon, F.R.S., 27; Death of Lieut.-Gen. Pitt-Rivers, F.R.S., 33; Obituary Notice of, 59; Dugong Vertebra as bracelet in Pelew Islands, Dr. O. Finsch, 36; Decorative Art of Sea Dayaks of Sarawak, Prof. A. C. Haddon, F.R.S., 68; Genealogical Researches in Torres Straits, Dr. W. H. R. Rivers, 71; Anthropological Institute, 71, 119, 167, 190; Stone Implements from Pitcairn Islands, J. Allen Brown, 119; Malay Magic, W. W. Skeat, 145; Earliest Communications between Italy and Scandinavia, Prof. O. Montelius, 167; Original Character of the British People, Nottidge Charles Macnamara, 172; the English Metric System of Criminal Identification, Dr. J. G. Garson, 190; Human Babies: what they Teach, S. S. Buckman, 221; the White Huns, C. de Ujfalvy, 323; Bushman Drawings, E. H. L. Schwarz, 336; Craniology of Irano-Indians, M. Ujfalvy, 351; Memorial Notices of F. H. Cushing, 397; Artificial Deformation of Heads and some Customs connected with Polyandry, Kumagusu Minakata, 437; Paleolithic Implements from Stellenbosch, L. Péringuey and G. S. Corstophine, 464; the Ginn in Morocco, Dr. E. Westermarck, 499; Slavic Skull at Niedersiedlitz, Prof. J. Deichmüller, 533; Mexican Symbolism, Carl Lumholtz, Prof. Alfred C. Haddon, 600; the Peopling of Australia, Sidney H. Ray, 621; Annual Congress of the German Anthropological Society, 632; see also Section H of the British Association
- Antonadi (E.), Anomaly of Dichotomous Phase of Venus, 464
- Applications of Electrical Science, Prof. G. F. Fitzgerald, 43
- Aquila, New Star in, 305
- Araucarioxylon*, on the Primary Structure of Certain Palæozoic Stems Referred to, Dr. D. H. Scott, F.R.S., 612
- Arber (E. A. Newell), on the Effect of Salts on the CO<sub>2</sub> Assimilation of *Ulua latissima*, 611
- Archæology: Pompeii and its Remains, 7; the Alleged Buddha Relics, 200; Indian Burial Caves on Rio Cunary, Brazil, Dr. Goeldi, 500; the Recent Cretan Discoveries and their bearing on the Early Culture and Ethnography of the East Mediterranean Basin, Arthur J. Evans, 526; see also Section H of the British Association
- Archibald (E. D.), Indian Famine-causing Droughts, 335
- Arctica: the Norwegian North Polar Expedition 1893-1896 to Franz Josef Land, Scientific Results, Fridtjof Nansen, J. F. Pompeckj, A. G. Nathorst, R. Collett, 146; the Russian Expedition at Spitsbergen, 373; Return of Amdrup Expedition, 577; Musk Ox to be Acclimatised in Sweden, 577
- Ardnamurchan, on a Granophyre Dyke Intrusive in Gabbro at, Prof. K. Busz, 588
- Argyll (the Duke of), Death and Obituary Notice of, 13
- Arithmetic: Elements de la Théorie des Nombres, E. Cohen, 52
- Arizona, "Chalcedony Park," the, L. F. Ward, 62
- Armitage (Mrs.), on some Yorkshire Earthworks, 637
- Armstrong (Prof.), Dr. Lodge's Paper on Volta's Contact Force, 70; Inhibiting Effect of Etherification on Substitution in Phenols, 261; Ions, 564
- Arnold (Mr.), Relative Advantages of Alternate and Continuous Current for General Electrical Supply, with regard to interference with other interests, 415
- Arons (L.), Electric Arc between Metallic Electrodes in Nitrogen and Hydrogen, 93
- Art and Industry, Science in Relation to, 32
- Art, Medicine as a Science and Medicine as an, Dr. P. H. Pye-Smith, F.R.S., 356
- Asbestos, Physical Structure of, Geoffrey Martin, 369
- Ascent of Sap, Dr. Henry H. Dixon, Prof. J. Joly, F.R.S., 572
- Aschan (Prof. Ossian), on the Constitution of Camphor, 567
- Asia: Sette Anni di Caccia Grossa e Note di Viaggio in America, Asia, Africa, Europe, Count Felice Scheibler, 244; Babylonians and Assyrians, Life and Customs, Rev. A. H. Sayce, 289
- Aspen Leaf, the Trembling of the, Henry J. Colbourn, 436
- Association of German Naturalists and Physicians, 553
- Assyria: the Reports of the Magicians and Astrologers of Nineveh and Babylon, R. C. Thompson, 5; Babylonians and Assyrians, Life and Customs, Rev. A. H. Sayce, 289
- Aston (W. G.), on the Japanese *Gohei* and the Ainu *inao*, 635
- Astrophographic Chart Conference, the, 377
- Astrology, the Reports of the Magicians and Astrologers of Nineveh and Babylon, R. C. Thompson, 51
- Astronomy: the Nature of the Solar Corona, Prof. Geo. Fras. Fitzgerald, F.R.S., 7; Photometry of Corona, April 16, 1893, Prof. H. H. Turner, 86; Proportion of Polarised Light in Solar Corona, J. J. Landerer, 167; Polarisation of Solar Corona observed at Elche, P. Joubin, 191; Automatic



- Photography of the Corona, Prof. C. Burckhalter, 535; Our Astronomical Column, 19, 37, 64, 86, 110, 137, 160, 183, 202, 233, 256, 304, 324, 352, 377, 398, 425, 459, 491, 501, 535, 556, 581, 606, 630; New Variable in Taurus, Madame Ceraski, 19; Relation between Solar Activity and Earth's Motion, W. G. Thackeray, 20; Determination of Solar Parallax from Opposition of Eros, Prof. S. Newcomb, 20; Ephemeris for Eros, 20, 110, 184, 233, 377, 459, 491, 501, 535, 556, 581, 606, 630; Photographic Observations of Eros, Prof. Howe, 137; Howe's Photographic Observation of Eros, A. C. D. Crommelin, 184; Measures of Eros, 233; Opposition of Eros, Prof. S. J. Brown, 425; M. Loewy, 630; Astronomical Application of Physical Problem Investigated at Solar Physics Observatory, Sir Norman Lockyer, 23; Comet Giacobini (1900 *a*) 37, 256; Colour Screens for Reflecting Telescopes, T. J. J. See and G. H. Peters, 37; Photometric Revision of Harvard Photometry, 37; the Total Eclipse of the Sun, 54, 132, 398; Charles P. Butler, 54; Sir Norman Lockyer, K.C.B., F.R.S., 104; M. Deslandres, 233; a French Observation of the Total Eclipse of the Sun, 183; the Total Eclipse Observed at Sea, Col. E. E. Markwick, 183; the Total Solar Eclipse as Observed by the Smithsonian Expedition, 246; Maximum Duration of a Total Solar Eclipse, C. T. Whitmell, 64, 86; Duration of Totality of Solar Eclipses at Greenwich, Chas. T. Whitmell, 269; the Dark Fringes Observed during Total Solar Eclipses, V. Ventosa, 86; Actinometric Observations during Solar Eclipse of May 28, 1900, J. Violle, 216; S. R. Bennett, 263; the Solar Eclipse of May 28, Prof. Copeland and Thomas Heath, 263; Eclipse Photography, Prof. Francis E. Nipher, 246; the Next Total Eclipse of the Sun, 202; the Total Eclipse of the Sun of May 17-18, 1900, J. J. A. Muller, 389; Unpublished Observations at Radcliffe Observatory, 1774-1838, Dr. A. A. Rambaut, 64; Rotation of Jupiter and his Spots, Th. Bredikhin, 70; the Spectrum of  $\beta$ -Lyrae and  $\eta$ -Aquila, A. Belopolsky, 70; Zenitho-nadiral Apparatus for Measuring Zenithal Distances of Stars near Zenith, A. Cornu, 95; Astronomical Occurrences in June, 110; in July, 202; in August, 304; in September, 425; in October, 535; Oxford University Observatory, Prof. H. H. Turner, 110; Rousdon Observatory, Devon, Sir C. E. Peek, 110; Occultation of Saturn, 137; Harvard College Observatory, 137; Liverpool Observatory, W. E. Plummer, 137; Temperature Control of Spectrograph, Prof. W. W. Campbell, 137; Rotation Period of Venus, Prof. A. Belopolsky, 160; Jeremiah Horrocks and the Transit of Venus, 257; Anomaly of Dichotomous Phase of Venus, E. Antoniadi, 464; New Variable in Auriga, Dr. T. D. Anderson, 161; Photographic Observations of Satellite of Neptune, M. S. Kostinsky, 161; the Perseid Meteoric Shower, W. F. Denning, 173; the August Perseids of 1900, W. F. Denning, 398; Ancient Records of Meteor Showers, M. D. Eginitis, 203; Meteor of July 17, 305; Meteoric Theory of the Gegen-schein, F. R. Moulton, 305; Velocities of Meteors, Dr. W. L. Elkin, 398; the Daylight Meteor of Sunday, September 2, W. F. Denning, 491; T. Rooke, 524; B. H. G. Lefroy, 524; the Fireball of Sunday, September 2, 535; the Stability of a Swarm of Meteorites and of a Planet and Satellite, Prof. A. Gray, F.R.S., 582; New Variable Star in Cepheus, Madame Ceraski, 183; the Kinetic Theory of Planetary Atmospheres, Prof. G. H. Bryan, F.R.S., 189; the Royal Observatory, Greenwich, 233; Notes on Saturn and his Markings, W. F. Denning, 237; Occultations of Saturn, 425; Rhythms and Geologic Time, G. K. Gilbert, 275; New Variable in Hercules, Madame Ceraski, 305; New Star in Aquila, 305; Comet Borrelly-Brooks, 1900 *b*, 324, 352, 377, 535; G. Rayet and A. Férand, 464; Catalogue of Double Stars, Prof. S. W. Burnham, 324; Ephemeris of Comet 1894 IV. (Swift), 352; Comet Swift (1894 IV.), 459; Variable Stars in Clusters, 352; the Astro-graphic Chart Conference, 377; Determination of Solar Parallax, 377; Observations of Stars, Capella as Double Star, W. H. M. Christie, 383; Report of the Cape Observatory, Sir David Gill, 398; Rousdon Observatory (Devon), Variable Stars, T Cassiopeiae and R Cassiopeiae, Sir C. E. Peek, 398; Independent Day Numbers for 1902, 398; Standards for Faint Stellar Magnitudes, 398; Ring Nebula in Lyra, 425; Orientation of the Field of View of the Siderostat and Coelostat, A. Fowler, 428; Death of Prof. J. E. Keeler, 456; Obituary Notice of, 497; the New Spectrographs for the Potsdam Great Refractor, Prof. H. C. Vogel, 459; Structure and Composition of Two New Meteor-ites, G. P. Merrill, H. N. Stokes, 459; Latitude Variation, Earth Magnetism and Solar Activity, Dr. J. Halm, 460; Apparent Semi-Diameter of Sun, Ch. André and Ph. Lagrula, 464; Swift's Comet (1892 I.), Prof. W. Pickering, 501; Astronomischer Jahresbericht, W. F. Wislicenus, 553; a Night with the Great Paris Telescope, C. P. Butler, 574; New Planetary Nebula, R. G. Aitken, 606; Paris Observatory Annual Report, M. Loewy, 606; New Double Stars, R. G. Aitken, 630; Astronomical Work at Daramona Observatory, W. E. Wilson, 630
- Astrophysics: Escape of Gases from Planetary Atmospheres, S. P. Cook, 54; Dr. G. Johnstone Stoney, F.R.S., 78; Comets and Corpuscular Matter, F. H. Loring, 80
- Atkinson (Dr. Edward), Death and Obituary Notice of, 34
- Atkinson (Prof. George F.), Lessons in Botany, 30
- Atlantic Ocean, North, on the Weather of the, during the Winter 1898-9; Captain Campbell Hepworth, 563
- Atlas of Urinary Sediments, Dr. Hermann Riedel, 53
- Atmosphere, the Carbonic Anhydride of the, Prof. E. A. Letts, R. F. Blake, 387
- Atmospheres, Planetary, the Kinetic Theory of, Prof. G. H. Bryan, F.R.S., 126
- Atmospheric Electricity, C. T. R. Wilson, 149; John Aitken, F.R.S., 366
- Atmospheric Electricity and Dew-ponds, Arthur Marshall, 495
- Atmospheric Resistance, Specially built Train for Experiment on, 200
- Atmospherical Circulation, Dynamical Theory of, Prof. V. Bjerknes, 200
- Atwater (Prof. W. O.), Dietary Studies of Harvard and Yale University Boat Crews, 232
- Atwood (W. W.), the Geography of the Regions about Devil's Lake and the Dalles of the Wisconsin, 172
- Auerbach (F.), Hardness of Metals, 639
- August Perseids of 1900, the, W. F. Denning, 398
- Auriga, New Variable in, Dr. T. D. Anderson, 161
- Australia: a Key to the Birds of Australia and Tasmania, with their Geographical Distribution in Australia, R. Hall, 6; Fungus Diseases of Citrus Trees in Australia and their Treatment, D. McAlpine, 494; Catalogue of Eastern and Australian *Lepidoptera Heterocera* in the Collection of the Oxford University Museum, 548; the Peopling of Australia, John Mathew, 549; Sidney H. Ray, 621
- Automatic Photography of the Corona, Prof. C. Burckhalter, 535
- Automobile Trials at Paris Exhibition, 158
- Automobiles, the Musker Steam Motor Wagon, 554
- Automotive Curves, A. B. Basset, F.R.S., 572
- Autumn Tints, Leaf Decay and, P. Q. Keegan, 523
- Ayrton (Prof. W. E., F.R.S.), Electrical Power Distribution, 296; a Recollection of King Umberto, 320; Relative Advantages of Alternate and Continuous Current for General Electrical Supply, with regard to Interference with other interests, 416
- Babies, Human, What they Teach, S. S. Buckman, 221
- Babylon, the Reports of the Magicians and Astrologers of Nineveh and, R. C. Thompson, 51
- Babylonians and Assyrians, Life and Customs, Rev. A. H. Sayce, 289
- Bacchus (Ramsden), the Forthcoming Meeting of the British Association at Bradford, 156, 300, 392, 439
- Bacteriology: the Principles of Bacteriology, Dr. Ferdinand Hueppe, Dr. A. C. Houston, 73; Bacteriological Method of Exterminating Rats, J. Danysz, 84; the Bacterial Treatment of Sewage, Dr. Frank Clowes, Dr. Houston, 128; Micro-Organisms and Fermentation, Alfred Jürgensen, 195; Influence of Temperatures of Liquid Hydrogen on Bacteria, Allan Macfadyen and Sydney Rowland, 286; Bacillus Anthracis Brevigemmans, C. Phisalix, 408; Living Light, Raphael Dubois, 464; the Structure and Functions of Bacteria, Alfred Fischer, Dr. A. C. Houston, 465; Tobacco, 576; the Melbourne University Laboratory, 578
- Baeyer (Herr), the New Hydride of Benzoyl Superoxide, 202; the Action of Permanganate on Hydrogen Peroxide, 629
- Bailey (Dr. G. H.), Elements of Qualitative Analysis, 412
- Bailey (L. H.), the Amateur's Practical Garden Book, 101
- Bailey (V.), Field-mice (North American Voles), 232
- Baily (Prof. F. G.), on a Lecture-room form of Volt and Ammeter, 563

- Baker (R. J.), New Meteorite from New South Wales, 384  
 Baker (T. J.), a Surface-Tension Experiment, 196  
 Balachowsky (Dmitri), Electrolytic Estimation of Bismuth, 312 ;  
 Electrolytic Estimation of Cadmium, 384  
 Balances, Thermal Deformation of, T. Middel, 211  
 Balfour (Right Hon. A. J.) on Scientific Progress, 358  
 Ballistics, some Modern Explosives, Sir Andrew Noble, K.C.B.,  
 F.R.S., 86, 111  
 Bamber (E. F.), Electricity Direct from Coal, 437  
 Bamberger (Prof.), Products of Nitroso-Benzene, 304  
 Bamboo Manna, David Hooper, 127  
 Banks (Right Hon. Sir Joseph), Illustrations of the Botany of  
 Captain Cook's Voyage Round the World in H.M.S. *Endeavour*  
 in 1768-71, 547  
 Barker's (J. H.) Combined Integrating Wattmeter and Maximum  
 Demand Indicator, 610  
 Barnard (R. J. A.), the Annual March of Temperature, 579  
 Barnes (Prof. Charles Reid), Outlines of Plant-Life, with Special  
 Reference to Form and Function, 30  
 Barnes (J.), the Depression of the Freezing-point in Salts Con-  
 taining a Common Ion, 64  
 Barnett (W. G.), Quaternion Methods applied to Dynamics, 174  
 Barometer, on a Novel Form of Mercurial, A. S. Davis, 562  
 Barrett (Mr.), the Cape Colony Fruit-Moth, 119  
 Barrett (Charles G.), Lepidoptera of the British Islands, 317  
 Barus (C.), Method of Studying Diffusion of Air through Water,  
 210  
 Basset (A. B., F.R.S.), on the Result that a Quintic Curve can-  
 not have more than Fifteen Real Points of Inflexion, 561 ;  
 Autotomic Curves, 572  
 Bataillon (E.), Experimental Parthogenetic Segmentation in  
 Amphibia and Fish, 288  
 Bather (F. A.), a Manual of the Echinoderms, 545  
 Bathymetrical Survey of the Fresh-water Lochs of Scotland,  
 Sir John Murray, K.C.B., F.R.S., and Fred. P. Pullar, 65,  
 263  
 Batrachia, Unusual Modes of Development in, Miss Sampson,  
 605  
 Baud (E.), Action of Anhydrous Aluminium Chloride on Acety-  
 lene, 96  
 Bauer (Dr. L. A.), Magnetic Observations during Solar Eclipses,  
 302  
 Bawden (H. H.), Mental Lapses, 108  
 Baxter (G. P.), the Atomic Weight of Iron, 160  
 Bay of Biscay, the Plankton of the, G. Herbert Fowler, 317  
 Bayley (R. C.), Photography in Colours, 195  
 Beal (F. E. L.), the Bobolink as a Rice-Pest, 605  
 Beard (W. F.), the Reform of Mathematical Teaching, 466  
 Beattie (Prof. J. C.), Electrical Leakage from Charged Bodies,  
 360  
 Beaulard (F.), the Viscosity of Dielectrics, 47  
 Beazeley (Alexander), the Reclamation of Land from Tidal  
 Waters, 266  
 Becquerel (Henri), the Radiation of Uranium, 191 ; the  
 Uranium Radiation, 312  
 Becquerel Rays, Sources and Properties of, Prof. G. H. Bryan,  
 F.R.S., 151  
 Beddard (Frank E., F.R.S.), Vibrissæ on the Forepaws of  
 Mammals, 523  
 Beddoe (Dr. John), on the Vagaries of the Cephalic Index, 633 ;  
 on the Anthropology of West Yorkshire, 635  
 Beddow (F.), Condensation of Phenols with Ethyl Phenyl-  
 propionate, 215  
 Beecher (C. E.), Restoration of *Stylonurus Lacoanus*, 432  
 Beetle, the Tiger, Fred. Enock, 208  
 Beeton (M.), Correlation between Life Duration and Number of  
 Offspring, 381  
 Behr (F. J.) on the Proposed Mono-rail High Speed Electric  
 Railway between Manchester and Liverpool, 610  
 Behrendsen (O.), Behaviour of Radium at Low Temperatures,  
 335  
 Bell (A. M.), on the Occurrence of Flint Implements of Palæo-  
 lithic Type on an old Land Surface in Oxfordshire, 636  
 Bellamy (V.), the Salt Lake of Larnaca, 94  
 Belopolsky Prof. A.), the Spectrum of  $\beta$  Lyræ and  $\eta$  Aquilæ,  
 70 ; Rotation Period of Venus, 160  
 Bennett (S. R.), Actinometric Observations of Solar Eclipse of  
 May 28, 263  
 Benzene, Report of the Committee of the British Association on  
 Isomeric derivatives of, 567  
 Berg (Dr. Otto), Significance of Kathode Rays in Connection  
 with Mechanism of Discharge, 628  
 Berget (Alphonse), Demonstration of Earth's Rotation with one  
 metre long Pendulum, 288 ; Apparatus for Measuring Geodetic  
 Bases, 408  
 Bermudas, Geology of, A. E. Verrill, 92  
 Berthelot (Daniel), Nitric Acid Formation during Combustion,  
 119, 143 ; Nitric Acid Formation in Combustion of Hydrogen,  
 216 ; Boiling Points of Zinc and Cadmium, 384 ; Egyptian  
 Gold, 464 ; Products and Decomposition of Nitric Esters and  
 Nitroglycerine by Alkalis, 544 ; Absorption of Free Oxygen  
 by Normal Urine, 592  
 Bertrand (Gabriel), Erythrulose, a new Sugar, 85 ; *d*-Erythrite,  
 144  
 Bessey (Prof. C. E.), Age of Big Trees of California, 627  
 Beyerinck (Prof.), Indigo Fermentation, 47  
 Biffen (R. H.), on the Life History of *Acrospeira mirabilis*,  
 613  
 Big Game in Africa, the Preservation of, E. N. Buxton, 550  
 Binet (Alfred), the Psychology of Reasoning, 388  
 Binnie (W. T. E.), on a New Form of Self Registering Rain  
 Gauge, 610  
 Biology : Histologische Beiträge, Heft IV. E. Strasburger, Prof.  
 J. B. Farmer, 28 ; Biology as an "Exact" Science. The  
 Grammar of Science, Prof. Karl Pearson, F.R.S., 49 ; All-  
 gemeine Biologie, Prof. Dr. Max Kassowitz, Prof. H.  
 Marshall Ward, F.R.S., 217 ; Facts of Inheritance, Prof. J.  
 Arthur Thompson, F.R.S., 331 ; Textbook of Zoology,  
 treated from a Biological Standpoint, O. Schmeil, 386 ;  
 Probleme Kritische Studien über den Monismus, Dr. H. v.  
 Schoeler, 435 ; Tobacco, 576 ; Genesis of the Vertebrate  
 Column, Herbert Spencer, 620 ; on the Biology and Cytology  
 of Pythium, Prof. Trow, 613 ; M. Poirault, 613 ; E. J.  
 Butler, 613 ; Marine Biology, Fixation of Clay in Suspension  
 in Water by Porous Bodies, J. Thoulet, 191 ; Annual  
 General Meeting of Marine Biological Association, 230 ; Use  
 of Diver for Collection of Specimens, 253 ; the Plankton of  
 the Bay of Biscay, G. Herbert Fowler, 317 ; the Cruise and  
 Deep-Sea Exploration of the *Siboga* in the Indian  
 Archipelago, 327 ; Deep Sea Deposits from *Valdivia* Ex-  
 pedition, Sir John Murray and Dr. Philippi, 360 ; Biological  
 Lectures from the Marine Laboratory at Wood's Holl, U.S.A.,  
 for 1899, 411 ; Place of Copepoda in Nature, Isaac C.  
 Thompson, 498  
 Birch Trees, Disease of, in Epping Forest and Elsewhere, Robt.  
 Paulson, 599  
 Bird Life, the Study of, W. P. Pycraft, 221  
 Birds, a Key to the Birds of Australia and Tasmania, with their  
 Geographical Distribution in Australia, R. Hall, 6 ; Racket  
 Feathers, L. W. Wiglesworth, 54 ; the Reviewer, 54 ;  
 British Birds, C. W. Wyatt, 100 ; Our Native (American)  
 Birds, D. Lange, 100 ; among the Birds in Northern Shires,  
 Charles Dixon, 177 ; Change of Feeding Habits of Rhino-  
 ceros-birds in British East Africa, Prof. E. Ray Lankester,  
 F.R.S., Capt. Hinde, 366 ; the Birds of Surrey, J. A.  
 Bucknill, 339 ; the Migration of Swifts, William Andrews,  
 436 ; on the Migration of British Birds, Eagle Clarke, 588 ;  
 Tenacity of Life of the Albatross, Prof. John Perry, F.R.S.,  
 621 ; Captain Wm. J. Reid, 621  
 Birmingham, the University of, 141  
 Bison, the Wood, J. A. Allen, 35  
 Bjerknes (Prof. V.), Vorlesungen über hydrodynamische  
 Fernkräfte nach C. A. Bjerknes' Theorie, 3 ; Dynamical  
 Theory of Atmospheric Circulation, 200  
 Black Sea, Physical, Chemical and Biological Conditions of,  
 Sir John Murray, 191  
 Blackman (W. L.), Estimation of Nitrogen Chloride and  
 Bromide Derivatives of Ortho- and Para-acet-toluide, 71  
 Blake (Rev. J. F.), on the Registration of Type Specimens,  
 587  
 Blake (R. F.), the Carbonic Anhydride of the Atmosphere,  
 387 ; on some Problems connected with Atmospheric Carbonic  
 Anhydride and on a New and Accurate Method of determining  
 its Amount, 566  
 Blanc (G.),  $\beta$ -phenyl and  $\beta$ -benzyl- $\alpha$ -alkoxy- $\alpha$ -cyanoacrylic Acids,  
 191 ; Synthesis of *aa*-dimethyl- $\gamma$ -cyanotricarballylic Ester, 264  
 Blondel (A.), Maximum Sensitiveness in Coherers for Wireless  
 Telegraphy, 23  
 Blood, Histology of the, Normal and Pathological, P. Ehrlich  
 and A. Lazarus, Dr. T. H. Milroy, 410

- Blood, Historical Aspects of the Discovery of the Circulation of the, Prof. T. Clifford Allbutt, F.R.S., 630
- Bloomer (H. H.), the Reparative Power of the Pond-Mussel, 274
- Bodroux (F.), Direct Production by Wet Method of Crystalline Mercuric and Mercurous Iodides, 191
- Bois (H. du), Magnetic Screening for Galvanometers, 211
- Bolas (Thomas), a Handbook of Photography in Colours, 434
- Bollettino della Società Sismologica Italiana, 93, 286
- Bombay, Earthquake in, 578
- Bonney (Prof. T. G., F.R.S.), Snow-Drifts on Ingleborough, 412; Memoirs of the Geological Survey of the United Kingdom: The Cretaceous Rocks of Britain, vol. i., the Gault and Upper Greensand of England, A. J. Jukes-Browne, 617
- Bore, the Severn, Vaughan Cornish, 126
- Borneo, on Relics of the Stone Age in, Dr. A. C. Haddon, 637; Dr. C. Hose, 637
- Borrelly-Brooks, Comet, 1900 *b.*, 324, 352, 377, 535; G. Rayet and A. Férand, 464
- Bose (Prof. Jagadis Chunder), Electric Touch and Molecular Changes produced by Electric Waves, 335; on the Effect of Electrical Stimulus on Organic and Inorganic Substances, 564
- Botany: Death of Prof. Kyokichi Yatabe, 15; Lessons in Botany, Prof. George F. Atkinson, 30; Outlines of Plant Life with Special Reference to Form and Function, Prof. Charles Reid Barnes, 30; Note on some Blue and Red Pigments, Prof. T. D. A. Cockerell, 31; the High-Level Flora of Tibet, W. B. Hemsley, 46; the Flora of the Andes, H. H. W. Pearson, 46; Linnean Society, 46, 143, 215, 262; Indigo Fermentation, Prof. Beyerinck, 47; Indican, J. Hazewinkel, 47; Prof. Hoogewerf and H. ter Meulen, 47; Modifications of Structure in Cells in True Fermentation, MM. L. Matruchot and M. Molliard, 47; Object Lessons in Botany from Forest, Field, Wayside and Garden, Edward Snelgrove, 53; Codium, 63; Ousounify, a New Edible Tuber from the Soudan, Maxime Cornu, 72; the Textile Uses of Peat, Herr Zschorner, 108; Composition of Albumen of St. Ignatius and Nux Vomica Beans, Em. Bourquelot and J. Laurent, 120; Reserve Carbohydrates of St. Ignatius Bean and Nux Vomica, Em. Bourquelot and J. Laurent, 336; Bamboo Manna, David Hooper, 127; Rubber Cultivation in Samoa, 136; Rubber Forests in Peru, 578; Effect of Iron upon the Growth of Grass, 151; Plant Hybrids, Wilfred Mark Webb, 174; Variations in Plants of the Herb Paris, Miss L. Eleanor Jex Blake, 174; Death of W. P. Sladen, 179; Mummy Cereals, Edmond Gain, 191; Insect Visitors to Iris, Prof. J. G. Needham, 201; Static Diffusion of Gases and Liquids in relation to Carbon-assimilation and Translocation in Plants, H. T. Brown, F.R.S., and F. Escombe, 212; Reserve Carbohydrates in Seed of *Trifolium repens*, H. Hérissé, 216; Diatomaceæ of Lakes Brianza and Segрино, Dr. Benedetto Corti, 232; the Poison of *Lotus Arabicus*, W. R. Dunstan, F.R.S., and T. A. Henry, 238; Journal of Botany, 260, 520; Composition of Albumen of *Gleditsia triacanthos* Seed, Maurice Goret, 264; the Origin of the British Flora, Clement Reid, F.R.S., 268; Action of Dry and Moist Air on Plants, M. Eberhardt, 312; Influence of Dry Air on Plant Structure, M. Eberhardt, 520; Le Café, Culture—Manipulation—Production, Henri Lecomte, 338; Untersuchungen ueber d. Vermehrung d. Laubmoose durch Brutorgane und Stecklinge, Dr. Carl Correns, 339; Recent Investigations on Rust of Wheat, William G. Smith, 352; Electrical Effect of Light on Green Leaves, 358; Die Glykocide, Dr. J. J. I. Van Rijn, 363; Amyl Ester of Eudesmic Acid in Eucalyptus Oils, H. G. Smith, 384; the Trembling of the Aspen Leaf, Henry J. Colbourn, 436; Action of Total Pressure of Carbon Dioxide on Assimilation by Chlorophyll, Jean Friedel, 464; Fungus Diseases of Citrus Trees in Australia, and their Treatment, D. McAlpine, 494; Missouri Botanical Garden, Eleventh Annual Report, 495; Large Puff Balls, W. A. Sanford, 496; Wood of Peat Bog Conifers, L. G. de Lamarlière, 520; Leaf Decay and Autumn Tints, P. Q. Keegan, 523; Illustrations of the Botany of Capt. Cook's Voyage round the World in H.M.S. *Endeavour* in 1768-71, Rt. Hon. Sir Joseph Banks and Dr. Daniel Solander, with Determinations by James Britten, W. Botting Hemsley, F.R.S., 547; Pflanzen und Tierverbreitung, Prof. Alfred Kirchoff, Dr. Otto Stapf, 569; Agricultural Botany, John Percival, 570; Ascent of Sap, Dr. Henry H. Dixon, Prof. J. Joly, F.R.S., 572; Tobacco, 576; Oxycelluloses from Cotton, Flax and Hemp, Leo Vignon, 592; Mutability of *Eriogonum Lamarckiana*, Hugo de Vries, 592; Flora of Bournemouth, including the Isle of Purbeck, E. F. Linton, 598; Further Investigations of Xenia in Maize, Herbert J. Webber, 601; Age of Big Trees of California, Prof. C. E. Bessey, 627; Proteolytic Ferment of Germinating Seeds, V. Harlay, 639; New South Wales Linnean Society, 640
- Bottomley (W. B.), on Bradford Sewage and its Treatment, 568
- Bottone (S. R.), Wireless Telegraphy and Hertzian Waves, 522
- Bougault (J.), Oxidation of Anethol and Analogues, 240; Action of Iodine and Yellow Oxide of Mercury on Styrolene and Safrol, 544
- Bourcet (P.), Iodine in Organism, 384; Presence of Iodine in Blood, 216
- Bourget (Prof. Henry), a Surface-tension Experiment, 269
- Bourne (G. C.), an Introduction to the Study of the Comparative Anatomy of Animals, 364
- Bournemouth, Flora of, including the Isle of Purbeck, E. F. Linton, 598
- Bourquelot (Em.), Composition of Albumen of St. Ignatius and Nux Vomica Beans, 120; the Reserve Carbohydrates of St. Ignatius Bean and Nux Vomica, 336; Preparation of Gento-pirine and Glucoside from Fresh Gentian Root, 288
- Boutan (M.), Death of, 179
- Bouty (E.), Dielectric Cohesion of Gases, 432; Dielectric Cohesion and Explosive Fields, 464
- Bouveault (L.), Method for Preparing Synthetically Higher Homologues of Acetolacetic Ester and Acetylacetone, 264
- Bower (Prof.), the Sand-binding Plant of the Dunes on the Scotch Coast near Berwick, 611
- Bowman (H. L.), Properties of Crystals yielding Doubly Refracting Liquids on Fusion, 68
- Boyle (David), on the Paganism of the Iroquois of Ontario, 635
- Brace (Prof. D. B.), Observation of the Circular Components in the "Faraday Effect," 368
- Bradford Meeting of the British Association, the Ramsden Bacchus, 156, 300, 392, 439; the Sectional Programmes, 369
- Bradford Sewage and its Treatment, on, F. W. Richardson, 567; W. Leach, 568; W. B. Bottomley, 568
- Brain, Microcephalic, on the, Prof. J. D. Cunningham, 633
- Brazil, Indian Burial Caves on Rio Cunany, Dr. Goeldi, 500
- Bredikhin (Th.), Rotation of Jupiter and his Spots, 70
- Bredt (Prof. J.), on the Constitution of Camphor, 567
- Brindley (H. H.), Abnormalities of Limbs and Tail of Dipnoean Fishes, 215
- Britain: a Tour through Great Britain in 1727, S. L. Petty, 496; Memoirs of the Geological Survey of the United Kingdom. The Cretaceous Rocks of Britain, vol. i. The Gault and Upper Greensand of England, A. J. Jukes-Browne, Prof. T. G. Bonney, F.R.S., 617
- British Association, the Bradford Meeting of the, Preliminary Arrangements, 369; Ramsden Bacchus, 156, 300, 392, 439; Inaugural Address by Prof. Sir William Turner, F.R.S., President of the Association, 440; Report on the Proceedings in Section A, Mathematics, E. T. Whittaker, 561; Report on the Proceedings in Section A, Physics, Dr. C. H. Lees, 562; Report on the Proceedings in Section A, Astronomy, A. Fowler, 565
- Section A (Mathematics and Physics).—Opening Address by Joseph Larmor, F.R.S., President of the Section, 449; Report of the Committee for Calculating Tables of certain Mathematical Functions, 561; Report of Miss F. Hardcastle on the Present State of the Theory of Point Groups, 561; Major MacMahon on a Property of the Characteristic Symbolic determinant of any  $n$  quantities in  $n$  variables, 561; Prof. Cyparissos Stephanos sur les Relations entre la Géométrie Projective et la Mécanique, 561; Mr. H. S. Carslaw on the Use of Multiple Space in Applied Mathematics, 561; Lieut.-Colonel Cunningham and Mr. H. J. Woodall on the Determination of Successive High Primes, 561; Dr. J. Willis on the Construction of Magic Squares, 561; Major MacMahon on the Aszygetic and Perpetual Co-variants of systems of Binary Quantics, 561; Major MacMahon on the Symbolism appropriate to the study of Orthogonal and Boolean Invariant Systems which appertain to Binary and other Quantics, 561; Mr. A. B. Basset, F.R.S., on the result that a Quintic Curve cannot have more than Fifteen Real Points of Inflection, 561; Dr. Trouton on the Creeping of Liquids and on the Surface Tension of

Mixtures, 562; Prof. G. H. Bryan on the Partition of Molecular Energy, 562; Prof. Fitzgerald, 562; Dr. Larmor on the Results of his Application of the Principle of Least Action to the Statistical Dynamics of Gas Theory, as illustrated by Meteor Swarms and Optical Ray Systems, 562; Report of the Seismological Committee, 562; Dr. Larmor on the Relation of Radiation to Temperature, 562; Prof. Fitzgerald, 562; Dr. S. P. Langley's Chart of the Infra-red Spectrum from  $7$  to  $5.3\mu$  obtained by the Bolometric Method, 562; Report of the Committee on Meteorological Phenomena, 562; Report of the Committee on Solar Radiation on Experiments by Prof. Callendar on the Modified Copper-cube Actinometer, 562; Mr. A. S. Davies on a Novel Form of Mercurial Barometer, 562; Mr. A. L. Rotch on the Use of Kites for Meteorological Observations, 563; Captain Campbell Hepworth on the Weather of the North Atlantic Ocean during the Winter 1898-9, 563; Mr. J. W. Thomas on the Physical Effects of Wind in Towns and their Influence upon Ventilation, 563; Mr. J. Hopkinson on the Rainfall of the Northern Counties of England, 563; Mr. G. E. Petaval's Apparatus for Experiments on the Explosive Pressures of Gases, 563; Mr. J. W. Gifford's Quartz-calcite Lens with Identical Visual and Photographic Focus, 563; Messrs. A. Dufton and W. M. Gardner's Arrangement for producing Artificial Light of the same Character as Daylight, 563; Mr. H. Ramage's Method of Investigating Correspondences between Spectra, 563; Mr. G. J. Burch's Experiment on Simultaneous Contrast, 563; Report of the Committee for improving the Method of Determining Magnetic Force on Board Ship, 563; Report of the Committee on Radiation in a Magnetic Field, 563; Report of the Electrical Standards Committee on the Removal of the Standards to Kew, 563; Mr. R. S. Whipple's Improved Standard Resistance Coils, 563; Mr. E. H. Griffith's Form of Wheatstone Bridge for Determining the Freezing-points of Dilute Solutions by Platinum Thermometry, 563; Mr. R. Threlfall, 563; Prof. F. G. Baily on a Lecture-room Form of Volt- and Ammeter, 563; Prof. W. B. Morton's Results obtained by applying J. J. Thomson's and Sommerfeld's Solution of the Propagation of an Electric Wave along a Single Wire, 563; Mr. S. H. Burbury on the Vector Potential of Electric Currents in a Field where Disturbances are propagated with Finite Velocity, 563; Sir William H. Preece on Wireless Telegraphy, 564; Prof. G. F. Fitzgerald on Crémieu's Experiment, 564; Dr. J. Larmor, 564; Prof. J. Chunder Bose on the Effect of Electrical Stimulus on Inorganic and Organic Substances, 564; Report of the Committee on Electrolysis and Electrical Chemistry, 564; Prof. G. F. Fitzgerald on Ions, 564; Dr. J. Larmor, 564; Prof. H. E. Armstrong, 564; Mr. Whetham, 564; Prof. Oliver J. Lodge, 564; Mr. W. J. Pope, 564; Dr. H. C. Pocklington on the Radiation of a Black Body on the Electro-magnetic Theory, 564; Mr. C. E. S. Phillips on the Apparent Emission of Kathode Rays from an Electrode at Zero Potential, 564; Mr. J. B. B. Burke on the Phosphorescent Glow in Gases, 564

*Section A (Department of Astronomy).*—Opening Address by Dr. A. A. Common, F.R.S., Chairman of the Department, 471; Prof. Todd on the Application of the Electric Telegraph to the furtherance of Eclipse Research, 565; Prof. Todd on Operating Eclipse Instruments Automatically, 565; Prof. Todd on the Use of a Wedge of Yellow Optical Glass in giving correctly Graduated Photographic Exposures of the Partial Phases of an Eclipse and the Corona, 565; the Rev. A. L. Cortie on the Classification of Sun Spots, 565; Prof. Turner on a Cheap Form of Micrometer for determining Star Positions on Photographic Plates, 565; Dr. W. J. Lockyer's Comparison of the Details of the Prominences and Corona on Photographs of the recent Eclipse taken by Prof. Langley in America, and Sir Norman Lockyer in Spain, 565; Mr. A. R. Hinks on the New Form of Refracting Telescope recently erected at Cambridge, 565; Mr. A. R. Hinks on Preparations for determining the Solar parallax by Observations of Eros, 565; Prof. Turner, 565; Mr. W. E. Plummer on Some Points connected with the Photography of a Moving Object, 565; Mr. A. R. Hinks, 565; Mr. John Herschel on his Method of Observing and Recording the Paths of Meteors, 565; Mr. C. T. Whitwell on the Duration of Totality of the Solar Eclipse of May 28, 1900, 566

*Section B (Chemistry).*—Opening Address by Prof. W. H. Perkin, F.R.S., President of the Section, 476; Report of the Committee on the Teaching of Science in Elementary Schools, 566; Dr. Letts and Mr. R. F. Blake on some Problems Connected with Atmospheric Carbonic Anhydride and on a New and Accurate Method of Determining its Amount, 566; Mr. W. Ackroyd on the Distribution of Chlorine in West Yorkshire and on the Limiting Standard of Acidity for Moorland Waters, 566; Dr. T. W. Hime on the Effects of Copper on the Human Body, 566; Prof. H. B. Dixon and Mr. F. W. Rixon on the Specific Heat of Gases up to a Temperature of  $400^{\circ}$ , 566; Mr. F. H. Neville on the Chemical Compounds contained in Alloys, 566; Prof. J. A. Ewing and Mr. W. Rosenhain on the Crystalline Structure of Metals, 567; Messrs. H. J. H. Fenton and H. O. Jones on a Simple Method of Comparing the "Affinities" of Certain Acids, 567; Mr. W. J. Pope on Recent Developments in Stereochemistry, 567; Prof. J. Bredt and Prof. Ossian Aschan on the Constitution of Camphor, 567; Report of the Committee on Isomeric Naphthalene Derivatives, 567; Report of the Committee on Isomeric Derivatives of Benzene, 567; Dr. J. B. Cohen and Mr. H. D. Dakin on the Chlorination of the Aromatic Hydrocarbons and the Constitution of the Dichlorotoluenes, 567; Mr. C. F. Cross on the Action of Caro's Reagent on Furfural, 567; Mr. T. Fairley on the Heating and Lighting Power of Coal Gas, 567; Dr. A. Liebmann on the Recent Improvement in the Textile Industries, 567; Mr. F. W. Richardson on Bradford Sewage and its Treatment, 567; Mr. W. Leach, 568; Mr. W. B. Bottomley, 568

*Section C (Geology).*—Opening Address by Prof. W. J. Sollas, F.R.S., President of the Section, 481; Prof. W. B. Scott on Recent Explorations in Patagonia, 587; Prof. J. Milne's Report of the Seismological Committee, 587; Mr. S. W. Cuttriss on the Pot-holes and Caves of the Mountain Limestone Districts of North-west Yorkshire, 587; the Rev. W. Lower Carter and Mr. A. R. Derryhouse on the Subterranean Drainage of the Limestone, 587; Mr. E. Greenly on the Ancient Peneplains in North Wales, 587; Dr. G. Abbott on the Concretionary Structures of the Magnesium Limestone of Durham, 587; Prof. W. J. Sollas, F.R.S., on a Concealed Coalfield beneath the London Basin, 587; Mr. R. H. Tiddeman on the Formation of Reef-knolls, 587; Mr. J. E. Marr, 587; Mr. W. Gibson on Rapid Changes in the Thickness and Character of the Coal-measures of North Staffordshire, 587; the Rev. J. F. Blake on the Registration of Type Specimens, 587; Mr. R. Kidston on Plant-life during the Growth of the Coal measures, 587; Mr. A. Strahan on the Physical Condition during the Growth of the Coal-measures, 587; Mr. J. E. Marr on the Geological Evidence of the Conditions under which Coal was Formed, 588; Dr. Horace Brown, 588; Prof. P. F. Kendall, 588; Mr. R. D. Oldham, 588; Mr. J. J. H. Teall on the Plutonic Complex of Cnoc-na-Sroine (Sutherlandshire), 588; Prof. K. Busz on a Granophyre Dyke Intrusive in Gabbro at Ardnamurchan (Scotland), 588; Prof. A. P. Coleman on the Recent Discovery of a Ferriferous Horizon in the Huronian North of Lake Superior, 588; Mr. F. W. Harmor on the Influence of Winds upon Climate during Past Epochs, 588; Dr. Monckman, Mr. E. Wilson, Mr. A. Jowett, Mr. H. B. Muff, on the Glacial Phenomena of the West Riding, 588; Mr. J. W. Stather on the Glaciation of the East Riding, 588; Mr. R. H. Tiddeman on the Raised Beach of Gower in South Wales, 588; Mr. R. D. Oldham on the Mode of Formation of the Basal Carboniferous Conglomerate of Ullswater, 588; Mr. R. D. Oldham on the Formation of New Beaches on the Shores of Thirlmere Reservoir, 588; Mr. G. W. Lamplugh on the Evidence as to the Age of the English Wealden Series, 588

*Section D (Zoology).*—Opening Address by Ramsay H. Traquair, F.R.S., 502; Mr. Eagle Clark on the Migration of British Birds, 588; Mr. R. C. L. Perkins on the Zoology of the Sandwich Islands, 589; Prof. W. B. Scott on the Miocene Fauna of Patagonia, 589; Dr. Gregg Wilson's Exhibit of Eggs and Embryos of *Ornithorhynchus*, 589; Major Ronald Ross on Malaria and Mosquitoes, 589; Prof. S. J. Hickson on *Dendrocometes*, 589; Dr. J. F. Gemmill on the Anatomy of the Head in Cyclopean Trout Embryos, 589; Prof. R. Burckhardt on Some Causes of

Brain-configuration in Selachians, 589; Prof. Marcus Hartog on a Peptic Zymase in Young Embryos, 589; Dr. R. Irvine on the Mechanical and Chemical Changes which take place during the Incubation of Eggs, 589; Prof. Gotch on the Physiological Effect of Local Injury in Nerve, 589; Mr. R. T. Günther on *Mnestra parasites*, 589; Prof. L. C. Miall on the Respiratory Organs of Aquatic Insects, 589; Report of the Committee on the Structure, Formation and Growth of the Coral Reefs of the Indian Ocean, Mr. Stanley Gardiner, 589-90; Prof. R. Burckhardt on the Anatomy and Systematic Position of the *Laemargidae*, 590; Mr. N. Annandale on the Appearance and Habits of Some Malay Insects, 590; Prof. E. B. Poulton's Photographs illustrating the General Principles of Müllerian Mimicry, 590; Prof. Lloyd Morgan's Experiments on the Avoidance of Distasteful Forms by Birds, 590; Messrs. F. W. Gamble and F. W. Keeble on the Colour Changes of Various Prawns, 590

*Section E (Geography).*—Presidential Address by Sir George Robertson, 590; Mr. E. G. Ravenstein on Foreign and Colonial Surveys, 590; Colonel Johnson, 590; Colonel Sir Thomas H. Holdich on the Question of a Railway Connection between Europe and India, 590; Mr. G. C. Chisholm on the Probable Economic Changes following the Development of the Resources of China, 590; Report of the Committee on the Climate of Tropical Africa, 590; Mr. E. G. Ravenstein on the Geographical Distributions of Relative Humidity, 590; Mr. R. T. Günther on the Coast of the Phlegrean Fields near Naples, 591; Dr. H. R. Mill on Profs. Pettersson and Nansen's New Insulating Water-bottle, 591; Dr. H. R. Mill on the Treatment of Regional Geography, 591; Mr. T. G. Rooper on the Teaching of Geography in the Elementary Schools of the West Riding, 591; Mr. E. R. Wethey's Method of Teaching Geography, 591

*Section F (Economic Science and Statistics).*—Opening Address by Major P. G. Craigie, 599

*Section G (Mechanical Science).*—President, Sir Alexander Binnie; Prof. Hele Shaw on the Question of the Resistance of Road Vehicles to Traction, 609; Mr. J. Watson on the Nidd Valley Waterworks of Bradford, 609; Mr. J. MacTaggart on the Disposal of House Refuse in Bradford, 609; Mr. E. K. Clark on the Construction of Shop Buildings in Large Engineering Works, 610; Mr. Glass on the Coal and Iron Ore Fields of Shansi and Honan, 610; Sir Wm. Preece and Mr. F. J. Behr on the Proposed Mono-Rail High-speed Electric Railway between Manchester and Liverpool, 610; Mr. A. Mallock on the Measurement of the Tractive Force, Resistance and Acceleration of Trains, 610; Mr. W. T. E. Binnie on a New Form of Self-registering Rain Gauge, 610; Mr. W. Dawson on the Demerbe System of Tramway Construction, 610; Mr. J. H. Barker and Prof. Ewing's Combined Integrating Wattmeter and Maximum Demand Indicator, 610; Prof. Goodman's New Form of Calorimeter for Measuring the Wetness of Steam, 610; Mr. A. T. Walmisley on the Use of Expanded Metal in Concrete, 610

*Section H (Anthropology).*—Opening Address by Prof. John Rhys, President of the Section, 513; Dr. John Beddoe on the Vagaries of the Cephalic Index, 633; Prof. Macalister, 633; Prof. A. Francis Dixon on Certain Markings on the Frontal Part of the Human Cranium and their Significance, 633; Mr. W. L. H. Duckworth on Nine Crania collected by Mr. J. Stanley Gardiner in his Expedition to Rotuma, 633; Mr. W. L. H. Duckworth on some Anthropological Observations of the Pangan Tribe of Aborigines in the Malay Peninsula, 633; Dr. David Waterson on the Developmental Changes in the Human Skeleton from the Point of View of Anthropology, 633; Prof. A. Macalister on Perforate Humeri from Ancient Egyptian Skeletons, 633; Prof. J. D. Cunningham on the Sacral Index, 633; Prof. J. D. Cunningham on the Microcephalic Brain, 633; Dr. A. C. Haddon on the Textile Patterns of the Seadyaks, 634; Mr. W. Rosenhain on the Making of a Malay "Kris" and on the Malay Method of producing Chains by Casting, 634; Prof. Macalister, 634; Prof. H. Louis on the "Kingfisher" Type of a Malay "Kris," 634; Mr. H. Ling Roth on Permanent Artificial Skin Marks, 634; Mr. F. L. Griffith on the System of Writing in Ancient Egypt, 634; Mr. Arthur J. Evans on the New Scripts

Discovered by Him in Crete, 526 and 634; Dr. C. Hose and Mr. W. McDougall on the Animal Cults of the Natives of Sarawak and their Bearing on the Problems of Totemism, 634; Mr. Hartland, 635; Mr. W. G. Aston on the Japanese *Gohet* and the Ainu *inao*, 635; Mr. David Boyle on the Paganism of the Civilised Iroquois of Ontario, 635; Dr. John Beddoe on the Anthropology of West Yorkshire, 635; Mr. J. Gray on the Physical Characteristics of the Population of West Aberdeenshire, 635-6; Mr. D. Randall-MacIver on the Present State of Our Knowledge of the Modern Population of Egypt, 636; Report of the Committee for the Ethnographical Survey of Canada, 636; Report of the Committee on the Natural History and Ethnography of the Malay Peninsula, Mr. W. W. Skeat, 636; Mr. A. M. Bell on the Occurrence of Flint Implements of Palaeolithic Type on an Old Land Surface in Oxfordshire, 636; Mr. J. Paxton Moir on the Stone Implements of the Natives of Tasmania, 636; Prof. E. B. Tylor, 636; Mr. H. Ling Roth, 637; Dr. A. C. Haddon on Relics of the Stone Age of Borneo, 637; Dr. C. Hose, 637; Mr. Butler Wood on the Prehistoric Antiquities of Rumbolt's Moor near Bradford, 637; Mr. Butler Wood on the Preservation of Local Antiquities, 637; Dr. A. C. Haddon, 637; Mrs. Armitage on some Yorkshire Earthworks, 637; Mr. D. G. Hogarth on the Cave of Psychró in Crete, 637; Mr. Arthur J. Evans, 637; Mr. J. L. Myres, 637

*Section K (Botany).*—Opening Address by Prof. S. H. Vines, F.R.S., President of the Section, 536; Mr. Kidston on the Flora of the Coal Measures, 610; Mr. Seward on the Climatic and other Physical Conditions under which Coal was Formed, 610; Dr. Horace Brown on the Possible Richness in CO<sub>2</sub> of the Atmosphere of the Coal Period, 610; Prof. Bower on the Sand-binding Plant of the Dunes on the Scotch Coast near Berwick, 611; Mr. Samuel Margerison on British Sylviculture, 611; Mr. Albert Wilson on the Great Smoke Cloud of the North of England and its Influence on Plants, 611; Prof. Marshall Ward, F.R.S., on Embryonic Tissues, 611; Mr. Henry Jackson on the Formation of Starch from Glycollic Aldehyde by Green Plants, 611; Mr. E. A. Newell Arber on the Effect of Salts on the CO<sub>2</sub> Assimilation of *Uva latissima*, 611; Prof. Letts and Mr. J. Hawthorn on the Relation of *Uva latissima* to the Pollution of Sea-water by Sewage, 611; Miss Elizabeth Dale on the Intumescences of *Hibiscus vitifolius*, 611; Miss Ethel Sargent on a Fourth Type of Transition from Stem to Root-structure, 611; Dr. D. H. Scott, F.R.S., on the Presence of Seed-like Organs in certain Palaeozoic Lycopods, 611; Dr. D. H. Scott, F.R.S., on the Primary Structure of certain Palaeozoic Stems referred to *Araucarioxylon*, 612; Prof. A. C. Seward, F.R.S., and Miss Elizabeth Dale on the Structure and Affinities of *Dipteris conjugata*, 612; Miss R. F. Shove on the Structure of the Stem of *Angiopteris evecta*, 612; Mr. A. G. Tansley on the Conducting Tissues of Bryophytes, 612; Mr. W. C. Worsdell on the Origin of Modern Cycads, 612; Prof. Overton on the Osmotic Properties and their Causes in the Living Plant and Animal Cell, 612; Mr. Harold Wager on a Demonstration of the Structure and Attachment of the Flagellum in *Euglena Viridis*, 612; Mr. Harold Wager on the Behaviour of the Nucleolus during Karyokinesis in the Root-apex of Phaseolus, 612; Miss Ethel N. Thomas on Double Fertilisation in a Dicotyledon *Caltha palustris*, 612; Mr. J. Lloyd Williams on the Germination of the Zoospore in Laminariaceae, 613; Mr. J. Lloyd Williams on *Dictyota*, 613; Prof. Vuillemin on the *Azygospores* of *Entomophthora gloeospora*, 613; Mr. J. Parkin on Fungi found in Ceylon Growing upon Scale-insects, 613; Mr. R. H. Biffen on the Life-history of *Acrospira mirabilis*, 613; Mr. T. W. Woodhead on the Structure of the Root-nodules of *Alnus glutinosa*, 613; Prof. F. E. Weiss on a Gymnosporangium from China, 613; Prof. Trow on the Biology and Cytology of Pythium, 613; M. Poirault and Mr. E. J. Butler's Observations on Pythium, 613; M. Poirault and Mr. E. J. Butler's Observations on Chytridinae, 614

British Birds, C. W. Wyatt, 100

British Coal-fields, the Duration of the, E. Lozé, Bennett H. Brough, 124

British Flora, the Origin of the, Clement Reid, F.R.S., 268

British Islands, the Lepidoptera of the, Charles G. Barrett, 317

- British Museum, Catalogue of the Lepidoptera Phalanæ in the, Vol. II., Catalogue of the Arctiadae (Nolinae, Lithosianae), Sir George F. Hampson, Bart., 77; (Natural History) Catalogue of the Fossil Bryozoa in the Department of Geology, the Cretaceous Bryozoa, Vol. I. Dr. J. W. Gregory, 125
- British People, Origin and Character of the, Nottidge Charles Macnamara, 172
- British Rainfall, Symons's, H. Sowerby Wallis, 435
- British Sylviculture, Samuel Margerison, 611
- Brochet (André), Impossibility of Primary Formation of Potassium Chlorate Obtained Electrolytically, 191; Electrolysis of Concentrated Solutions of Hypochlorites, 383; Accessory Reactions of Electrolysis, 639
- Brooks (William Keith), the Foundations of Zoology, 593
- Brooks, Comet Borrelly, 1900 *b*, 324, 352, 377, 535
- Brough (Bennett H.), Les Charbons Britanniques et leur Epuisement, E. Lozé, 124
- Brown (Bertha Millard), Physiology for the Laboratory, 365
- Brown (Dr. Horace T., F.R.S.), Chlorophyll a Sensitiser, 103; Static Diffusion of Gases and Liquids in Relation to Carbon-assimilation and Translocation in Plants, 212; on the Geological Evidence of the Conditions under which Coal was Formed, 588; on the Possible Richness in CO<sub>2</sub> of the Atmosphere of the Coal Period, 610
- Brown (J. Allen), Stone Implements from Pitcairn Island, 119
- Brown (Prof. S. J.), Opposition of Eros, 425
- Bruner (Dr. H. L.), the Hearts of Lungless Salamanders, 274
- Bruno (Giordano) zur Erinnerung an den 17 Februar, 1600, Alois Riehl, 77
- Brunton (Sir Lauder, F.R.S.), Percussion Caps for Shooting in Schools, 54
- Bryan (Prof. G. H., F.R.S.), Vorlesungen über hydrodynamische Fernkräfte nach, C. A. Bjerkne's Theorie, 3; The Kinetic Theory of Planetary Atmospheres, 126, 189; Sources and Properties of Becquerel Rays, 151; the Steadying of Ships, 186; on the Partition of Molecular Energy, 562
- Bryant (A. P.), Dietary Studies of Harvard and Yale University Boat Crews, 232
- Bryophytes, on the Conducting Tissues of, A. G. Tansley, 612
- Bryozoa, Catalogue of the Fossil, in the Department of Geology, British Museum (Natural History): The Cretaceous Bryozoa, vol. i., Dr. J. W. Gregory, 125
- Buckley (T. E.), a Vertebrate Fauna of the Shetland Isles, 75
- Buckman (S. S.), Human Babies, What they Teach, 221
- Bucknill (J. A.), the Birds of Surrey, 339
- Buddha Relics, the Alleged, 200
- Buddicom (Robert A.), Church Stretton, vol. i., Molluscs, 571
- Building Construction for Beginners, J. W. Riley, 125
- Building-land made by Sea-dredging, 158
- Bulletin de l'Académie de St. Pétersbourg, 70, 211
- Bulletin of American Mathematical Society, 69, 189, 260, 381
- Bulletin de la Société des Naturalistes de Moscou, 93
- Burbury (S. H.), on the Vector Potential of Electric Currents in a Field where Disturbances are propagated with Finite Velocity, 563
- Burch (G. J.), on an Experiment on Simultaneous Contrast, 563; Spectroscopic Examination of Colour produced by Simultaneous Contrast, 615
- Burckhalter (Prof. C.), Automatic Photography of the Corona, 535
- Burckhardt (Prof. R.), on some Causes of Brain-configuration in Selachians, 589
- Burdon-Sanderson (Sir J.), Relation of Cell to Enzymes, 423
- Burial Caves on Rio Cunany, Brazil, Dr. Goeldi, 500
- Burke (J. B. B.), on the Phosphorescent Glow in Gases, 564
- Burkhardt (Prof. R.), on the Anatomy and Systematic Position of the Læmargidæ, 590
- Burnham (Prof. S. W.), Catalogue of Double Stars, 324
- Burton (W.), Plumbism in Pottery Workers, 616
- Busz (Prof. K.), on a Granophyre Dyke intrusive in Gabbro at Ardnamurchan, 588
- Butler (Charles P.), the Approaching Total Eclipse of the Sun, 54; a Night with the Great Paris Telescope, 574
- Butler (E. J.), Observations on Pythium, 613; Observations on Chytridinae, 614
- Butlin (H. T.), Research in Pathology, 254
- Butschli (O.), Untersuchungen über Mikrostrukturen des erstarrten Schwefels nebst Bemerkungen über Sublimation, 619; Untersuchungen über die Microstruktur künstlicher und natürlicher Kieselsäure-gallerten (Tabaschir, Hydrophan, Opal), 619
- Butterflies: Brief Guide to the Commoner Butterflies of the Northern United States and Canada, Samuel Hubbard Scudder, 411; Numerousness of Clouded Yellow and Holly-blue Butterflies, 532
- Buxton (E. N.), the Preservation of Big Game in Africa, 550
- Byatt (H. A.), the Ndonda District, 422
- Cables, Wastage of their Electrical Properties under Continuous Currents, Georges Rheins, 520
- Cadett and Neall's X-Ray Paper, 253
- Cady (W.), Energy of Kathode Rays, 93
- Cahen (E.), Eléments de la Théorie des Nombres, 52
- Cailletet (L.), Researches on Presence of Saturated Mercury Vapour, 191
- Calculus, Differential: Leçons Nouvelles sur les Applications Géométriques du Calcul différentiel, W. de Fannenberg, 196; Elementary Illustrations of the Differential and Integral Calculus, Augustus De Morgan, 196; an Introduction to the Differential and Integral Calculus and Differential Equation, F. G. Taylor, 221
- Californian Big Trees, Age of, Prof. C. E. Bessey, 627
- Callaway (Dr. Charles), Longmyndian Inliers of Old Radnor, 94
- Callendar (Prof.), Report of the British Association Committee on Solar Radiation on his Experiments on the Modified Copper-Cube Actinometer, 562
- Calltha palustris*, on Double Fertilisation in a Dicotyledon, Miss Ethel N. Thomas, 612
- Cambridge: Cambridge Philosophical Society, 215, 239; on the New Form of Refracting Telescope recently erected at Cambridge, A. R. Hinks, 565
- Campbell (Prof. W. W.), Control of Spectrograph, 137
- Campbell (W.), Crystallisation produced by Pressure in Solid Metal, 166
- Campetti (Dr. A.), Difference of Potential between Solid Salt and its Solution, 458
- Canada: the Ore Deposits of the United States and Canada, J. F. Kemp, 365; Brief Guide to the Commoner Butterflies of the Northern United States and Canada, Samuel Hubbard Scudder, 411; Mineral Production of Canada, E. D. Ingall, 499; on the Paganism of the Iroquois of Ontario, David Boyle, 635; Report of the Committee of the British Association for the Ethnographical Survey of Canada, 636
- Canals: the Pneumatic Balance Canal Lock, C. M. Dutton, 135; Electrical Traction on Canals, 231
- Cannon-fire as a Hail preventive, 158
- Cape Observatory, Report of the, Sir David Gill, 398
- Cape Town, South African Philosophical Society, 216, 264, 464
- Carnations and Picotees for Garden and Exhibition, H. W. Weguelin, 598
- Carrot (M.), Chemical Constitution of Steel, 288
- Carruthers (Mr., F.R.S.), the Structure of Palæozoic Plants, 287
- Carlaw (H. S.), on the Use of Multiple Space in Applied Mathematics, 561
- Carter (Rev. W. Lower), on the Subterranean Drainage of the Limestone, 587
- Carvalho (J.), Influence of Temperature on Activity of Motor Nerves of Frog, 47
- T and R Cassiopeiae, Variable Stars, Sir C. E. Peck of Rousdon Observatory (Devon), 398
- Catalogue of the Physiological Series of Comparative Anatomy contained in the Museum of the Royal College of Surgeons of England, Descriptive and Illustrated, 385
- Cause and Prevention of Decay in Teeth, the, J. Sim Wallace, 149
- Causse (H.), Pressure of Tyrosine in contaminated Well Water, 47
- Caventou (J. B.), Unveiling of a Monument to Bertrand Pelletier and, 421
- Cazeneuve (P.), Diphenylcarbazide as Sensitive Reagent for Metallic Compounds, 383
- Cell Problems, a Revision of Certain, Histologische Beiträge, Heft IV., E. Strasburger, Prof. J. B. Farmer, 28
- Cellular Elements in the Blood, Modern Views on the Characters of, P. Ehrlich and A. Lazarus, Dr. T. H. Milroy, 410

Centenary of the Royal College of Surgeons, 331; Victor Plarr, 294  
 Cephalic Index, on the Vagaries of the, Dr. John Beddoe, 633; Prof. Macalister, 633  
 Cepheus, New Variable Star Observed in, Madame Ceraski, 183  
 Ceraski (Madame) New Variable in Taurus, 20; New Variable Star Observed in Cepheus, 183; New Variable in Herculis, 305  
 Cereals, Mummy, Edmond Gain, 191  
 Cetacea, Body Temperature of, Dr. G. Guldberg, 159  
 Ceylon, on Fungi found in Ceylon Growing on Scale Insects, J. Parkin, 613  
 Chains by Casting, on the Malay Method of Producing, W. Rosenhain, 634; Prof. A. Macalister, 634  
 Chamois, Recently Killed, Temperatures of, G. Stallard, 293  
 Chandler (Prof.), Chemistry in United States, 301  
 Chapman (Frederick), the Consolidated Oolite Sands of Ketheawad, 239  
 Chappius (Dr. P.), Gas Thermometry, 214  
 Charbons Britanniques et leur épuisement, les, E. Lozé, Bennett H. Brough, 124  
 Charon (E.), Product of Decomposition of a Di-iodhydrin of Glycerol, 191  
 Chattaway (F. D.), Transformation Products of Phenylacetyl Nitrogen Chloride, 143; Substituted Nitrogen Chloride and Bromide Derivatives of Ortho- and Para-acet-toluide, 71  
 Chavastilol (M.), Crystalline Combinations of Acetylene with Cuprous and Potassium Chlorides, 240  
 Chemistry: a New Indicator in Acidimetry, Jules Wolff, 23; Crystallised Lead Selenide, M. Fonzes Diacon, 23; the Alkaline Selenio-Antimonites, 24; Selenides of Iron, M. Fonzes Diacon, 216; Selenides of Nickel, M. Fonzes Diacon, 592; Death and Obituary Notice of Edouard Grimaux, 34; Death and Obituary Notice of Dr. Edmund Atkinson, 34; Peculiarities of Picric Acid and its Solutions in Light of Ionic Hypothesis, Dr. Marckwald, 37; Manganous Fluoride, MM. H. Moissan and Venturi, 47; Samarium, Eug. Demarçay, 47; Unknown Earths in Crude Samaria, Eug. Demarçay, 144; Composition of Mont Dore Gas, F. Parmentier and A. Hurion, 47; Bromination with Aluminium Bromide, Ch. Pouret, 47; Preparation of some Aluminium Compounds and Corresponding Hydrogen Derivatives, M. Fonzes Diacon, 95; Action of Monochloroacetic Esters on Sodium Derivative of Acetylacetone, F. Marsh, 47; Method for Preparing Synthetically Higher Homologues of Acetolacetic Ester and Acetylacetone, L. Bouveault, 264; Diacetylacetone Derivatives, J. N. Collie and B. D. Steel, 260; Presence of Tyrosine in Contaminated Well Water, H. Causse, 47; Indigo Fermentation, Prof. Beyerinck, 47; Indican, J. Hazewinkel, 47; Prof. Hoogewerff and H. ter Meulen, 47; Heat of Alloy Formation, J. B. Taylor, 70; Want of Uniformity of Action of Copper Zinc Alloys on Nitric Acid, Dr. J. H. Gladstone, 70; Substituted Nitrogen Chloride and Bromide Derivatives of Ortho and Para-acet-toluide, F. D. Chattaway and K. J. P. Orton, 71; Estimation of Hypo-iodides and Reaction of Iodine Monochloride with Alkalis, K. J. P. Orton and W. L. Blackman, 71; Products of Sulphur Dioxide and Ammonia, E. Divers, 71; Brazilin (iv.), A. W. Gilbody, W. H. Perkin, jun. and J. Yates, 71; Hematoxylin (v.), W. H. Perkin, jun. and J. Yates, 71; Chemical Society, 71, 143, 215, 260; the  $\beta$ -alkyloxy- and  $\alpha$ -cyanocrotonic esters, A. Haller, 71; Solubility of Mixture of Salts having common Ion, Charles Touren, 72; Acetyl-phenylacetylene and Benzyl-phenylacetylene, Charles Moureu and R. Delange, 72; the Hydrolysis of Fibrous Tissue, A. Etard, 72; Introduction to Physical Chemistry, James Walker, Prof. Arthur Smithells, 76; Employment of Chemists in German Factories, 84; Erythrose, a New Sugar, Gabriel Bertrand, 85; *d*-Erythrite, Gabriel Bertrand, 144; New General Method of Preparing Secondary and Tertiary Alcohols, V. Grignard, 85; Expansion of Rubidium during Fusion, M. Eckardt, 93; the Estimation of Thallium, V. Thomas, 96; Action of Anhydrous Aluminium Chloride on Acetylene, E. Baud, 96; Tyrosinase, C. Gessard, 96; the Purification of Acetylene, 110; Additions of Hydrogen to Acetylene in presence of Copper, Paul Sabatier and J. B. Senderens, 168; Addition of Hydrogen to Acetylene in Presence of Reduced Iron or Cobalt, Paul Sabatier and J. B. Senderens, 191; Crystalline Combinations

of Acetylene with Cuprous and Potassium Chlorides, M. Chavastilol, 240; Addition of Hydrogen to Acetylene and Ethylene in presence of Finely-divided Platinum, Paul Sabatier and J. B. Senderens, 264; Action of Reduced Nickel on Acetylene, Paul Sabatier and J. B. Senderens, 312; Action of Finely-divided Metals on Acetylene and Ethylene, Paul Sabatier and J. B. Senderens, 336; Acetylene: a Handbook for the Student and Manufacturer, Vivian B. Lewes, 522; Products of Explosion of Acetylene, W. G. Mixer, 639; Christian Friedrich Schönbein, 1799-1868, Georg W. A. Kahlbaum, Ed. Schaer, Prof. R. Meldola, F.R.S., 97; Chlorophyll a Sensitiser, Prof. Clement Timiriazeff, 102; Dr. Horace T. Brown, F.R.S., 103; Nitric Acid Formation during Combustion, Daniel Berthelot, 119, 143; Limits of Combustibility by Red-hot Copper Oxide of Hydrogen and Methane diluted with Large Volumes of Air, Armand Gautier, 119; Action of Hydrogen Bromide on Dextro-rotatory Benzylidene Camphor, A. Haller and J. Minguin, 119; Reserve Carbohydrates of St. Ignatius Bean and Nux Vomica, Em. Bourquelot and J. Laurent, 120, 336; Reserve Carbohydrates in Seed of Trifolium Repen-, H. Hérissé, 216; the Theory of Electrolytic Dissociation, H. C. Jones, 121; Thionyl Fluoride, H. Moissan and P. Lebeau, 136; the Extraction of Tannic Acid from Chestnut Wood in Corsica, 136; Advancement of Electrical Chemistry, Dr. F. Mollwo Perkin, 138; Aminochloropyridines, W. J. Sell and F. W. Dootson, 143; Transformation Product of Phenylacetyl Nitrogen Chloride, F. D. Chattaway and K. J. P. Orton, 143; Ammonium Imidosulphite, 143; Ethyl Sodio- and Methylsodio-cyanacetate, J. F. Thorpe, 143; the  $\alpha$ - $\beta$ -tetramethylglutaric Acids, J. F. Thorpe and W. J. Young, 143;  $\beta$ -isopropylglutaric Acid and *Cis*- and *Trans*-methylisopropylglutaric Acids, F. H. Howles, W. J. Thorpe and W. Udall, 143; Dextromethylethylpropyl Tin Dextro-bromocamphorsulphonate, W. J. Pope and S. J. Peachey, 143; Racemic and Optically-active Forms of Isoamarine, H. L. Snape, 143; a Lithium Peroxide, M. de Forcrand, 143; Action of Cyanogen Chloride on Acetonedicarboxylic Ethyl Ester, Juvénal Derôme, 144; the Cyanide Process of Gold Extraction, James Park, 148; the Purification of Mercury, G. A. Hulett, 160; Researches on Pressure of Saturated Mercury Vapour, MM. L. Cailletet, Colardeau and Rivière, 191; Separation and Determination of Mercury as Mercurous Oxalate, C. A. Peters, 210; Action of Iodine and Yellow Oxide of Mercury on Styrolene and Safrol, J. Bougault, 544; Direct Production by Wet Method of Crystallised Mercuric and Mercurous Iodides, F. Bodroux, 191; Precipitated Mercurous Iodide, Dr. F. P. Power, 322; the Atomic Weight of Iron, Prof. Richards and G. P. Baxter, 160; Mechanical Decomposition of some Metallic Chlorides, G. de Coninck, 168; Conditions of Stability of Rotatory Power, 168; the Weight of Hydrogen Desiccated by Liquid Air, Lord Rayleigh, F.R.S., 189;  $\beta$ -phenyl and  $\beta$ -benzyl- $\alpha$ -alkoxy- $\alpha$ -cyanoacrylic Acids, A. Haller and G. Blanc, 191; Impossibility of Primary Formation of Potassium Chlorate obtained Electrolytically, André Brochet, 191; Product of Decomposition of a Di-iodhydrin of Glycerol, E. Charon and C. Paix-Séailles, 191; the New Hydride of Benzoylsuperoxide, Herren Baeyer and Villiger, 202; Condensation of Ethyl Acetylenedicarboxylate with Bases and  $\beta$ -ketonic Esters, S. Ruhemann and H. E. Stapleton, 215; Condensation of Phenols with Ethyl Phenylpropionate, S. Ruhemann and F. Beddow, 215; Constitution of Pilocarpine, H. A. D. Jowett, 215; Persulphuric Acid, T. M. Lowry and J. H. West, 215; Derivatives of Cyanocamphor and Homocamphoric Acid, A. Lapworth, 215; Action of Formaldehydes on Naphthalene Amines (II.), G. T. Morgan, 215; Condensation of Ethyl Crotonate with Ethyl Oxalate, A. Lapworth, 215; Silicodiphenyldiimide and Silicotriphenylguanidine, J. E. Reynolds, 215; Nitric Acid Formation in Combustion of Hydrogen, D. Berthelot, 216; Combustible Gases of Atmosphere, Armand Gautier, 216; the Expansion of Fused Silica, H. Le Chatelier, 216; True Atomic Weight of Boron, G. Henrichs, 216; Action of Sulphur Dioxide and Hydrogen Sulphide on Pyridine, G. André, 216; Presence of Iodine in Blood, E. Gley and P. Bourcet, 216; Permeability of Fused Silica to Hydrogen, P. Villard, 240; Addition of Hydrogen to Ethylene in Presence of Reduced Metals, Paul Sabatier and T. B. Senderens, 240; Oxidation of Anethol and Analogues, J.

- Bougault, 240; Theoretical and Physical Chemistry, Part II.: Chemical Statics, J. H. van 't Hoff, 245; the Wellcome Research Laboratories, R. J. Friswell, 271; Morphine (I.), S. B. Schryer and F. H. Lees, 260; Oxime of Mesoxamide, M. A. Whiteley, 260; Dehydracetic Acid, J. N. Collie, 260; New Series of Pentamethylene Derivatives (I.), W. H. Perkin, jun., J. F. Thorpe and C. Walker, 261; Action of Sodium and Methyl Iodide on Ethyl Dimethylbutanetricarboxylate, W. H. Perkin, jun., and J. F. Thorpe, 261; Condensation of Ethyl  $\alpha$ -bromoisobutyrate with Ethyl Malonates and Cyanacetates, W. T. Lawrence, 261; Estimation of Furfural, W. Cormack, 261; Inhibiting Effect of Etherification on Substitution in Phenols, H. E. Armstrong and E. W. Lewis, 261; Action of Nitric Acid on Trichloroguaiacol, H. Cousin, 264; Composition of Albumen of *Gleditsia Triacanthos* Seed, Maurice Goret, 264; Combustible Gases of Atmosphere, Armand Gautier, 264; Synthesis of  $\alpha\alpha$ -dimethyl- $\gamma$ -cyanotriballylic Ester, A. Haller and G. Blanc, 264; Chemical Constitution of Steel, M. M. Carnot and Goutal, 288; an Ammoniacal Chromous Sulphate, Ch. Laurent, 288; Combustible Gases of Atmosphere, Armand Gautier, 288; Preparation of Gentopirine and Glucoside from Fresh Gentian Root, Em. Bourquelot and H. Hérissay, 288; Le Fluor et ses Composés, Henri Moissan, 291; an Introduction to Analytical Chemistry, G. G. Henderson, M. A. Parker, 292; a Text-book of Physical Chemistry, Dr. R. A. Lehfeldt, 292; Chemistry in United States, Prof. Chandler, 301; Products of Nitroso-Benzene, Prof. Bamberger, 304; Two New Silicon Borides, Henri Moissan and Alfred Stock, 312; Crystallisation of Gold, A. Ditte, 312; Solubility of Calcium Phosphate in Soil Water in Presence of Carbon Dioxide, Th. Schloesing, 312; Temperature of Maximum Density of Aqueous Solutions of Ammonium Chloride and Lithium Bromide and Iodide, L. C. de Coppet, 312; Electrolytic Estimation of Bismuth, Dmitri Balachowsky, 312; Sodium-potassium Amalgams, M. M. Guntz and Ferée, 312; Preparation of Pure Tungsten, Marcel Delépine, 312; "Die Harze und die Harzbehälter," A. Tschirch, 316; Santalol, E. J. Parry, 322; American, Russian, and French Turpentine, and Terebenes, C. T. Tyrer and A. Wertheimer, 322; the Viscosity of Essential Oils, E. Douzard, 322; Organic Solutions of Ferric Chloride, G. de Coninck, 336; on the Driving Energy of Physico-Chemical Reaction, and its Temperature Coefficients, Prof. T. W. Richards, 351; "Die Glykoside," Dr. J. J. I. Van Rijn, 363; Preparation of Free Hydroxylamine, Dr. R. Uhlenhuth, 376; a Standard Table of Atomic Weights, 376; Electrolysis of Concentrated Solutions of Hypochlorites, André Brochet, 383; Diphenylcarbazide as Sensitive Reagent for Metallic Compounds, P. Cazeneuve, 383; Arsenic and Iodine in Animal Economy, Armand Gautier, 383; Action of Hydrogen on Arsenic Sulphides, H. Pélabon, 408; Boiling Points of Zinc and Cadmium, Daniel Berthelot, 384; Atomic Weight of Radiferous Barium, Madame Curie, 384; Electrolytic Estimation of Cadmium, Dmitri Balachowsky, 384; Blue Oxide of Molybdenum, Marcel Guichard, 384, 408; Iodine in Organism, P. Bourcet, 384; Amyl Ester of Eudesmic Acid in Eucalyptus Oils, H. G. Smith, 384; the Lavoisier Monument, 390; Elements of Qualitative Analysis, Dr. G. H. Bailey and G. J. Fowler, 412; Unveiling of a Monument to Bertrand Pelletier and J. B. Caventou, 421; Manufacture of Artificial Dyestuffs in Germany, 422; Composition of Air at Different Levels, G. Hinrichs, 432; Extraction of Oxygen from Air by Solution at Low Temperatures, Georges Claude, 432; Use of Sodium Peroxide for Purifying Wells containing Carbonic Acid, 432; Structure and Constitution of Two New Meteorites, G. P. Merrill, H. N. Stokes, 459; Death of Sir John Bennet Lawes, Bart., F.R.S., 456, Obituary Notice, of Prof. R. Warrington, F.R.S., 467; Report of Government Laboratory, Dr. T. E. Thorpe, F.R.S., 499; International Congress of Applied Chemistry, 519; the Nitro-celluloses, Léo Vignon, 520; the Theory of Ions, 524; Products of Decomposition of Nitric Esters and Nitroglycerine by Alkalis, Daniel Berthelot, 544; Reduction of Nitro-celluloses, Léo Vignon, 544; Crystallised Calcium Aluminate, Em. Dufau, 568; Combustible Gases in Paris Air, Armand Gautier, 568; Absorption of Free Oxygen by Normal Urine, Daniel Berthelot, 592; Oxycelluloses from Cotton, Flax, and Hemp, Léo Vignon, 592; Lehrbuch der Anorganischen Chemie, Dr. A. F. Holleman, 598; Iron Silicide, P. Lebeau, 616; New Pyrogenous Product from Tartaric Acid, L. J. Simon, 616; Acetyl Derivatives of Cellulose and Oxycellulose, Léo Vignon and F. Gerin, 616; Lectures on the History of the Development of Chemistry since the time of Lavoisier, Dr. A. Ladenburg, 618; Elementary Physics and Chemistry, R. A. Gregory, A. T. Simmons, 620; the Division of Racemic Amido-acids into their Optical Components, Emil Fischer, 629; the Action of Permanganate on Hydrogen Peroxide, Herren von Baeyer and Villigér, 629; Carbides of Neodymium and Praseodidymium, Henri Moissan, 639; Accessory Reactions of Electrolysis, A. Brachet, 639; Isopyrotiric Acid, L. J. Simon, 639; Proteolytic Ferment of Germinating Seeds, V. Harlay, 640
- China: on the Probable Economic Changes following the Development of the Resources of, G. C. Chisholm, 590; on a Gymnosporangium from China, Prof. F. E. Weiss, 613
- Chisholm (G. C.), on the Probable Economic Changes following the Development of the Resources of China, 590
- Chittendon (F. H.), Garden-pests, 109
- Christie (W. H. M.), Observations of Capella as a Double Star, 383
- Christmas Island, a Monograph of (Indian Ocean), Physical Features and Geology, C. W. Andrews, 193
- Church Stretton, vol. i., Geology, E. S. Cobbold, Macro-Lepidoptera, F. B. Newnham: Molluscs, Robert A. Buddicom, 571
- Chytridinae, Observations on, M. Poirault, 614, E. J. Butler, 614
- Circular Components in the "Faraday Effect," Observation of the, Prof. D. B. Brace, 368
- Circulation of the Blood, Historical Aspects of the Discovery of the, Prof. T. Clifford Allbutt, F.R.S., 630
- Citrus Trees in Australia, Fungus Diseases of, and their Treatment, D. McAlpine, 494
- Clark (E. K.), on the Construction of Shop Buildings in large Engineering Works, 610
- Clarke (Eagle), on the Migration of British Birds, 588
- Claude (Georges), Extraction of Oxygen from Air by Solution at Low Temperature, 432
- Clerc (A.), Anti-coagulating Power of Serum in Pathological State, 216
- Cleverley (Mr.), Mud Island in Walfisch Bay, 464
- Climate during Past Epochs, on the Influence of Winds upon, F. W. Harmer, 588
- Cloves (Dr. Frank), the Bacterial Treatment of Sewage, 128
- Clusters, Variable Stars in, 352
- Coal: the Duration of the British Coal-fields, E. Lozé, Bennett H. Brough, 124; Accidents in Coal Mines, Prof. Le N. Foster, 136; Electricity direct from Coal, E. F. Bamber, 437; on the Heating and Lighting Power of Coal Gas, T. Fairley, 567; on the Physical Conditions during the growth of the Coal Measures, A. Strahan, 587; on Plant Life during the Growth of the Coal Measures, R. Kidston, 587, 610; on Rapid Changes in the Thickness and Character of the Coal Measures of North Staffordshire, W. Gibson, 587; on a Concealed Coalfield beneath the London Basin, Prof. W. J. Sollas, F.R.S., 587; on the Geological Evidence of the Conditions under which Coal was Formed, J. C. Marr, 588, Dr. Horace Brown, 588, Prof. P. F. Kendall, 588, R. D. Oldham, 588; on the Climatic and other Physical Conditions under which Coal was Formed, Mr. Seward, 610; on the Possible Richness in CO<sub>2</sub> of the Atmosphere of the Coal Period, Dr. Horace Brown, 610; the Coal and Iron Ore Fields of Shansi and Honan, Mr. Glass, 610
- Cobbett (Dr. L.), Rise of Temperature in Fabrics when Moistened, 239
- Cobbold (E. S.), Church Stretton, vol. i. Geology, 571
- Cockerell (Prof. T. D. A.), Note on some Blue and Red Pigments, 31
- "Codium," 63
- Coelostat, Orientation of the Field of View of the Siderostat and, A. Fowler, 428
- Coffee: Le Café, Culture—Manipulation—Production, Henri Lecomte, 338
- Cohen (Dr. J. B.), on the Chlorination of the Aromatic Hydrocarbons and the Constitution of the Dichlorotoluenes, 567
- Colardeau (M.), Researches on Presence of Saturated Mercury Vapour, 191
- Colbourne (Henry J.), the Trembling of the Aspen leaf, 436



- Cole (Mr.), the Nest-building Brook-Lamprey, 500  
 Coleman (Prof. A. P.), on the Recent Discovery of a Ferriferous Horizon in the Huronian North of Lake Superior, 588  
 Collateral Heredity Measurements in Schools, Prof. Karl Pearson, F.R.S., 173, 599  
 Colledge (W. R.), Mosquitoes, 201  
 Collett (R.), the Norwegian North Polar Expedition 1893-1896 to Franz Josef Land, Scientific Results, 146  
 Collie (F. N.), Diacetylaceton Derivatives, 260; Dehydracetic Acid, 260  
 Collier (N. C.), the Causes and Prevention of Consumption, 181  
 Collins (Henry F.), Metallurgy of Lead and Silver, 194  
 Colour-changes in Prawns, Dr. Gamble and Mr. Keeble, 555  
 Colour Photography: Photography in Colours, R. C. Bayley, 195; a Handbook of Photography in Colours, Thomas Bolas, Alexander A. K. Tallent, Edgar Senior, 434  
 Colour Photometry (iii.), Sir William Abney, 273  
 Colour Screens for Refracting Telescopes, T. J. J. See and G. H. Peters, 37  
 "Coma," Prof. S. P. Thompson, 118  
 Comets: Comet Giacobini (1900 a), 37, 256; Comets and Corpuscular Matter, F. H. Loring, 80; Comet Borrelly-Brooks (1900 b), 324, 352, 377, 535; Comet Swift (1894 IV.), 352, 459; Swift's Comet (1892 I.), Prof. W. Pickering, 501  
 Common (Dr. A. A., F.R.S.), Opening Address in the Department of Astronomy in Section A of the British Association, 471  
 Comparative Anatomy of Animals, an Introduction to the Study of the, G. C. Bourne, 364  
 Conductivity produced in Gases by the Motion of Negatively-charged Ions, the, J. S. Townsend, 340  
 Conference, Third International, on a Catalogue of Scientific Literature, London, June, 1900, 206  
 Congress of German Anthropological Society, Annual, 632  
 Congress, International, of Applied Chemistry, 519  
 Congress, International Geological, L. Gentil, 557  
 Congress of Mathematicians, Paris International, 418  
 Congress, Paris International Physical, Dr. Ch. Ed. Guillaume, 425  
 Coninck (E. de), Mechanical Decomposition of some Metallic Chlorides, 168; Organic Solutions of Ferric Chloride, 336  
 Consultative Committee, the Board of Education and its, 248  
 Consultative Committee and Technical Education, the, Prof. J. Wertheimer, 294  
 Consumption, its Causes and Prevention, N. C. Collier, 181  
 Cook's (Captain) Voyage Round the World, Illustrations of the Botany of, in H.M.S. *Endeavour* in 1768-71, Right Hon. Sir Joseph Banks and Dr. Daniel Solander, with Determinations by James Britten, W. Botting Hemsley, 547  
 Cook (Frederick A.), Through the First Antarctic Night, 1898-99, 624  
 Cook (S. R.), Escape of Gases from Planetary Atmospheres, 54  
 Cooking in New Mexico, from the Meteorological Point of View, 421  
 Copeland (Prof.), the Solar Eclipse of May 28, 263  
 Copepoda, Place in Nature of, Isaac C. Thompson, 498  
 Coppet (L. C. de), Temperature of Maximum Density of Aqueous Solutions of Ammonium Chloride and Lithium Bromide and Iodide, 312  
 Corda (Mr.), Relative Advantages of Alternate and Continuous Current for General Electrical Supply, with regard to Interference with other Interests, 416  
 Cormack (W.), Estimation of Furfural, 261  
 Cornish (Vaughan), the Severn Bore, 126  
 Cornu (A.), Zenith-nadir Apparatus for Measuring Zenithal Distances of Stars near Zenith, 95  
 Cornu (Maxime), Ousounify a New Edible Tuber from the Soudan, 72  
 Corona, the Nature of the Solar, Prof. Geo. Fras. Fitzgerald, F.R.S., 7  
 Corona, Photometry of, April 16, 1893, Prof. H. H. Turner, 86  
 Corona, Automatic Photography of the, Prof. C. Burckhalter, 535  
 Coronas (P. J.), Earthquakes of 1897 in Philippines, 555  
 Corpuscles in Physical Phenomena, some Speculations as to the Part Played by, Prof. J. J. Thomson, F.R.S., 31  
 Corpuscular Matter, Comets and, F. H. Loring, 80  
 Correns (Dr. Carl), Untersuchungen ueber die Vermehrung d. Laubmoose durch Brutorgane und Stecklinge, 339  
 Corsica: the Extraction of Tannic Acid from Chestnut Wood, 136  
 Corstophine (G. S.), Palaeolithic Instruments from Stellenbosch, 464  
 Corti (Dr. Benedetto), Diatomaceæ of Lakes Brianza and Segrino, 232  
 Cortie (Rev. A. L.), on the Classification of Sun-spots, 565  
 Coupin (Henri), Functions of Crystalline Tube of Acephala, 47  
 Cousin (H.), Action of Nitric Acid on Trichlor-guaiacol, 264  
 Coward (J. A.), the Birds of Cheshire, 417  
 Cowham (Joseph H.), the School Journey, a Means of Teaching Geography, Physiography, and Elementary Science, 619  
 Crab, a Large Tasmanian, Alex. Morton, 496  
 Craigie (Major P. G.), Opening Address in Section F at the Bradford Meeting of the British Association, 509  
 Craniology: Craniology of Indian Hill Tribes, Sir Wm. Turner, F.R.S., 263; Craniology of Irano Indians, M. Ujfalvy, 351; Slavic Skull at Niedersedlitz, Prof. J. Deichmüller, 533; on Certain Markings on the Frontal Part of the Human Cranium and their Significance, Prof. A. Francis Dixon, 633; on Nine Crania Collected by J. Stanley Gardiner during his Expedition to Rotuma, W. H. L. Duckworth, 623  
 Creeping of Liquids, and on the Surface Tensions of Mixtures, on the, Dr. Trouton, 562  
 Crémieu (V.), Magnetic Effect not produced by Motion of Electrified Body, 167; Moving Electric Charge not Productive of Magnetic Field, 396; Inverse Effect of Magnetic Field not Productive of Movement in Electrified Bodies, 616  
 Cretaceous Rocks of Britain, Memoirs of the Geological Survey of the United Kingdom, vol. i., the Gault and Upper Greensand of England, A. J. Jukes-Browne, Prof. T. G. Bonney, 617  
 Crete: the Recent Cretan Discoveries and their Bearing on the Early Culture and Ethnography of the East Mediterranean Basin, Arthur J. Evans, 526; on the New Scripts discovered by Arthur J. Evans in Crete, 526, 634; on the Cave of Psychró in Crete, D. G. Hogarth, 637; Arthur J. Evans, 637; J. L. Myres, 637  
 Criminal Identification, the English System, Dr. J. G. Garson, 190  
 Crocker (Prof.), Relative Advantages of Alternate and Continuous Current for General Electrical Supply, with regard to Interference with other Interests, 416  
 Crommelin (A.C. D.), Howe's Photographic Observation of Eros, 184  
 Cross (C. F.), on the Action of Caro's Reagent on Furfural, 567  
 Crystallography: Properties of Crystals Yielding Doubly-refracting Liquids on Fusion, H. R. Hartley and H. L. Bowman, 68; Crystallisation produced in Solid Metal by Pressure, W. Campbell, 166; Crystalline Structures of Metals, J. A. Eving, F.R.S., and Walter Rosenheim, 211; Method for Determining Refractive Indices of Minerals of Low Symmetry, G. F. Herbert Smith, 239; Liquid Crystals, O. Lehmann, 568; Calcite Crystals, S. L. Penfield and W. E. Ford, 568  
 Cuckoo, Mode of Carriage of Egg by, A. H. Meiklejohn, 201  
 "Cuckoo-spit," Prof. E. S. Morse, 109  
 "Cuckoo-spittle," the Common Frog-hopper, Dr. A. Porta, 532  
 Cunningham (J. A.), Theory of Order of Crystallisation of Minerals in Igneous Rocks, 262, 368  
 Cunningham (Prof. J. D.), on the Sacral Index, 633; on the Microcephalic Brain, 633  
 Cunningham (Lieut.-Colonel), on the Determination of Successive High Primes, 561  
 Cushing (Frank H.), Death of, 16; Obituary Notice of, 397  
 Curie (Mme.), Atomic Weight of Radiferous Barium, 384  
 Current Papers, Ocean, H. C. Russell, 108  
 Curves, Autotomic, A. B. Basset, F.R.S., 572  
 Cutter (M.), Effects of Work of Active on Inactive Muscular Groups, 492  
 Cuttriss (S. W.), on the Pot-holes and Caves of the Mountain Limestone District of North-west Yorkshire, 587  
 Cyanide Process of Gold Extraction, the, James Parks, 148  
 Cycads, on the Origin of, W. C. Worsdell, 612  
 Cytology: Histology of the Blood, Normal and Pathological, P. Ehrlich and A. Lazarus, Dr. T. H. Milroy, 410; on the Biology and Cytology of Pythium, Prof. Trow, 613; M. Poirault, 613; E. J. Butler, 613

- Daily Weather Report of the Meteorological Office, the, W. N. Shaw, F.R.S., 300
- Dakin (H. D.), on the Chlorination of the Aromatic Hydrocarbons and the Constitution of the Dichlorotoluenes, 567
- Dale (Miss Elizabeth), on the Intumescence of *Hibiscus vitifolius*, 611; on the Structure and Affinities of *Dipteris conjugata*, 612
- Dallas (W. L.), Indian Thunderstorm Observations, 395
- Dante, Edmund G. Gardner, 53
- Danysz (J.), Bacteriological Method of Exterminating Rats, 84
- Daramona Observatory, Astronomical Work at, W. E. Wilson, 630
- Dark Fringes Observed during Total Solar Eclipses, the, V. Ventosa, 86
- Dark Images of Photographed Lightning Discharges, J. B. Hannay, 389
- "Dark" Lamp, a, Gustave Le Bon, 532
- Darwiniens, Lamarckiens et, Félix Le Dantec, 388
- Daubeny (Captain G. A.), Mirage over Needles, Isle of Wight, 605
- Davenport (C. B. and Gertrude C.), Introduction to Zoology, 433
- Davies (A. S.), on a Novel Form of Mercurial Barometer, 562
- Davis (A. Edward), the Refraction of the Eye, including a Complete Treatise on Ophthalmometry, 6
- Davis (R.), New Effect Produced by Stationary Sound-waves, 568
- Davis (W. M.), the Colorado Canyon District, 638
- Davison (Dr. Charles), the Distance to which the Firing of Heavy Guns is Heard, 377
- Dawson (W.), on the Demerbe System of Tramway Construction, 610
- Day (A.), the Air Thermometer at High Temperatures, 381; the Gas Thermometer at High Temperatures, 568
- Daylight Meteor of Sunday, September 2, the, T. Rooke, 524; B. St. G. Lefroy, 524
- De Morgan (Augustus), Elementary Illustrations of the Differential and Integral Calculus, 196
- Debierne (A.), Artificial Radio-active Barium, 383
- Decay in Teeth, the Cause and Prevention of, J. Sim Wallace, 149
- Deep-sea Exploration of the *Siboga* in the Indian Archipelago, the Cruise and, 327
- Deformation, Artificial, of Heads, and Some Customs Connected with Polyandry, Kumagusu Minakata, 437
- Deichmüller (Prof. J.), Slavic Skull at Niedersiedlitz, 533
- Delage (Yves), *Traité de Zoologie Concrète*. T. ii. 1<sup>re</sup> partie, Mésozoaires—Spongiaires, 122
- Delange (R.), Acetyl-phenylacetylene and Benzoyl-phenylacetylene, 72
- Delépine (Marcel), Preparation of Pure Tungsten, 312
- Delezenne (C.), Action of Antileucocytic Serums on Blood-coagulation, 144
- Demarçay (Eug.), Samarium, 47; Unknown Earths in Crude Samaria, 144; Spectrum of Radium, 336
- Denning (W. F.), the Perseid Meteoric Shower, 173; Notes on Saturn and His Markings, 237; the August Perseids of 1900, 398; the Daylight Meteor of Sunday, September 2, 491
- Denny (G. A.), Diamond Drilling for Gold and Other Minerals, 435
- Dentistry, the Cause and Prevention of Decay in Teeth, J. Sim Wallace, 149
- Depéret (C.), Neogenic Regions of Lower Egypt, 408
- Derby (O. A.), Monazite, 568
- Derennes (E.), Use of Sodium Peroxide for Sanifying Wells containing Carbonic Acid, 432
- Derôme (Juvénal), Action of Cyanogen Chloride on Acetone-dicarboxylic Ethyl Ester, 144
- Deslandres (M.), Total Eclipse of the Sun, 233
- Dew-ponds, Atmospheric Electricity and, Arthur Marshall, 495
- Dewar (A. Redcote), from Matter to Man, a New Theory of the Universe, 493
- Dexter (Dr. Edwin G.), Drunkenness and the Weather, 31
- Diamond-drilling for Gold and other Minerals, G. A. Denny, 435
- Diamonds discovered on Kamenka River, 603
- Dickson (H. N.), Circulation of Surface Waters of North Atlantic, 286
- Dietyota, J. Lloyd Williams, 613
- Didymorchis, Prof. W. A. Haswell, F.R.S., 640
- Dietary Studies of Harvard and Yale University Boat Crews, Prof. W. O. Atwater and A. P. Bryant, 232
- Differential Equations, Theory of, A. R. Forsyth, F.R.S., 170
- Differential and Integral Calculus, Elementary Illustrations of the, Augustus De Morgan, 196
- Dipteris conjugata*, on the Structure and Affinities of, Prof. A. C. Seward, F.R.S., and Miss Elizabeth Dale, 612
- Disney (Alfred N.), Modern Microscopes, 154
- Distance to which the Firing of Heavy Guns is Heard, the, Dr. Charles Davidson, 377; J. W. Mallet, 523
- Titte (A.), Crystallisation of Gold, 312
- Diver for Collection of Zoological Specimens, Use of, 253
- Divers (E.), Products of Sulphur Dioxide and Ammonia, 71; Ammonium Imidosulphite, 143
- Dixon (Prof. A. Francis), on Certain Markings on the Frontal Part of the Human Cranium and their Significance, 633
- Dixon (Charles), Among the Birds in Northern Shires, 177
- Dixon (Prof. H. B.), on the Specific Heat of Gases up to a Temperature of 400°, 566
- Dixon (Dr. Henry H.), Ascent of Sap, 572
- Dobkévitch (G.), Maximum Sensitiveness in Coherers for Wireless Telegraphy, 23
- Dollo (Louis), *Racovitzia glacialis*, New Antarctic Fish, 350
- Dootson (F. W.), Amino-chloropyridines, 143
- Double Stars, Catalogue of, Prof. S. W. Burnham, 324
- Dowzard (E.), the Viscosity of Essential Oils, 322
- Drainage, Irrigation and, F. H. King, 5
- Dromaius ater*, Vieillot, a Third Specimen of the Extinct, found in the Royal Zoological Museum, Florence, Prof. Henry H. Giglioli, 102
- Dromaius ater*, Specimens of, Prof. Alfred Newton, F.R.S., 151
- Drude (Dr. Paul), *Lehrbuch der Optik*, 595
- Drunkenness and the Weather, Dr. Edwin G. Dexter, 31
- Dubois (Prof. Eugène), the Earth's Age, 498
- Dubois (Raphael), Living Light, 464
- Dublin Royal Society, 95, 262
- Dublin Section of the Institution of Electrical Engineers, Inaugural Address, Applications of Electrical Science, Prof. G. F. Fitzgerald, 43
- Duckworth (W. L. H.), Rechts-und Linkshändigkeit, Dr. Fritz Lueddeckens, 409; on some Anthropological Observations of the Pangan Tribe of Aborigines in the Malay Peninsula, 633; On Nine Crania collected by J. Stanley Gardiner during his Expedition to Rotuma, 633
- Dufau (Em.), Crystallised Calcium Aluminate, 568
- Dufour (M.), the Thermal Properties of Fused Silica, 255
- Dufton (A.), an Arrangement for producing Artificial Light of the same character as Daylight, 563
- Dugast (J.), Vinification dans les Pays Chauds—Algérie et Tunisie, 74
- Dunraven (the Earl of), Self-instruction in the Practice and Theory of Navigation, 337
- Dunstan (W. R., F.R.S.), the Poison of *Lotus arabicus*, 238
- Duration, Maximum, of a Total Solar Eclipse, C. T. Whitmell, 64, 86
- Duration of Totality of Solar Eclipses at Greenwich, Chas. T. Whitmell, 269
- Durham, on the Concretionary Structures of the Magnesian Limestone of, Dr. G. Abbott, 587
- Dutton (C. N.), the Pneumatic Balance Canal Lock, 135
- Dwerryhouse (A. R.), on the Subterranean Drainage of the Limestone, 587
- Dyeing Machinery, Electrical, A. E. Sunderland, 457
- Dye-stuffs, Artificial, Manufacture in Germany of, 422
- Dynamics of Pseudospherical Space, Prof. D. de Francesco, 18
- Dynamics, Quaternion Methods applied to, W. G. Barnett, 174
- Earth Magnetism and Solar Activity, Latitude Variation, Dr. J. Halm, 460
- Earth, Recent and Proposed Geodetic Measurements, 622
- Earth, an Estimate of the Geological Age of the, J. Joly, F.R.S., 235
- Earth's Age, Prof. Eugène Dubois, 498
- Earth's Motion, Relation between Solar Activity and, W. G. Thackeray, 20
- Earth's Rotation, Demonstration with 1 metre long Pendulum of, Alphonse Berget, 288
- Earthquakes: Earth-shake near Manchester, 17; Greek Earth-

- quakes, 1893-8, M. Eginitis, 85; the Great Earthquake of June 12, 1897, R. D. Oldham, 305; Philippine Earthquakes of 1897, P. J. Coronas, 555; Earthquake in Bombay and Madras, 578
- Earthworks, on some Yorkshire, Mrs. Armitage, 637
- Eberhardt (M.), Action of Dry and Moist Air on Plants, 312; Influence of Dry Air on Plant Structure, 520
- Ebert (A.), Generation of Electricity in Liquid Air, 568
- Echinoderms, a Manual of the, F. A. Bather, J. W. Gregory and E. S. Goodrich, 545
- Eckardt (M.), Expansion of Rubidium during Fusion, 93
- Eckerlein (P. A.), Thermal Conductivity of Gases, 639
- Eclipses: the Total Eclipse of the Sun, 54, 132, 398; Charles P. Butler, 54; Sir Norman Lockyer, K.C.B., F.R.S., 104; M. Deslandres, 233; French Observations of the Total Eclipse of the Sun, 183; the Total Eclipse observed at Sea, Col. E. E. Markwick, 183; Solar Eclipse of May 28, 1900, Actinometric Observations during, J. Violle, 216; S. R. Bennett, 263; Prof. Copeland and Thomas Heath, 263; the Total Solar Eclipse as observed by the Smithsonian Expedition, 246; Magnetic Observations during, Dr. L. A. Bauer, 302; Maximum Duration of a Total Solar Eclipse, C. T. Whitmell, 64, 86; Duration of Totality of Solar Eclipses at Greenwich, Chas. T. Whitmell, 269; the Dark Fringes Observed during Total Solar Eclipses, V. Ventosa, 86; Photometry of Corona, April 16, 1893, Prof. H. H. Turner, 86; Eclipse Photography, Prof. Francis E. Nipher, 246; Automatic Photography of the Corona, Prof. C. Burckhalter, 535; the Total Eclipse of the Sun of May 17-18, 1901, 202; J. J. A. Muller, 389; *see also* British Association
- Edelmann (M. T.), High Note Production by Galton's Whistle, 381
- Edinburgh Mathematical Society, 95, 191
- Edinburgh Royal Society, 95, 191, 263, 360
- Education: Extension of the Dyeing Department of Yorkshire College, 115; a Modern University, 184, 203; the Reorganisation of the Education Department, 209; the Board of Education and its Consultative Committee, 248; the Consultative Committee and Technical Education, Prof. J. Wertheimer, 294; the Teaching of Mathematics, Prof. John Perry, F.R.S., 317; the Reform of Mathematical Teaching, David Mair, 389; Henry Woollen, 436; W. F. Beard, 466; C. E. Stromeyer, 523; Oliver Heaviside, 548; a Physical Basis of Precocity, 578
- Egerton (H. E.), Sir Stamford Raffles: "England in the Far East," 548
- Eginitis (D.), Greek Earthquakes, 1893-8, 85; Ancient Records of Meteor Showers, 203
- Egypt: Nile Floods and Monsoon Rains, 391; Egyptian Gold, Daniel Berthelot, 464; on Perforate Humeri from Ancient Egyptian Skeletons, Prof. A. Macalister, 633; on the System of Writing in Ancient Egypt, F. Ll. Griffiths, 634; on the Present State of our Knowledge of the Modern Population of Egypt, D. Randall-MacIver, 636
- Ehrlich (P.), Histology of the Blood: Normal and Pathological, 410
- Eichhorn (H.), Resistivity of Bismuth in Magnetic Field, 639
- Eider-duck's Summer Moulting Plumage, the, Witmer Stone, 201
- Electricity: Maximum Sensitiveness in CHERERS for Wireless Telegraphy, A. Blondel and G. Dobkévitch, 23; Wireless Telegraphy and Hertzian Waves, S. R. Bottone, 522; Human Body as Screen in Wireless Telegraphy, E. Guarini and F. Poncelet, 568; Value of Refractive Index of Ice for Electro-magnetic Radiations, C. Gutton, 23; Electro-magnetic Experiment, Prof. S. P. Thompson, 71; Therapeutic Electricity and Practical Muscle Testing, W. S. Hedley, 30; Dublin Section of the Institution of Electrical Engineers, Inaugural Address, Applications of Electrical Science, Prof. G. F. Fitzgerald, 43; an Experiment of M. Jaumann, P. Villard, 47; the Viscosity of Dielectrics, F. Beaulard, 47; Electric Micrometer, P. E. Shaw, 67; the Lightning Conductors of St. Paul's, K. Hedges, 68; Discussion on Prof. Lodge's paper on Volta's Contact Force, Prof. Armstrong, Mr. Glazebrook and Dr. Lehfeldt, 70; Electrical Power Transmission Works in Northern Italy, 84; Electric Arc between Metallic Electrodes in Nitrogen and Hydrogen, L. Arons, 93; Electrolytic Records of Currents, P. Gruetner, 93; the Metropolitan District Short Electric Railway Line, 107; Nikola Tesla's Recent Electrical Experiments, 116; Measurement of Standard Resistances, R. T. Glazebrook, 118; the Theory of Electrolytic Dissociation, H. C. Jones, 121; the St. Lawrence Power Works, 135; Standardisation of Electrical Engineering Plant, R. P. Sellon, 135; Advancement of Electrical Chemistry, Dr. F. Mollwo Perkin, 138; the Kathode Rays, P. Villard, 191; Electrical Resistance of Thin Films deposited by Kathode Discharge, A. C. Longden, 210; Discontinuity of Kathodic Emission, P. Villard, 240; Significance of Kathode Rays in connection with Mechanism of Discharge, Dr. Otto Berg, 628; Reflection and Mechanical Effect of Kathode Rays, H. Starke, 639; Apparatus for production of Short Electric Waves and Study of Electro-optic Phenomena, Prof. J. A. Fleming, F.R.S., 208; Change of Conductivity of Gases by Continuous Current, J. Stark, 211; Magnetic Screening for Galvanometers, H. du Bois, A. C. P. Wills, 211; Electrical Traction on Canals, 231; Action of High-frequency Currents on Elementary Respiration, M. Tripet, 240; Experiments on Striated Discharges, R. S. Willows, 240; Electromotive force of Nickel Steel, Emile Steinmann, 264; Poulsen's Telephonograph, Louis Olivier 273; Newton's Rings from Selenium Rays, A. C. Longden, 273; a String Alternator, K. Honda and S. Shimizu, 286; Volta e la Pila, Prof. Augusto Righi, 293; Electrical Organs, Muscle or Nerve? Beiträge zur Physiologie des elektrischen Organes der Zitterrochen (Torpedo), Siegfried Garten, 290; Electrical Power Distribution, Prof. W. E. Ayrton, F.R.S., 296; Electrolytic Estimation of Bismuth, Dmitri Balachowsky, 312; Resistivity of Bismuth in Magnetic Field, H. Eichhorn, 639; Some Results obtained with a Storage Battery of Twenty Thousand Cells, Prof. John Trowbridge, 325; Electric Touch and Molecular Changes produced by Electric Waves, Prof. Jagadis Chunder Bose, 335; Interruption Spark in Alternating Current with Metallic Electrodes, L. Kallir, 335; Thermoelectric force of some Metallic Oxides and Sulphates, A. Abt, 335; Anomalous Electro-magnetic Rotary Dispersion, A. Schmauss, 335; Point Discharges, E. Warburg, 335; the Conductivity produced in Gases by the Motion of Negatively-charged Ions, J. S. Townsend, 340; Swift and Son's Electric Lamp for Microscopy, 351; Electrical Effects of Light on Green Leaves, Dr. A. D. Waller, F.R.S., 358; Electrical Leakage from Charged Bodies, Prof. J. C. Beattie, 360; Atmospheric Electricity, C. T. R. Wilson, 149; John Aitken, F.R.S., 366; Variations with altitude of Air Potential, Prof. E. Semmola, 375; Recording Telephones, 371; Variation of Condenser and Choking-Coil Currents with Shape of Electromotive Wave, Alex. Russell, 375; Electron Theory of Atomic Magnetism, Robert Lang, 376; Subjects for Consideration by Electrical Engineers, 379; Dispersion in Air, J. Elster and H. Geitel, 381; Fluorescence and Phosphorescence in Discharge through Nitrogen, P. Lewis, 381; Electrolysis of Concentrated Solutions of Hypochlorites, André Brochet, 383; Circuits formed entirely by Electrolytes, MM. Carmichel and Swyngedauw, 384; Electrolytic Estimation of Cadmium, Dmitri Balachowsky, 384; Electric Batteries, how to Make and Use Them, 388; Moving Charge Not Productive of Magnetic Field, V. Crémieu, 396; Wireless Telegraph in French Navy, 396; What Pressure is Dangerous on Electric Railways with Overhead Trolley Wires, William Rung, 399; Units at the International Electrical Congress, 414; American Institute and English Institution of Electrical Engineers at Paris, 415; Relative Advantages of Alternate and Continuous Current for General Supply, with regard to Interference with Other Interests, M. Ferranti, 415; Mr. Arnold, 415; Sir William Preece, 415; Dr. Kennelly, 415; Prof. Ayrton, 416; M. Corda, 416; Prof. Crocker, 416; Mr. Mordey, 417; Mr. Mailloux, 417; Prof. S. P. Thompson, 417; the Niagara Falls Power Company's Works, 422; Rowland's New Method for Measuring Electric Absorption, L. M. Potts, 432; Dielectric Cohesion of Gases, M. Bouty, 432; Electricity Direct from Coal, E. F. Bamber, 437; Electrical Dyeing Machinery, A. E. Sunderland, 457; Effect of Thunderstorms on Calcutta Glow Lamps, 457; Evaporation not Productive of Loss of Charge, A. Pochettino and A. Sella, 458; Dielectric Cohesion and Explosive Fields, 464; Electrical Determination of Last Sign of Life, A. D. Waller, 492; Atmospheric Electricity and Dew-ponds, Arthur Marshall, 495; Wastage of Electrical Properties of Cables under Continuous Currents, George Rheins, 520; the Theory of Ions, 524; Ions, Prof. G. F. Fitzgerald, 564; Dr. J. Larmor, 564; Prof. H. E. Armstrong, 564; Mr. Whetham, 564; Prof. Oliver Lodge,

- 564; W. J. Pope, 564; Electric Railway Traction in Germany, 532; Negative Effect of Solar Eclipse on Atmospheric, Dr. E. Oddone, 532; Report of the British Association Electrical Standards Committee on the Removal of the Standards to Kew, 563; Improved Standard Resistance Coils, R. S. Whipple, 563; Prof. F. G. Baily on a Lecture-room form of Volt and Ammeter, 563; Prof. W. B. Morton's Results Obtained by Applying J. J. Thomson's and Sommerfeld's Solution of the Propagation of an Electric Wave along a Single Wire, 563; On the Vector Potential of Electric Currents in a Field where Disturbances are Propagated with Finite Velocity, S. H. Burbury, 563; Wireless Telephony, Sir William H. Preece, 564; Prof. J. Chunder Bose on the Effect of Electrical Stimulus on Inorganic and Organic Substances, 564; Report of the British Association Committee on Electrolysis and Electrical Chemistry, 564; Generation of Electricity in Liquid Air, H. Ebert and B. A. Hoffmann, 568; Fall of Potential in Flame Gases, E. Marx, 568; Hall Effect in Flame Gases, E. Marx, 568; Influence of Spark-gap on Generation of Röntgen Rays, A. Winkelmann, 568; on the Proposed Mono-rail High-speed Electric Railway between Manchester and Liverpool, Sir William Preece, F.R.S., and F. J. Behr, 610; Inverse Effect of Magnetic Field not Productive of Movement in Electrified Bodies, V. Crémieu, 616; Experiments on High Resistance, O. N. Rood, 638; Accessory Reactions of Electrolysis, A. Brochet, 639; Electric Conductivity of Pressed Powders, F. Streintz, 639; Ratio of Thermal and Electric Conductivities, E. Grüneisen, 639
- Éléments de la Théorie des Nombres, E. Cahen, 52
- Elephant Seals of Kerguelen Island, the, R. Hall, 628
- Elephantiasis and Mosquitoes, 374
- Elkin (Dr. W. L.), the Velocities of Meteors, 398
- Elliott (D. G.), *Oreannus kennedyi*, a New American Mountain Antelope, 321
- Elliot (Captain R. H.), Snake Venom, 180
- Ellis (Prof. G. V.), Death of, 16
- Elster (J.), Electrical Dispersion in Air, 381
- Elwes (H. J., F.R.S.), Mosquitoes and Malaria, 554
- Embryonic Tissues, Prof. Marshall Ward, F.R.S., 611
- Emett (Delta), Models of Blood-Corpuscles Infected with Malaria Parasite, 208
- Emotion, Experimentation on, Prof. C. S. Sherrington, F.R.S., 328
- Emu, a Third Specimen of the Extinct *Dromaius ater*, Vieillot; found in the Royal Zoological Museum, Florence, Prof. Henry H. Giglioli, 102
- Emu, Specimens of *Dromaius ater*, Prof. Alfred Newton, F.R.S., 151
- Engineering: Valve Motions of Engines, F. J. Vaes, 31; Prof. John Perry, F.R.S., 31; the Proposed Mont Blanc Railway, J. and H. Vallot, 62; the Open Hearth Continuous Steel Process, B. Talbot, 67; Apparatus for Equalising Hot Blast Temperatures, L. G. Gjers and J. H. Harrison, 67; the Metropolitan District Short Electric Railway Line, 107; the Elevated Moving Pavement at the Paris Exposition, 107; Railways and Moving Platforms, Prof. John Perry, F.R.S., 412; Road Locomotion, Prof. Hele Shaw, F.R.S., 139; Automobile Trials at Paris Exhibition, 158; the Musker Steam Motor Wagon, 554; the Halford Gradient Railway, 180; the Conditions of High Speed on Railways, 181; Specially built Train for Experiment on Atmospheric Resistance, 200; Papers on Mechanical and Physical Subjects, Osborne Reynolds, 243; the Transbaikalian Railway, 253; the Reclamation of Land from Tidal Waters, Alexander Beazeley, 266; the Great Alpine Tunnels, Francis Fox, 281; Electrical Power Distribution, Prof. W. E. Ayton, F.R.S., 296; Marine Engineering, H.M.S. *Viper*, 322; Subjects for Consideration by Electrical Engineers, 379; American Institute and English Institution of Electrical Engineers at Paris, 415; Iron and Steel Institute, 535; Development of Iron Industry in France, H. Pinget, 535; Iron and Phosphorus, J. E. Stead, 535; New Aluminium Method of Producing High Temperatures, E. F. Lange, 536; Present Position of Solution Theory of Carburised Iron, Dr. A. Stansfeld, 536; On the Construction of Shop Buildings and large Engineering Works, E. K. Clark, 610
- England in the Far East, Sir Stamford Raffles, H. E. Egerton, 548
- England's Neglect of Science, Prof. John Perry, F.R.S., 221
- Enoch (Fred), the Tiger Beetle, 208; *Ranatra Linearis*, 261
- Entomology: Spider-silk manufactures in Madagascar, M. Nogue, 17; Note on some Blue and Red Pigments, Prof. T. D. A. Cockerell, 31; Catalogue of the *Lepidoptera Phalaenae* in the British Museum, Vol. II., Catalogue of the Arctiidae (Nolina, Lithosiane), Sir George F. Hampson, Bart., 77; "Cuckoo-spit," Prof. E. S. Morse, 109; "Cuckoo Spittle," the Common Frog Hopper, Dr. A. Porter, 532; Garden Pests, F. H. Chittenden, 109; Entomological Society, 118, 261, 639; the Cape Colony Fruit Moth, Mr. Barrett, 119; Influence of Temperature on Development of Lepidoptera, Prof. Max Standfuss, 136; the Lepidoptera of the British Islands, Charles G. Barrett, 317; Elm and Pine Pests, Dr. R. S. McDougall, 191; Mosquitoes, W. R. Colledge, 201; Mosquitoes and Malaria, H. J. Elwes, F.R.S., 554; Prof. Grassi's Experiment on Mosquitoes and Malaria, 578; Insect Visitors to Iris, Prof. J. G. Needham, 201; Web-Spinning Habits of Red Ant, E. G. Green, 253; the Pupae of *Aporia Crataegi*, Mr. Merrifield, *Oligostigma Araealis*, Sir G. F. Hampson, 261; *Ranatra Linearis*, F. Enock, 261; Phylogeny of Pieridae, A. R. Grote, 274; Fig Insects, W. W. Froggatt, 303; Eggs of Wood-Leopard Moth, C. Repington, 321; Functions of an Organ of the Larva of the Puss Moth, Arthur S. Thorn, 389; Function of the Whips of the Larva of the Puss Moth, W. F. Kirby, 413; Brief Guide to the Commoner Butterflies of the Northern United States and Canada, Samuel Hubbard Scudder, 411; the Fruit-pest *Ceratitidis Capitata*, Alfred Giard, 432; Artificial Ant-hills at Paris Exhibition, C. Janet, 490; the Ocelli in the head of the Cockroach, C. Kochi, 500; Catalogue of Eastern and Australian *Lepidoptera Heterocera* in the Collection of the Oxford University Museum, 548; Church Stretton, vol. i., Macro-Lepidoptera, F. B. Newnham, 571; Dragon-fly Migrations, A. Lancaster, 579; Rare British Insects Captured During Past Summer and Autumn, 606; Morphology of Respiratory Apparatus of *Brochus Ornatus*, L. G. Seurat, 639
- Eutomophthora gloeospora*, on the *Azygospores* of, Prof. Vuillemin, 613
- Epping Forest and Elsewhere, Disease of Birch Trees in, Robt. Paulson, 599
- Equations, Differential, Theory of, A. R. Forsyth, F.R.S., 170
- Erinnerungen aus meinem Leben, A. Kölliker, 169
- Eros: Ephemeric for Eros, 20, 110, 184, 233, 377, 459, 491, 501, 535, 556, 581, 606, 630; Determination of Solar Parallax from Opposition of Eros, Prof. S. Newcomb, 20; Photographic Observation of Eros, Prof. Howe, 137; Howe's Photographic Observation of Eros, A. C. D. Crommelin, 184; Measures of Eros, 233; Opposition of Eros, 425; M. Loewy, 630; On Preparations for Determining the Solar Parallax by Observations of Eros, A. R. Hinks, 565; Prof. Turner, 565
- Escape of Gases from Planetary Atmospheres, S. R. Cook, 54
- Escape of Gases from Atmospheres, Dr. G. Johnstone Stoney, F.R.S., 78
- Escombe (F.), Static Diffusion in Gases and Liquids in Relation to Carbon-assimilation and Translocation in Plants, 212
- Etard (A.), the Hydrolysis of Fibrous Tissue, 72
- Ethnography: Malay Magic, W. W. Skeat, 145; see also Section H of the British Association.
- Ethnology: Death and Obituary Notice of Frank H. Cushing, 16; the Races of Europe, a Sociological Study, William Z. Ripley, Prof. A. C. Haddon, F.R.S., 27; Der Ursprung der Kultur, L. Frobenius, 101; the Recent Cretan Discoveries and their Bearing on the Early Culture and Ethnography of the East Mediterranean Basin, Arthur J. Evans, 526; the Peopling of Australia, John Mathew, 549
- Euglena*, the Eye-spot in, H. Wager, 605
- Euglena Viridis*, on a Demonstration of the Structure and Attachment of the Flagellum in, Harold Wager, 612
- Europe: the Races of Europe, a Sociological Study, William Z. Ripley, Prof. A. C. Haddon, F.R.S., 27; Sette Anni di Caccia Grossa é Note di Viaggio in America, Asia, Africa, Europa, Count Felice Scheibler, 244
- Evans (A. H.), a Vertebrate Fauna of the Shetland Isles, 75
- Evans (Arthur J.), the Recent Cretan Discoveries and their Bearing on the Early Culture and Ethnography of the East Mediterranean Basin, 526; on the New Scripts discovered by him in Crete, 526, 634; on the Cave of Psychró in Crete, 637
- Evans (Sir John, F.R.S.), Paleolithic Man in Africa, 190

- Evans (Dr. J. W.), the Mechanically Formed Limestone of Junagadh, 239
- Evaporation not Productive of Loss of Electricity, A. Pochettino and A. Sella, 458
- Evolution: Death and Obituary Notice of the Duke of Argyll, 13; Naturalism and Agnosticism, James Ward, 25; the Races of Europe, a Sociological Study, William Z. Ripley, Prof. A. C. Haddon, F.R.S., 27; Man and his Ancestor, a Study in Evolution, Charles Morris, 101; Correlation between Life-duration and Number of Offspring, M. Beeton, G. U. Yule, and Karl Pearson, F.R.S., 381; the Origin of Vertebrates, deduced from Study of Ammocetes, Dr. Gaskell, 423; the Subordination of the Individual to the Welfare of the Species, 593
- Ewing (Prof. J. A., F.R.S.), Crystalline Structure of Metals, 211, 567
- Ewing's (Prof.), Combined Integrating Wattmeter and Maximum Demand Indicator, 610
- Explorations of the *Albatross* in the Pacific, 307
- Explosives: Researches on Modern, W. Macnab and E. Ristori, 46; Some Modern Explosives, Sir Andrew Noble, K.C.B., F.R.S., 86, 111
- Extension of the Dyeing Department of Yorkshire College, 115
- Eye, the Refraction of the, including a Complete Treatise on Ophthalmometry, A. Edward Davis, 6
- Eye: Ueber den Bau und die Entwicklung der Linse, Dr. Carl Rabl, 125
- Fabry, Charles, the Production of Monochromatic Light, 350
- Facts of Inheritance, Prof. J. Arthur Thompson, F.R.S., 331
- Fairchild (Geo. T.), Rural Wealth and Welfare, 245
- Fairley (T.), on the Heating and Lighting Power of Coal Gas, 567
- Fannenberg (W. de), Leçons Nouvelles sur les Applications Géométriques du Calcul différentiel, 196
- "Faraday Effect," Observation of the Circular Components in the, Prof. D. B. Brace, 368
- Farmer (Prof. J. B.), Histologische Beiträge, Heft iv., E. Strasburger, 28
- Farmstead, the, Prof. J. P. Roberts, 53
- Fauna of the Shetland Isles, a Vertebrate, A. H. Evans and T. E. Buckley, 75
- Fauna of South Africa, Mammals, W. L. Sclater, 521
- Feeding Habits of Rhinoceros Birds in British East Africa, Change of, Capt. Hinde, Prof. E. Ray Lankester, F.R.S., 366
- Feathers, Racket, L. W. Wigglesworth, 54; the Reviewer, 54
- Fenton (H. J. H.), on a Simple Method of comparing the "Affinities" of certain Acids, 567
- Férand (A.), Comet 1900*b* (Borelly-Brooks), 464
- Férée (M.), Sodium Potassium Amalgams, 312
- Fermentation, Micro-Organisms and, Alfred Jörgensen, 195
- Ferranti (M.), Relative Advantages of Alternate and Continuous Current for General Electrical Supply with regard to Interference with other Interests, 415
- Field-Mice (North American Voles), V. Bailey, 232
- Fifty Years of Geological Survey in India, 105
- Filippi (Dottore Filippo de), La Spedizione di sua Altezza Reale il Principe Luigi Amedeo di Savoia, Duca degli Abruzzi, al Monte Sant' Elia (Alaska), 1897, 1
- Finn (F.), Fancy Water-Fowl, 547
- Finsch (Dr. O.), Dugong Vertebra as Bracelet in Pelew Islands, 36
- Fireball of Sunday September 2, the, 535
- Fischer (Alfred), the Structure and Functions of Bacteria, 465
- Fischer (Emil), the Division of Racemic Amido-Acids into their Optical Components, 629
- Fischer (Dr. K. T.), a Simple Experiment in Thermal Radiation, 103
- Fisheries: the Scotch Salmon Fishery for 1899, 303
- Fishes, Albinism and Natural Selection in, Walter Garstang, 620
- Fishes, Psychology of, Dr. R. W. Shufeldt, 63
- Fitzgerald (E. A.), the Highest Andes, 38
- Fitzgerald (Prof. Geo. Fras., F.R.S.), the Nature of the Solar Corona, 7; Applications of Electrical Science, 43; Æther and Matter, Joseph Larmor, 265; on the Relation of Radiation to Temperature, 562; on the Partition of Molecular Energy, 562; Ions, 564; on Crémieu's Experiment, 564
- Flatau (Dr. Edw.), Handbuch der Anatomie und vergleichenden Anatomie des Centralnervensystems der Säugetiere, 267
- Fleming (Prof. J. A., F.R.S.), Apparatus for Production of Short Electric Waves and Study of Electro-Optic Phenomena, 208
- Flight, the Mechanics of, Lord Rayleigh, 108
- Flint Implements of Palæolithic Type, on the Occurrence of, on an Old Land Surface in Oxfordshire, A. M. Bell, 636
- Flood at Forres, 457
- Flora of Bournemouth, including the Isle of Purbeck, E. F. Linton, 598
- Flora, the Origin of the British, Clement Reid, F.R.S., 268
- Florence, R. Zoological Museum, a Third Specimen of the Extinct *Dromaius ater*, Vieillot, found in the, Prof. Henry H. Giglioli, 102
- Fluorine: Le Fluor et ses Composés, Henri Moissan, 291
- Folklore: "Malay Magic"; being an Introduction to the Folk-Lore and Popular Religion of the Malay Peninsula, W. W. Skeat, 145; the Ginn in Morocco, Dr. E. Westermarck, 499
- Fonzes-Diacon (M.), Crystallised Lead Selenide, 23; Preparation of some Aluminium Compounds and Corresponding Hydrogen Derivatives, 95; Selenides of Iron, 216; Selenides of Nickel, 592
- Food: Dietary Studies of Harvard and Yale University Boat Crews, Prof. W. O. Atwater and A. P. Bryant, 232
- Food, Air, Water and, Ellen H. Richards, Alpheus G. Woodman, 620
- Forerand (M. de), a Lithium Peroxide, 143
- Ford (W. E.), Calcite Crystals, 568
- Forepaws of Mammals, Vibrissæ on the, Frank E. Beddard, F.R.S., 523
- Forestry: Les Vieux Arbres de la Normandie, Henri Gadeau de Kerville, 7; Disease of Birch Trees in Epping Forest and elsewhere, Robt. Paulson, 599; on British Sylviculture, Samuel Margerison, 611
- Forres, Reservoir Burst at, 457
- Forsyth (A. R., F.R.S.), Theory of Differential Equations, 170
- Fossils: Catalogue of the Fossil Bryozoa in the Department of Geology, British Museum (Natural History), the Cretaceous Bryozoa, Vol. I., Dr. J. W. Gregory, 125
- Foster (Prof. Le N.), Accidents in Coal Mines, 136
- Foundations of Zoology, the, William Keith Brooks, 593
- Fourtau (R.), Neogenic Regions of Lower Egypt, 408
- Fowler (A.), Orientation of the Field of View of the Siderostat and Coelostat, 428; Report on the Proceedings in Section A, Astronomy, at the Bradford Meeting of the B.A., 565
- Fowler (G. Herbert), the Plankton of the Bay of Biscay, 317
- Fowler (G. J.), Elements of Qualitative Analysis, 412
- Fowls, Crooked-keeled Breastbone in, Prof. R. J. Anderson, 159
- Fox (Francis), the Great Alpine Tunnels, 281
- Fox (T. W.), Mechanism of Weaving, 29
- Fracture of Steel Rails, the Cause of, 437
- France, Leprosy in, 198; French Observations of the Total Eclipse of the Sun, 183
- Francesco (Prof. D. de), Dynamics of Pseudospherical Space, 18
- Franz Josef Land, the Norwegian North Polar Expedition, 1893-1896, to, Scientific Results, Fridtjof Nansen, J. F. Pompeckj, A. G. Nathorst, R. Collett, 146
- Freeland (E. H.), the Causes of Sunstroke, 396
- Freshwater Lochs of Scotland, the, Sir John Murray, K.C.B., F.R.S., and Fred P. Pullar, 65
- Fricker (Dr. Karl), the Antarctic Regions, 624
- Friedel (Jean), Action of Total Pressure of Carbon Dioxide on Assimilation by Chlorophyll, 464
- Friedländer (Dr. B.), New Zealand Volcanoes, 180
- Friswell (R. J.), the Wellcome Research Laboratories, 271
- Frobenius (L.), Der Ursprung der Kultur, 101
- Froggatt (W. W.), Fig Insects, 303
- "Frost Fighting," A. G. McAdie, 274
- Frost, Sunspots and, Alex. B. MacDowall, 599
- Fürbringer (Dr.), New Subdivision of Vertebrates, 397
- Fungi found in Ceylon Growing on Scale Insects, on, J. Parkin, 613
- Fungus Diseases of Citrus Trees in Australia, and their Treatment, D. McAlpine, 494

- Gahl (Dr. R.), Method of Confirming Thermo-dynamical Relations between Freezing Point and Vapour Pressures of very Dilute Solution, 37
- Gain (Edmond), Mummy Cereals, 191
- Galton (Francis, F.R.S.), Analytical Portraiture, 320; Photographic Side of Analytical Portraiture Suggestions, 374; High Note Production by Galton's Whistle, M. T. Edelmänn, 381
- Galveston, the Lessons of, W. J. McGee, 604
- Galveston Hurricane, Track of, 628
- Gamble (F. W.), Graff's Monographie der Turbellarien, II., Tricladida Terricola (Landplanarien), 241; Colour-changes in Prawns, 555; on the Colour-changes of Various Prawns, 590
- Garden-pests, F. H. Chittenden, 109
- Gardening: the Amateur's Practical Garden Book, C. E. Hund, L. H. Bailey, 101
- Gardiner (Stanley), Report of B.A. Committee on the Structure, Formation, and Growth of the Coral Reefs of the Indian Ocean, 589-590; on Nine Crania Collected by J. Stanley Gardiner during his Expedition to Rotuma, 633
- Gardner (Edmund G.), Dante, 53
- Gardner (W. M.), an Arrangement for Producing Artificial Light of the same Character as Daylight, 563
- Garson (Dr. J. G.), the English Metric System of Criminal Identification, 190
- Garstang (Walter), Albinism and Natural Selection, 620
- Garten (Siegfried), Beiträge zur Physiologie des elektrischen Organes der Zitterrochen (Torpedo), 290
- Gas Producer, Portable, Dr. J. A. Purves, 601
- Gas Thermometry, Dr. P. Chappuis, 214
- Gases: Escape of Gases from Planetary Atmospheres, S. R. Cook, 54; Escape of Gases from Atmospheres, Dr. G. Johnston Stoney, F.R.S., 78, 359; Viscosity of Gases as affected by Temperature, Lord Rayleigh, F.R.S., 287; the Conductivity produced in Gases by the Motion of Negatively-charged Ions, J. S. Townsend, 340; on the Results of Dr. Larmor's Application of the Principle of Least Action to the Statistical Dynamics of Gas Theory, as illustrated by Meteor Swarms and Optical Ray Systems, Dr. Larmor, 562; G. E. Petaval's Apparatus for Experiments on the Explosive Pressures of Gases, 563; Phosphorescent Glow in Gases, J. B. B. Burke, 564; on the Specific Heat of Gases up to a Temperature of 400°, Prof. H. B. Dixon, F. W. Rixon, 566
- Gaskell (Dr.), the Origin of Vertebrates deduced from Study of Ammocetes, 423
- Gault and Upper Greensand of England, the, Memoirs of the Geological Survey of the United Kingdom, the Cretaceous Rocks of Britain, vol. i., A. J. Jukes-Browne, Prof. T. G. Bonney, F.R.S., 617
- Gautier (Armand), Combustible Gases of Atmosphere, 216, 264, 288; Combustible Gases in Paris Air, 568; Limits of Combustibility by Red-hot Copper Oxide of Hydrogen and Methane diluted with large Volumes of Air, 119; Arsenic and Iodine in Animal Economy, 383
- Gegenschein, Meteoric Theory of the, F. R. Moulton, 305
- Geitel (H.), Electrical Dispersion in Air, 381
- Gemmill (Dr. J. F.), on the Anatomy of the Head in Cyclopean Trout Embryos, 589
- Genesis of the Vertebrate Column, Herbert Spencer, 620
- Gentil (L.), International Geological Congress, 557
- Geodesy: Apparatus for Measuring Geodetic Bases, Alphonse Bergot, 408; Recent and Proposed Geodetic Measurements, 622
- Geography: La spedizione di sua Altezza Reale il Principe Luigi Amedeo di Savoia, Duca degli Abruzzi, al Monte Sant' Elia (Alaska), 1897, Dottore Filippo de Filippi, 1; Preliminary Notes on the Result of the Mount Kenya Expedition, 1899, H. J. Mackinder, 12; Royal Geographical Society Medal Awards, 34; Granddidier's Expedition to Madagascar, 35; Second Expedition to Head Waters of Xingu, Dr. Hermann Meyer, 36; the Highest Andes, E. A. Fitzgerald, Edward Whymper, 38; the Fresh-water Lochs of Scotland, Sir John Murray, K.C.B., F.R.S., and Fred P. Pullar, 65; the Salt Lake of Larnaca, C. V. Bellamy, 94; Death and Obituary Notice of Miss M. H. Kingsley, 134; the Geography of the Region about Devil's Lake and the Dalles of the Wisconsin, Prof. R. D. Salisbury, W. W. Atwood, 172; Area of Basins of Russia in Asia, J. de Schokalsky, 408; the Ndonda District, H. A. Byatt, 422; Pflanzen und Tierverbreitung, Prof. Alfred Kirchhoff, Dr. Otto Stapf, 569; Surveying and Exploring in Siam, James McCarthy, 571; Return of Amdrup's Arctic Expedition, 577; the Lessons of Galveston, W. J. McGee, 604; the Navigation of the Lower Mississippi, L. M. Haupt, 604; the School Journey, a Means of Teaching Geography, Physiography and Elementary Science, Joseph H. Cowham, 619; the Antarctic Regions, Dr. Karl Fricker, Dr. Hugh Robert Mill, 624; Through the First Antarctic Night, 1898-99; Frederick A. Cook, Dr. Hugh Robert Mill, 624; Physical Geography, Circulation of Surface Waters of North Atlantic, H. N. Dickson, 286
- Geology: Rock Structures in the Isle of Man and in South Tyrol, Dr. Maria M. Ogilvie Gordon, 7; Preliminary Notes on the Results of the Mount Kenya Expedition, 1899, H. J. Mackinder, 12; Geology of Klondike Goldfields, R. G. McConnell, 63; Death and Obituary Notice of James Thomson, 83; Geology of Bermudas, A. E. Verrill, 92; Longmyndian Inliers at Old Radnor, Dr. Charles Galloway, 94; the Crag of Essex, F. W. Harmer, 94; Fifty Years of Geological Survey in India, 105; Catalogue of the Fossil Bryozoa in the Department of Geology, British Museum (Natural History), the Cretaceous Bryozoa, vol. i., Dr. J. W. Gregory, 125; the Norwegian North Polar Expedition (1893-1896) to Franz Josef Land, Scientific Results, Fridtjof Nansen, J. F. Pompeckj, A. G. Nathorst, R. Collett, 146; Geological Society, 94, 167, 239, 262; Igneous Rocks of Waterford Coast, F. R. C. Reed, 167; New Rock-type from Kentallen, J. B. Hill and H. Kynaston, 167; the Carboniferous Strata of Nossi-Bé, M. Villiaume, 168; the Geography of the Regions about Devil's Lake and the Dalles of the Wisconsin, Prof. R. D. Salisbury, W. W. Atwood, 172; the Copper-bearing Rocks of Wisconsin, Dr. U. S. Grant, 181; A Monograph of Christmas Island (Indian Ocean), Physical Features and Geology, C. W. Andrews, 193; the Origin and Formation of the Red Sea, A. Issel, 201; an Estimate of the Geological Age of the Earth, J. Joly, F.R.S., 235; the Mechanically-formed Limestone of Junagadh, Dr. J. W. Evans, 239; the Consolidated Oolite Sands of Kathiawad, Frederick Chapman, 239; Ceylon Rocks and Graphite, A. K. C. Swamy, 239; Jubilee of the Imperial Geological Institute of Vienna, 258; the Order of Crystallisation of Sillicates in Igneous Rocks, Prof. J. Joly, F.R.S., 262; Theory of Order of Crystallisation of Minerals in Igneous Rocks, J. A. Cunningham, 262, 368; Death and Obituary Notice of Prof. G. H. F. Ulrich, 272; the Clays of Alabama, Drs. E. A. Smith and H. Ries, 274; Rhythms and Geologic Time, G. K. Gilbert, 275; Volcanic Rocks from Temisconata Lake, H. E. Gregory, 286; the Statement of Rock Analysis, H. S. Washington, 286; Explorations of the *Albatross* in the Pacific, 307; the Flow of Marble, Prof. F. D. Adams and J. T. Nicolson, 335; Sea Coast Destruction and Littoral Drift, W. H. Wheeler, 400; Neogenic Regions of Lower Egypt, C. Depéret and R. Fourtau, 408; Snow-Drifts on Ingleborough, Prof. T. G. Bonney, F.R.S., 412; New Observations on High Dordogne Valley, A. Michel-Lévy, 432; Amount of Circulation of Carbonate of Lime and Earth's Age, Prof. Eugene Dubois, 498; Geology of Lake District, J. E. Marr, 534; International Geological Congress, L. Gentil, 557; Church Stretton, vol. i., Geology, E. S. Cobbold, 571; the Ravine of Chevallegres and Torrent Retrogression, Stanislas Meunier, 592; Memoirs of the Geological Survey of the United Kingdom. The Cretaceous Rocks of Britain, vol. i. The Gault and Upper Greensand of England, A. J. Jukes-Browne, Prof. T. G. Bonney, F.R.S., 617; the Colorado Canyon District, W. M. Davis, 638
- Geometry: A First Geometry Book, J. G. Hamilton, F. Kettle, 101; Leçons Nouvelles sur les Applications Géométriques du Calcul Différentiel, W. D. Fannenberg, 196; Two Remarkable Groups of Loci, E. Mathias, 240
- Geometrical Optics: Leçons d'Optique Géométrique à l'Usage des Elèves de Mathématique Spéciales, E. Wallon, 30
- Geothermal Gradient in Michigan, A. C. Lane, 210
- Gerin (F.), Acetyl Derivatives of Cellulose and Oxycellulose, 616
- Germany: Employment of Chemists in German Factories, 84; Manufacture of Artificial Dye-Substances in Germany, 422; Electric Railway Traction in Germany, 532; Association of German Naturalists and Physicians, 553; Annual Congress of German Anthropological Society, 632

- Gessard (C.), Tyrosinase, 96  
 Ghizeh Zoological Gardens, 374  
 Giacobini, Comet, (1900 *a*), 37, 256  
 Giard (Alfred), the Fruit-Pest *Ceratitits capitata*, 432  
 Gibson (W.), on Rapid Changes in the Thickness and Character of the Coal Measures of North Staffordshire, 587  
 Gifford (J. W.), a Quartz-Calcite Lens with Identical Visual and Photographic Focus, 563  
 Giglioli (Prof. Henry H.), a Third Specimen of the Extinct *Dromaius ater*, Vieillot, found in the R. Zoological Museum, Florence, 102  
 Gilbert (G. K.), Rhythms and Geologic Time, 275  
 Gilbody (A. W.), Brazilin (iv), 71  
 Gill (Sir David), Report of the Cape Observatory, 398  
 Ginn, The, in Morocco, Dr. E. Westermarck, 499  
 Giraffe, the Sub-Species of, 35  
 Gjers (L. G.), Apparatus for Equalising Hot Blast Temperatures, 67  
 Glaciation: Snow-Drifts on Ingleborough in July, Prof. T. McKenny Hughes, F.R.S., 389  
 Gladstone (Dr. J. H.), Want of Uniformity of Action of Copper-Zinc Alloys on Nitric Acid, 70  
 Glasgow, the Plague in, 456, 498, 577  
 Glass, the Action of Water upon, Edmund F. Mondy, 246  
 Glass (W.), on the Coal and Iron Ore Fields of Shansi and Honan, 610  
 Glazebrook (R. J.), Dr. Lodge's Paper on Volta's Contact Force, 70; Measurement of Standard Resistances, 118  
 Gley (E.), Presence of Iodine in Blood, 216  
 Glucosides, the, Dr. J. J. I. van Rijn, 363  
 Goeldi (Dr.), Indian Burial Caves in Rio Cunany, Brazil, 500  
 Gold: the Cyanide Process of Gold Extraction, James Park, 148; Diamond Drilling for Gold and other Minerals, G. A. Denny, 435; Egyptian Gold, Daniel Berthelot, 464  
 Goodman's (Prof.) New Form of Calorimeter for Measuring the Wetness of Steam, 610  
 Goodrich (E. S.), a Manual of Echinoderms, 545  
 Goransson (G. F.), Death and Obituary Notice of, 83  
 Gordon (Dr. Maria M. Ogilvie), Rock-structures in the Isle of Man and in South Tyrol, 7  
 Goret (Maurice), Composition of Albumin of *Gleditschia triacanthos* Seed, 264  
 Gotch (Prof.), on the Physiological Effect of Local Injury in Nerve, 589  
 Göttingen Royal Society, 96, 384  
 Goutal (M.), Chemical Constitution of Steel, 288  
 Government Laboratory, Report of, Dr. T. E. Thorpe, F.R.S., 499  
 Grand'Eury (M.), Sigillaria, 23; Cordaites, 47  
 Graetz (L.), Mechanical Motions under Influence of Kathodes and Röntgen Rays, 92  
 Graff (Prof. Ludwig von), Monographie der Turbellarien, II. *Tricladida terricola* (Landplanarien), 241  
 Grammar of Science, the, Prof. Karl Pearson, F.R.S., 49  
 Grandidier's Expedition to Madagascar, 35  
 Grant (Dr. U. S.), the Copper-bearing Rocks of Wisconsin, 181  
 Grass, Effect of Iron upon the Growth of, 151  
 Grassi (Prof.), Mosquitoes and Malaria, 578, 627; Mosquitoes and *Filaria immitis*, 627  
 Gravitation: Recent Studies in Gravitation, Prof. John H. Poynting, F.R.S., 403  
 Gray (Prof. A., F.R.S.), the Stability of a Swarm of Meteorites and of a Planet and Satellite, 582  
 Gray (J.), on the Physical Characteristics of the Population of West Aberdeenshire, 635-6  
 Greek Earthquakes, 1893-8, M. Eginitis, 85  
 Green (E. G.), Web-spinning Habits of Red Ant, 253  
 Greenly (E.), on the Ancient Peneplains in North Wales, 587  
 Greenwich, the Royal Observatory, 233; Duration of Totality of Solar Eclipses at, Chas. T. Whitmell, 269  
 Gregory (H. E.), Volcanic Rocks from Temisconata Lake, 286  
 Gregory (Dr. J. W.), Catalogue of the Fossil Bryozoa in the Department of Geology, British Museum (Natural History). The Cretaceous Bryozoa, Vol. i., 125; a Manual of Echinoderms, 545  
 Gregory (R. A.), Elementary Physics and Chemistry, 620  
 Griffiths (E. H.), a Form of Wheatstone Bridge for Determining the Freezing-points of Dilute Solutions by Platinum Thermometry, 563  
 Griffiths (F. Ll.), on the System of Writing in Ancient Egypt, 634  
 Grignard (V.), New General Method of Preparing Secondary and Tertiary Alcohols, 85  
 Grimaux (Edouard), Death and Obituary Notice of, 34  
 Grote (A. R.), Phylogeny of Pieridae, 274  
 Growth of Grass, Effect of Iron upon the, 151  
 Gruetzner (P.), Electrolytic Records of Electric Currents, 93  
 Gruneisen (E.), Ratio of Thermal and Electric Conductivities, 639  
 Guarini (E.), Human Body as Screen in Wireless Telegraphy, 568  
 Guichard (Marcel), Blue Oxide of Molybdenum, 384, 408  
 Guest (J. J.), Strength of Ductile Materials under Combined Stresses, 118  
 Guillaume (Dr. Ch. Ed.), the International Physical Congress, 425  
 Guldeberg (Dr. G.), Body Temperature of Cetacea, 159  
 Guns: the Distance to which the Firing of Heavy Guns is Heard, Dr. Charles Davison, 377; J. W. Mallet, 523  
 Günther (R. T.), on *Mnestra parasites*, 589; on the Coast of the Phlegraean Fields near Naples, 591  
 Guntz (M.), Sodium-potassium Amalgams, 312  
 Gutton (C.), Value of Refractive Index of Ice for Electromagnetic Radiations, 23  
 Gymnosporangium from China, on a, Prof. F. E. Weiss, 613  
 Haddon (Prof. A. C., F.R.S.), the Races of Europe; a Sociological Study, 27; Decorative Arts of Sea-Dyaks of Sarawak, 68; Mexican Symbolism, Carl Lummholtz, 600; on the Textile Patterns of the Sea-Dyaks, 634; on Relics of the Stone Age in Borneo, 637; on the Preservation of Local Antiquities, 637  
 Hæmamoebids, Generative Process in, Prof. E. R. Lankester, 424  
 Hæmoglobin not Estimable by Absorbing Power of Blood, L. G. de St. Martin, 520  
 Hail Preventive, Cannon-fire as a, 158  
 Hailstorm, a Remarkable, J. G. Roberts, 341  
 Halford Gradient Railway, the, 180  
 Hall (R.), a Key to the Birds of Australia and Tasmania, with their Geographical Distribution in Australia, 6; Nesting Habits of Australian Diamond Bird, 303; the Elephant Seals of Kerguelen Island, 628  
 Haller (A.), the  $\beta$ -alkoxy- $\alpha$ -cyanocrotonic Esters, 71; Action of Hydrogen Bromide on Dextro-rotatory Benzylidene Camphor, 119;  $\beta$ -phenyl and  $\beta$ -benzyl- $\alpha$ -alkoxy- $\alpha$ -cyanoacrylic Acids, 191; Synthesis of  $\alpha\alpha$ -dimethyl- $\gamma$ -cyano-cyanotricarballylic Ester, 264  
 Haller (Dr. B.), Brain of Pond-Tortoise, 324  
 Halm (Dr. J.), Latitude Variation, Earth Magnetism, and Solar Activity, 460  
 Hamilton (I. G.), a First Geometry Book, 101  
 Hampson (Sir George F., Bart.), Catalogue of the Lepidoptera Phalænæ in the British Museum. Vol. ii. Catalogue of the Arctiidae (Nolinæ Lithosianæ), 77; *Oligostigma araealis*, 261  
 Handbuch der Anatomie und Vergleichenden Anatomie des Centralnervensystems der Säugetiere, Dr. Edw. Flatau, Dr. L. Jacobsohn, 267  
 Hannay (J. B.), Dark Images of Photographed Lightning Discharges, 389  
 Hardcastle (Miss F.), the Present State of the Theory of Point Groups, 561  
 Harlay (V.), Proteolytic Ferment of Germinating Seeds, 640  
 Harmer (F. W.), the Crag of Essex, 94; on the Influences of Winds upon Climate during Past Epochs, 588  
 Harris (R. A.), a Partial Explanation of some of the Principal Ocean Tides, 258  
 Harrison (J. H.), Apparatus for Equalising Hot Blast Temperatures, 67  
 Hart (J. H.), Action of Light on Magnetism, 286  
 Hartland (Mr.), on the Animal Cults of the Natives of Sarawak and their bearing on the Problems of Totemism, 635  
 Hartley (H. B.), Properties of Crystals yielding Doubly Refracting Liquids on Fusion, 68  
 Hartog (Prof. Marcus), on a Peptic Zymase in Young Embryos, 589  
 Harvard College Observatory, 137  
 Harvard Photometry, Photometric Revision of, 37

- Harveian Oration of 1900, the, Historical Aspects of the Discovery of the Circulation of the Blood, Prof. T. Clifford Allbutt, F.R.S., 630
- Harze, Die, und die Harzebehälter, A. Tschirch, 316
- Haselgrove (F. W.), Robin's Nest in Water-can, 17
- Haswell (Prof. W. A., F.R.S.), Didymochris, 640
- Haupt (L. M.), the Navigation of the Lower Mississippi, 604
- Hawthorn (J.), on the Relation of *Ulva latissima* to the Pollution of Sea-water by Sewage, 611
- Hazewinkel (J.), Indican, 47
- Heat : a New Thermo-calorimeter, G. Massol, 23; Method of confirming Thermo-dynamical Relations between Freezing Point and Vapour Pressures of very Dilute Solution, Dr. R. Gahl, 37; Researches on Accurate Determination of Temperature of Explosion of Modern Explosives in Closed Vessel, W. Macnab and E. Ristori, 46; the Depression of the Freezing-point in Salts containing a Common Ion, J. Barnes, 64; Heat of Alloy Formation, J. B. Taylor, 70; Want of Uniformity of Action of Copper-zinc Alloys on Nitric Acid, Dr. J. H. Gladstone, 70; Temperature and Potential Gradient in Rarefied Gases, G. C. Schmidt, 92; Boiling-point Curves, C. L. Speyers, 92; Geothermal Gradient in Michigan, A. C. Lane, 210; Thermal Deformation of Balances, T. Middel, 211; Additive Character of Atomic Heats, S. Meyer, 211; Gas Thermometry, Dr. P. Chappuis, 214; the Gas Thermometer at High Temperatures, L. Holborn and A. L. Day, 568; a Comparison of Impure Platinum Thermometers, H. M. Tory, 214; the Law of Cailletet and Mathias and the Critical Density, Prof. S. Young, 214; the Expansion of Fused Silica, H. Le Chatelier, 216; the Thermal Properties of Fused Silica, P. Villard and M. Dufour, 255; Rise of Temperature in Fabrics when Moistened, Dr. L. Cobbett, 239; Viscosity of Gases as affected by Temperature, Lord Rayleigh, F.R.S., 287; Temperature of Maximum Density of Aqueous Solution of Ammonium Chloride and Lithium Bromide and Iodide, L. C. de Coppet, 312; Temperature Coefficients of Physico-chemical Reaction, Prof. T. W. Richards, 351; the Air-thermometer at High Temperatures, L. Holborn and A. Day, 381; Boiling Points of Zinc and Cadmium, Daniel Berthelot, 384; the Rate of Increase of Underground Heat, James Stirling, 555; Ratio of Thermal and Electric Conductivities, E. Grüneisen, 639; Thermal Conductivity of Gases, P. A. Eckerlein, 639
- Heath (Thomas), the Solar Eclipse of May 28, 263
- Heaviside (Oliver, F.R.S.), the Teaching of Mathematics, 548
- Hedges (K.), Lightning Conductors of St. Paul's, 68
- Hedley (W. S.), Therapeutic Electricity and Practical Muscle Testing, 30
- Heilprin (Prof. A.), the Permanence of Lake Nicaragua, 395
- Heinrich (W.), Die Moderne Physiologische Psychologie in Deutschland, 245; Zur Prinzipienfragen der Psychologie, 245
- Hele-Shaw (Prof., F.R.S.), Road Locomotion, 139; on the Question of the Resistance of Vehicles to Traction, 609
- Hemptonne (A. de), Phosphorescence unaffected by Magnetic Field, 323
- Hemselech (G. A.), Band Spectrum of Aluminium, 335
- Hemsley (W. Botting, F.R.S.), the High Level Flora of Tibet, 46; Illustrations of the Botany of Captain Cook's Voyage Round the World in H.M.S. *Endeavour* in 1768-71, Right Hon. Sir Joseph Banks and Dr. Daniel Solander, with Determinations by James Britten, 547
- Henderson (G. G.), an Introduction to Analytical Chemistry, 292
- Henkel (F. W.), Huxley and his Work, 437
- Henry (Prof. A. J.), Elevation and Depression of Lake Level by Wind Action, 579; Tide Oscillation on Lake Erie, 579
- Henry (T. A.), the Poison of *Lotus Arabicus*, 238
- Hepworth (Captain Campbell), on the Weather of the North Atlantic Ocean during the Winter 1898-9, 563
- Herb Paris, Variations in Plants of the, Miss L. Eleanor Jex-Blake, 174
- Herculis, New Variable in, Madame Ceraski, 305
- Heredity : Collateral Heredity, Measurements in Schools, Prof. Karl Pearson, F.R.S., 173, 599; Human Babies, what they Teach, S. S. Buckman, 221; Facts of Inheritance, Prof. J. Arthur Thompson, F.R.S., 331; Lamarkiens et Darwiniens, Felix Le Dantec, 388; Homochronous Heredity and Changes of Pronunciation, Charles G. Stuart-Menteath, 524; Homochronous Heredity and the Acquisition of Language, Prof. R. Meldola, F.R.S., 572; the Foundations of Zoology, William Keith Brooks, 593
- Hergesell (Dr.), Temperature of Free Air, 253
- Hérissèy (E.), Preparation of Gento Picrine and Glucoside from Fresh Gentian Root, 288
- Hérissèy (H.), Reserve Carbohydrates in Seed of *Trifolium Repens*, 216
- Hérouard (Edgard), *Traité de Zoologie Concrète*. T. ii. 1<sup>re</sup> partie, Mésozoaires—Spongiaires, 122
- Herschel (Prof. A. S., F.R.S.), some Notes on the Late Prof. Piazzi Smyth's Work in Spectroscopy, 161
- Herschel (John), on a Method of Observing and Recording the Paths of Meteors, 565
- Hertz (Heinrich), the Principles of Mechanics presented in a New Form, 50
- Hertzian Waves, Wireless Telegraphy and, S. R. Bottone, 522
- Hervey (D.), *Plotosus canius* and the "Snake-stone," 79
- Hibiscus vitifolius*, on the Intumescences of, Miss Elizabeth Dale, 611
- Hickson (Prof. S. J.), on *Dendrocometes*, 589
- Highest Andes, the, E. A. Fitzgerald, Edward Whympfer, 38
- Hill (J. H.), New Rock-type from Kentallen, 167
- Hillebrand (W. F.), Carnotite, 432
- Hime (Dr. T. W.), on the Effects of Copper on the Human Body, 566
- Hinde (Captain), Change of Feeding Habits of Rhinoceros-birds in British East Africa, 366
- Hinks (A. R.), on some Points connected with the Photography of a Moving Object, 565; on the New Form of Refracting Telescope recently erected at Cambridge, 565; on Preparations for Determining the Solar Parallax by Observations of Eros, 565
- Hinrichs (G.), True Atomic Weight of Boron, 216; Composition of Air at Different Levels, 432
- Histologische Beiträge, Heft IV., E. Strasburger, Prof. J. B. Farmer, 28
- Histology of the Blood : Normal and Pathological, P. Ehrlich and A. Lazarus, Dr. T. H. Milroy, 410
- History of the Development of Chemistry since the Time of Lavoisier, Lectures on the, Dr. A. Ladenburg, 618
- History of Language, the, Henry Sweet, 195
- Hoffmann (B. A.), Generation of Electricity in Liquid Air, 568
- Hogarth (D. G.), on the Cave of Psychró in Crete, 637
- Holborn (L.), the Air Thermometer at High Temperatures, 381; the Gas Thermometer at High Temperatures, 568
- Holdich (Colonel Sir Thomas H.), on the Question of a Railway Connection between Europe and India, 590
- Holleman (Dr. A. F.), *Lehrbuch der Anorganischen Chemie*, 598
- Holmes (W. M.), Radiolaria from Coalsdon Upper Chalk, W. M. Holmes, 262
- Homochronous Heredity and Changes of Pronunciation, Charles G. Stuart-Menteath, 524
- Homochronous Heredity and the Acquisition of Language, Prof. R. Meldola, F.R.S., 572
- Honda (K.), a String Alternator, 286
- Hoogewerff (Prof.), Indican, 47
- Hooper (David), Bamboo Manna, 127
- Hopkinson (J.), on the Rainfall of the Northern Counties of England, 563
- Horovitch (Jacob), *Untersuchungen über Philons und Platons Lehre von der Welt schöpfung*, 494
- Horrocks (Jeremiah) and the Transit of Venus, 257
- Horse-sickness, African, a Possible Preventive of, Dr. G. C. Purvis, 83
- Horticulture : the Amateur's Practical Garden Book, C. E. Hunn, L. H. Bailey, 101; Plant Hybrids, Wilfred Mark Webb, 174; the Fruit-pest *Ceratitidis capitata*, Alfred Giard, 432; Carnations and Picotees for Garden and Exhibition, H. W. Weguelin, 598
- Hose (Dr. C.), on Relics of the Stone Age in Borneo, 637; on the Animal Cults of the Natives of Sarawak and their Bearing on the Problems of Totemism, 634
- Houston (Dr. A. C.), the Principles of Bacteriology, Dr. Ferdinand Hueppe, 73; the Bacterial Treatment of Sewage, 128; the Structure and Functions of Bacteria, Alfred Fischer, 465
- Howard (Dr. L. O.), Mosquitoes and Malaria, 500
- Howe (Prof.), Photographic Observation of Eros, 137, 184



- Howles (F. H.),  $\beta$ -Isopropylglutaric Acid and *Cis*- and *Trans*-methylisopropylglutaric Acids, 143
- Hudson (W. H.), Nature in Downland, 417
- Hueppe (Dr. Ferdinand), the Principles of Bacteriology, 73
- Hughes (Prof. T. McKenny, F.R.S.), Snowdrifts on Ingleborough in July, 389
- Hulett (G. A.), the Purification of Mercury, 160
- Human Babies: What they Teach, S. S. Buckman, 221
- Humeri, Perforate, on, from Ancient Egyptian Skeletons, Prof. A. Macalister, 633
- Hunn (C. E.), the Amateur's Practical Garden Book, 101
- Huns, the White, C. de Ujfalvy, 323
- Hunt (A. R.), Microphotography, Isophotography, Megaphotography, 79
- Hurion (A.), Composition of Mont Dore Gas, 47
- Hurricane, Disastrous Hurricane in the United States, 489
- Hurricane, Galveston, the Lessons of, 604; Track of, 628
- Huxley Memorial Statue, the Unveiling of the, 10
- Huxley and his Work, F. W. Henkel, 437; C. Simmonds, 495
- Huxley (Thos. H., LL.D., F.R.S.), Lessons in Elementary Physiology, 363
- Hybrids, Plant, Wilfred Mark Webb, 174
- Hydrodynamics: Vorlesungen über hydrodynamische Fernkräfte nach C. A. Bjerknæs' Theorie, V. Bjerknæs, Prof. G. H. Bryan, F.R.S., 3
- Hydrography: the Severn Bore, Vaughan Cornish, 126; a Partial Explanation of some of the Principal Ocean Tides, R. A. Harris, 258; the Cruise and Deep-sea Exploration of the *Siboga* in the Indian Archipelago, 327
- Hygiene: the Bacterial Treatment of Sewage, Dr. Frank Clowes and Dr. Houston, 128; First-stage Hygiene, Robert A. Lyster, 173; Use of Sodium Peroxide for Purifying Wells containing Carbonic Acid, E. Derenne, 432; Principes d'Hygiene Coloniale, Dr. Georges Treille, 620
- Ichthyology: Psychology of Fishes, Dr. R. W. Shufeldt, 63; Abnormalities of Limbs and Tail of Dipnoan Fishes, H. H. Brindley, 215; Beiträge zur Physiologie des elektrischen Organes der Zitterrochen (Torpedo), Siegfried Garten, 290; Leptocephales, Young of Conger-eel, E. R. Waite, 324; Racovitza Glacialis, New Antarctic Fish, Louis Dollo, 350; a Large Tasmanian Crab, Alex. Morton, 496; the Nest-building Brook-Lamprey, Messrs. Young and Cole, 500
- Identification, Criminal, the English System, Dr. J. G. Garson, 190.
- India: Cambrian Fossils of Eastern Salt-range, Dr. K. Redlich, 36; Fifty Years of Geological Survey in India, 105; Bamboo Manna, David Hooper, 127; Crainology of Hill Tribes, Sir Wm. Turner, F.R.S., 263; the Great Earthquake of June 12, 1897, R. D. Oldham, 305; the Cruise and Deep-sea Exploration of the *Siboga* in the Indian Archipelago, 327
- Indiana, Wire Fence Telephony in, 374
- Indian, J. Hazewinkel, 47; Prof. Hoogewerff and H. ter Meulen, 47
- Indigo, Artificial, Manufacture in Germany of, 422
- Indigo Fermentation, Prof. Beyerinck, 47
- Industry, Science in Relation to Art and, 32
- Infusoria, the Eye-spot in Euglena, H. Wager, 605
- Ingall (E. D.), Mineral Production of Canada, 499
- Ingleborough, Snow-drifts on, in July, Prof. T. McKenny Hughes, F.R.S., 389; Prof. T. G. Bonney, F.R.S., 412
- Ink, Writing, Dr. T. E. Thorpe, 554
- International Association of Academics, the, 249
- International Catalogue of Scientific Literature, the, 197, 206
- International Congress of Applied Chemistry, 519
- International Geological Congress, L. Gentil, 557
- Introduction to Physical Chemistry, James Walker, Prof. Arthur Smithells, 76
- Introduction to Zoology, C. B. Davenport, Gertrude C. Davenport, 433
- Ions, the Theory of, 524
- Irano Indians, Craniology, M. Ujfalvy, 351
- Iris, Insect Visitors to, Prof. J. G. Needham, 201
- Iron: Iron and Steel Institute, 67, 535; Solution Theory Applied to Molten Iron and Steel, John Parry, 128; Effect of Iron upon the Growth of Grass, 151; Permeability of Iron under the Influence of the Oscillatory Discharge from a Condenser, E. W. Marchant, 413
- Iroquois of Ontario, on the Paganism of the, David Boyle, 635
- Irrigation and Drainage, F. H. King, 5
- Irvine (Dr. R.), on the Mechanical and Chemical Changes which take place during the Incubation of Eggs, 589
- Irving (Rev. Dr. A.), the New Senate of the University of London, 549
- Isle of Man, Rock-structures in the, and in South Tyrol, Dr. Maria M. Ogilvie Gordon, 7
- Isophotography, A. R. Hunt, 79
- Issel (A.), Origin and Formation of Red Sea, 201
- Italy: Electrical Power Transmission Works in Northern Italy, 84; Cannon Fire as a Hail-preventive, 158; a Recollection of King Umberto, Prof. W. E. Ayrton, F.R.S., 320
- Jackson (Henry), on the Formation of Starch from Glycollic Aldehyde by Green Plants, 611
- Jacobsohn (Dr. L.), Handbuch der Anatomie und vergleichenden Anatomie des Centralnervensystems der Säugetiere, 267
- Janet (C.), Artificial Ant-hills at Paris Exhibition, 490
- Japan, on the Japanese *Gohei* and the Ainu *inao*, W. G. Aston, 635
- Jaumann (G.), an Electrical Experiment of M. Jaumann, P. Villard, 47; Rotating Magnetic Flag, 211
- Jex-Blake (Miss L.), Variations in Plants of the Herb Paris, 174
- Johnson (Colonel), on Foreign and Colonial Surveys, 590
- Joly (Prof. J., F.R.S.), the Formation of Silica, 84; an Estimate of the Geological Age of the Earth, 235; the Order of Crystallisation of Silicates in Igneous Rocks, 262; Ascent of Sap, 572
- Jones (Francis), the Air of Rooms, 387
- Jones (H. C.), the Theory of Electrolytic Dissociation, 121
- Jones (H. O.), on a Simple Method of Comparing the "Affinities" of Certain Acids, 567
- Jørgensen (Alfred), Micro-organisms and Fermentation, 195
- Joubin (P.), Polarisation of Solar Corona observed at Elche, 191
- Jourdain (Philip E. B.), Lehrbuch der Photochromie (Photographie der Natürlichen Farben), Wilhelm Zenker, 316
- Journal of Botany, 260, 520
- Journal of Microscopical Society, 520
- Jowett (A.), on the Glacial Phenomena of the West Riding, 588
- Jowett H. R. D.), Constitution of Pilocarpine, 215
- Jubilee of the Imperial Geological Institute of Vienna, 258
- Jukes-Browne (A. J.), Memoirs of the Geological Survey of the United Kingdom. The Cretaceous Rocks of Britain. Vol. I. The Gault and Upper Greensand of England, 617
- Kamenka River, Diamonds discovered on, 603
- Kahlbaum (Georg W. A.), Christian Friedrich Schönbein, 1799-1868, 97
- Kallir (L.), Interruption Spark in Alternating Current with Metallic Electrodes, 335
- Kassowitz (Prof. Dr. Max), Allgemeine Biologie, Prof. H. Marshall Ward, F.R.S., 217
- Kathode Rays: on the Apparent Emission of Kathode Rays from an Electrode at Zero-potential, C. E. Phillips, 564
- Kazan Society of Naturalists, Memoirs of, 93
- Keeble (F. W.), Colour-changes in Prawns, 555; on the Colour-changes of various Prawns, 590
- Keegan (P. Q.), Leaf Decay and Autumn Tints, 523
- Keeler (Prof. James Edward), Death of, 456; Obituary Notice of, 497
- Keller (Helen), Souvenir, 388
- Kelvin (Lord, F.R.S.), Motion in an Infinite Elastic Solid caused by Motion through it of a Body acting on it only by Attraction and Repulsion, 360
- Kemp (J. F.), the Ore Deposits of the United States and Canada, 365
- Kendall (Prof. P. F.), on the Geological Evidence of the Conditions under which Coal was formed, 588
- Kennedy (N.), Surveying with the Tacheometer, 571
- Kennedy (W.), Large Meteor at Roche's Point, 395
- Kennelly (Dr.), Relative Advantages of Alternate and Continuous Currents for General Electrical Supply with regard to Interference with other Interests, 415

- Kerguelen Island, the Elephant Seals of, R. Hall, 628  
 Kerville (Henri Gadeau de), Les Vieux Arbres de la Normandie, 7  
 Kettle (F.), a First Geometry Book, 101  
 Key to the Birds of Australia and Tasmania, a, with their Geographical Distribution in Australia, R. Hall, 6  
 Kidston (R.), on Plant Life during the Growth of the Coal-measures, 587; on the Flora of the Coal-measures, 610  
 Kimberley, the Winds of, J. R. Sutton, 35  
 Kinetic Theory of Planetary Atmospheres, the, Prof. G. H. Bryan, F.R.S., 126  
 King (F. H.), Irrigation and Drainage, 5  
 Kingsley (George Henry), Notes on Sport and Travel, 5  
 Kingsley (J. S.), the Origin of Mammals, 254  
 Kingsley (Miss M. H.), Death and Obituary Notice of, 134  
 Kirby (W. F.), Function of the Whips of the Larva of the Puss Moth, 413  
 Kirchhoff (Prof. Alfred), Pflanzen-und Tierverbreitung, 569  
 Kites, Telephony by, 578  
 Kites, on the Use of, for Meteorological Observations, A. L. Rotch, 563  
 Klondike Goldfields, Geology of, R. G. McConnell, 63  
 Kochi (C.), the Ocelli in the Head of the Cockroach, 500  
 Kölliker (A.), Erinnerungen aus meinem Leben, 169  
 Kostinsky (M. S.), Photographic Observations of Satellite of Neptune, 161  
 Kronecker (M.), Effects of Work of Active on Inactive Muscular Groups, 492  
 "Kris," Malay, on the Making of a, and on the Malay Method of producing Chains by Casting, W. Rosenhain, 634; Prof. A. Macalister, 634  
 "Kris," Malay, on the "Kingfisher" Type of a, Prof. H. Louis, 634  
 Kühne (Dr. Wilhelm), Death of, 198  
 Kultur, Der Ursprung der, L. Frobenius, 101  
 Kynaston (H.), New Rock-type from Kentallen, 167
- Laboratories: the Wellcome Research Laboratories, R. J. Friswell, 271; Physiology for the Laboratory, Bertha Millard Brown, 365; Biological Lectures from the Marine Laboratory at Woods Holl, U.S.A., for 1899, 411; Report of Government Laboratory, Dr. T. E. Thorpe, F.R.S., 499  
 Lacell (H. G.), Working Silica in the Oxy-gas Blowpipe Flame, 20  
 Lacroix (A.), Mineralogical Composition of Teschenites, 72; the Fayalite of Callobrières, 240  
 Ladenburg (Dr. A.), Lectures on the History of the Development of Chemistry since the Time of Lavoisier, 618  
 Lafay (A.), Deformations of Contact of Elastic Bodies, 544  
 Lagrula (Ph.), Apparent Semi-diameter of Sun, 464  
 Lakes: a Bathymetrical Survey of the Fresh-water Lochs of Scotland, Sir John Murray, K.C.B., F.R.S., and Fred P. Pullar, 65; the Permanence of Lake Nicaragua, Prof. A. Heilprin, 395; Elevation and Depression of Level by Wind Action, Prof. A. J. Henry, 579; Tide Oscillation on Lake Erie, Prof. A. J. Henry, 579; on the Recent Discovery of a Ferriferous Horizon in the Huronian north of Lake Superior, Prof. A. P. Coleman, 588  
 Lamarkiens et Darwiniens, Félix Le Dantec, 388  
 Lamarlière (L. G. de), Wood of Peat Bog Conifers, 520  
 Lamb (Prof. Horace, F.R.S.), Scientific Papers, 99  
 Laminariaceæ, on the Germination of the Zoospore in, J. Lloyd Williams, 613  
 Lamp, a "Dark," Gustave le Bon, 532  
 Lamplugh (G. W.), on the Evidence as to the Age of the English Wealden Series, 588  
 Lamprey, the Nest-building Brook, Messrs. E. Young and Cole, 500  
 Lancaster (A.), Dragon-fly Migrations, 579  
 Land-Planarians, Monographie der Turbellarien, II. Tricladida Terracola (Land-planarien), Prof. Ludwig von Graff, F. W. Gamble, 241  
 Land, the Reclamation from Tidal Waters of, Alexander Bezeley, 266  
 Landerer (J. J.), Proportion of Polarised Light in Solar Corona, 167  
 Lane (A. C.), Geothermal Gradient in Michigan, 210  
 Lang (Robert), the Electron Theory of Atomic Magnetism, 376  
 Lange (D.), Our Native (American) Birds, 100  
 Lange (E. F.), New Aluminium Method of Producing High Temperatures, 536  
 Lange (Dr. Karl), Death of, 198  
 Langley's (Dr. S. P.), Chart of the Infra Red Spectrum from  $7$  to  $5\cdot3\mu$  obtained by the Bolometric Method, 562  
 Language, the History of, Henry Sweet, 195  
 Language, Homochronous Heredity and the Acquisition of, Prof. R. Meldola, F.R.S., 572  
 Lankester (Prof. E. Ray, F.R.S.), Change of Feeding Habits of Rhinoceros Birds in British East Africa, 366; Generative Process in Hemamebids, 424  
 Lapses, Mental, H. H. Bawden, 108  
 Lapworth (A.), Derivatives of Cyanocamphor and Homocamphoric Acid, 215; Condensation of Ethyl Crotonate with Ethyl Oxalate, 215  
 Larmor (Joseph, F.R.S.), Æther and Matter, 265; Opening Address in Section A (Mathematics and Physics) of the British Association, 449; on the Results of his Application of the Principles of Least Action to the Statistical Dynamics of Gas Theory, as Illustrated by Meteor Swarms and Optical Ray Systems, 562; on the Relation of Radiation to Temperature, 562; on Crémieu's Experiment, 564; on Ions, 564  
 Larnaca, the Salt Lake of, C. V. Bellamy, 94  
 Larva of the Puss Moth, Functions of an Organ of the, Arthur S. Thorn, 389  
 Latitude Variation, Earth Magnetism and Solar Activity, Dr. J. Halm, 460  
 Latter (Oswald H.), the Migration of Swifts, 413  
 Laurent (Ch.), an Ammoniacal Chromous Sulphate, 288  
 Laurent (J.), Composition of Albumen of St. Ignatius and Nux Vomica Beans, 120; the Reserve Carbohydrates of St. Ignatius Bean and Nux Vomica, 336  
 Laval (Ed.), Les Armes Blanches, leur Action et Leurs Effets Vulnérants, 313; Les Projectiles des Armes de Guerre; leur Action Vulnérante, 313; Les Explosifs, les Poudres, les Projectiles d'Exercice, leur Action et leurs Effets Vulnérants, 313  
 Lavoisier Monument, the, 390  
 Lawes (Sir John Bennet, Bart., F.R.S.), Death of, 456; Obituary Notice of, Prof. R. Warington, F.R.S., 467  
 Lawrence (W. T.), Condensation of Ethyl  $\alpha$ -Bromoisobutyrate with Ethyl Malonates and Cyanacetates, 261  
 Lazarus (A.), Histology of the Blood, Normal and Pathological, 410  
 Le Bel (J. A.), Conditions of Stability of Rotatory Power, 168  
 Le Bon (Gustave), a "Dark" Lamp, 532  
 Le Chatelier (H.), the Expansion of Fused Silica, 216  
 Le Dantec (Félix), Lamarkiens et Darwiniens, 388  
 Leach (Dr. D. J.), Death and Obituary Notice of, 228  
 Leach (W.), on Bradford Sewage and its Treatment, 568  
 Lead and Silver, Metallurgy of, Henry F. Collins, 194  
 Leaf Decay and Autumn Tints, P. Q. Keegan, 523  
 Lebeau (P.), Thionyl Fluoride, 136; Iron Silicide, 616  
 Lecarne (J. and L.), Wireless Telegraphy from Free Balloon, 95  
 Lecoq (G.), Magnetic Observations during *Belgica* Antarctic Expedition, 108  
 Lecomte (Henri), Le Café, Culture, Manipulation, Production, 338  
 Leçons d'Optique Géométrique à l'Usage des Elèves de Mathématiques Spéciales, 30  
 Lees (Dr. C. H.), Viscosities of Mixtures of Liquids, 166; Report on the Proceedings in Section A (Physics) at the Bradford Meeting of the British Association, 562  
 Lees (F. H.), Morphine (I.), 260  
 Lefroy (B. St. G.), the Daylight Meteor of Sunday, September 2, 524  
 Lehfeldt (Dr.), Dr. Lodge's Paper on Volta's Contact Force, 70; a Text-book of Physical Chemistry, 292  
 Lehmann (O.), Liquid Crystals, 568  
 Lenard (P.), Production of Kathode Rays by Ultra-violet Light, 335  
 Lens, the Orthostigmat, 188  
 Lepidoptera: Catalogue of the Lepidoptera Phalaenæ in the British Museum. Vol. ii. Catalogue of the Arctiadae (Nolinae, Lithosianæ), Sir George F. Hampson, Bart., 77; the Lepidoptera of the British Islands, Charles G. Barrett, 317; Numerosity of Clouded Yellow and Holly-blue Butterflies, 532; Catalogue of Eastern and Australian Lepidoptera

- Heterocera, in the Collection of the Oxford University Museum, 548
- Leprosy in France, 198
- Lessons in Botany, Prof. George F. Atkinson, 30
- Letts (Prof. E. A.), the Carbonic Anhydride of the Atmosphere, 387; on some Problems connected with Atmospheric Carbonic Anhydride and on a New and Accurate Method of Determining its Amount, 566; on the Relation of *Uvula latissima* to the Pollution of Sea-water by Sewage, 611
- Lewis (E. W.), Inhibiting Effect of Etherification on Substitution in Phenols, 261
- Lewis (P.), Fluorescence and Phosphorescence in Electric Discharge through Nitrogen, 381; Influence of Slight Impurities on Argon and Helium Spectra, 381
- Lewes (Vivian B.), Acetylene, a Handbook for the Student and Manufacturer, 522
- Liebman (Dr. A.), on the Recent Improvements in the Textile Industries, 567
- Life and Art, Pompeii, August Mau, 7
- Light, Living, Raphael Dubois, 464
- Lighting Portable Gas Producers, Dr. J. A. Purves, 601
- Lightning Conductors of St. Paul's, the, K. Hedges, 68
- Lightning Discharges, Dark Images of Photographed, J. B. Hannay, 389
- Lightning, Globe, Prof. Max Toepler, 350
- Lincei, Reale Accademia dei, Anniversary Meeting of, 430
- Linnæan Society, 46, 143, 215, 262
- Linton (E. F.), Flora of Bournemouth, including the Isle of Purbeck, 598
- Liquid Crystals, O. Lehmann, 568
- Liquids, on the Creeping of, and on the Surface Tension of Mixtures, Dr. Trouton, 562
- Liquids, Viscosities of Mixtures of, Dr. C. H. Lees, 166
- Literature, the International Catalogue of Scientific, 197, 206
- Littoral Drift, Sea Coast Destruction and, W. H. Wheeler, 400
- Liverpool Observatory, W. E. Plummer, 137
- Lochs, Scotch, Bathymetrical Survey (Part II.), of, Sir John Murray and F. P. Pullar, 263
- Lock, Canal, the Pneumatic Balance, C. M. Dutton, 135
- Lockyer (Sir Norman, K.C.B., F.R.S.), Astronomical Applications of Physical Problems investigated at Solar Physics Observatory, 23; the Total Eclipse of the Sun, 104
- Lockyer (Dr. W. J.), a Comparison of the Details of the Prominences and Corona on Photographs of the Recent Eclipse taken by Prof. Langley in America and Sir Norman Lockyer in Spain, 565
- Locomotion, Road, Prof. Hele-Shaw, F.R.S., 139
- Lodge (Prof. Oliver), Ions, 564
- Lodge's (Prof.) Paper on Volta's Contact Force, Discussion on, Prof. Armstrong, Mr. Glazebrook and Dr. Lehfeldt, 70
- Loewy (M.), Paris Observatory Annual Report, 606; Opposition of Eros, 630
- London: Heat Wave in, 157; Conference on an International Catalogue of Scientific Literature, June 1900, 206; the London Mathematical Society, R. Tucker, 294; the New Senate of the University of London, Rev. Dr. A. Irving, 549; on a Concealed Coalfield beneath the London Basin, Prof. W. J. Sollas, F.R.S., 587
- Longden (A. C.), Electrical Resistance of Thin Films deposited by Kathode Discharge, 210; Newton's Rings from Selenium Rays, 273
- Looms, Modern Power, 29
- Lorenzo (Dr. G. de), Increased Activity of Vesuvius due to Exceptional Rainfall, 605
- Loring (F. H.), Comets and Corpuscular Matter, 80
- Louis (Prof. H.), on the "Kingfisher" Type of a Malay "Kris," 634
- Lovett (Dr. E. O.), Families of Transformations of Straight Lines into Spheres, 92
- Low (Dr.), Mosquitoes and Malaria in the Campagna, 531
- Lowe (Dr. W. H.), Death and Obituary Notice of, 456
- Lowry (T. M.), Persulphuric Acids, 215
- Lozé (E.), Les Charbons Britanniques et leur épusement, 124
- Lueddeckens (Dr. Fritz), Rechts und Linkshändigkeit, 409
- Lumboltz (Carl), Mexican Symbolism, 600
- Lycopods, on the Presence of Seed-like Organs in Certain Palæozoic, Dr. D. H. Scott, F.R.S., 611
- Lyra, Ring Nebula in, 425
- Lyster (Robert A.), First Stage Hygiene, 173
- McAdie (A.G.), the Climate of San Francisco, 18; Frost Fighting, 274
- Macalister (Prof.), on the Vagaries of the Cephalic Index, 633; on Perforate Humeri from Ancient Egyptian Skeletons, 633; on the Making of a Malay "Kris," and on the Malay Method of Producing Chains by Casting, 634
- McAlpine (D.), Fungus Diseases of Citrus Trees in Australia, and their Treatment, 494
- McCarthy (James), Surveying and Exploring in Siam, 571
- McConnell (R. G.), Geology of Klondike Goldfields, 63
- McDougall (Dr. R. S.), Elm and Pine Pests, 191
- McDougall (W.), on the Animal Cults of the Natives of Sarawak and their Bearing on the Problems of Totemism, 634
- MacDowall (Alex B.), Sunspots and Frost, 599
- Macfadyen (Allan), Influence of Temperature of Liquid Hydrogen on Bacteria, 286
- McGee (W. J.), the Lessons of Galveston, 604
- Mackinder (H. J.), Preliminary Notes on the Results of the Mount Kenya Expedition, 1899, 12
- MacMahon (Major), on the Aszygetic and Perpetuant Co-variables of Systems of Binary Quantics, 561; on the Symbolism appropriate to the Study of Orthogonal and Boolean Invariant Systems which Appertain to Binary and other Quantics, 561; a Property of the Characteristic Symbolic Determinant of any  $n$  Quantics in  $n$  Variables, 561
- Macnab (W.), Researches on Modern Explosives, ii., 46
- Macnamara (Nottidge Charles), Origin and Character of the British People, 172
- MacTaggart (J.), on the Disposal of House Refuse in Bradford, 609
- Madagascar: Spider-Silk Manufacture, M. Nogue, 17; Grandidier's Expedition to Madagascar, 35
- Madras, Earthquake in, 578
- Magic Squares, on the Construction of, Dr. J. Willis, 561
- Magnetism: Magneto-electric Experiment, Prof. S. P. Thompson, 71; Atomic and Molecular Magnetism, S. Meyer, 92; the Electron Theory of Atomic Magnetism, Robert Lang, 376; Magnetic Observations during *Belgica* Antarctic Expedition, G. Lecoq, 108; Magnetic Properties of Iron Aluminium Alloys, ii., S. W. Richardson and L. Lowndes, 166; no Magnetic Effect produced by Motion of Electrified Body, V. Crémieu, 167; Magnetic Screening for Galvanometers, H. du Bois and A. P. Wills, 211; Rotating Magnetic Flag, G. Jaumann, 211; Action of Light on Magnetism, J. H. Hart, 286; Magnetic Observations during Solar Eclipse of May 28, Dr. L. A. Bauer, 302; Phosphorescence Unaffected by Magnetic Field, A. de Hemptinne, 323; Recording Telephones, 371; Moving Electric Charge not Productive of Magnetic Field, V. Crémieu, 396; Properties of Magnetic Deposits in Magnetic Field, Charles Maurain, 408; Permeability of Iron under the Influence of the Oscillatory Discharge from a Condenser, E. W. Marchant, 413; Latitude Variation, Earth Magnetism and Solar Activity, Dr. J. Halm, 460; a Magnetic Theory of the Universe, 493; Report of the British Association Committee for Improving the Method of Determining Magnetic Force on Board Ship, 563; Report of the British Association Committee on Radiation in a Magnetic Field, 563; Distribution of Horizontal Component of Earth's Magnetism in France, E. Mathias, 592; Inverse Effect of Magnetic Field not Productive of Movement in Electrified Bodies, V. Crémieu, 616; Resistivity of Bismuth in Magnetic Field, H. Eichhorn, 639
- Mailloux (Mr.), Relative Advantages of Alternate and Continuous Current for General Electrical Supply, with regard to Interference with other Interests, 417
- Mair (David), the Reform of Mathematical Teaching, 389
- Maize, Further Investigations of Zenia in, Herbert J. Webber, 601
- Malaria, Mosquitoes and, G. A. K. Marshall, 375; Dr. L. O. Howard, 500; H. J. Elwes, F.R.S., 554; Major Ronald Ross, 589; Prof. Grassi's Experiment, 578, 627; Mosquitoes and Elephantiasis, 371; Investigations of Drs. Sambon and Low in the Campagna, 581; Malaria-Parasite, Models of Infected Blood-corpuscles, Delta Emett, 208; Mosquitoes and *Filaria immitis*, Prof. Grassi and G. Noè, 627
- Malay "Kris," on the making of a, and on the Malay Method of producing Chains by Casting, W. Rosenhain, 634; Prof. A. Macalister, 634
- Malay "Kris," on the "Kingfisher" Type of a, Prof. H. Louis, 634

- Malay Magic, being an Introduction to the Folklore and Popular Religion of the Malay Peninsula, W. W. Skeat, 145
- Malay Peninsula, on some Anthropological Observations of the Pangan Tribe of Aborigines in the, W. L. H. Duckworth, 633; Report of the Committee of the British Association on the Natural History and Ethnography of the, W. W. Skeat, 636
- Mallet (J. W.), the Distance to which the Firing of Heavy Guns is Heard, 523
- Mallock (A.), on the Measurement of the Tractive Force, Resistance and Acceleration of Trains, 610
- Mammals: the Origin of Mammals, J. S. Kingsley, 254; the Mammalian Brain, 267; a Text-book of Mammals, 386; Mammals of South Africa, 521; Vibrissae on the Forepaws of Mammals, Frank E. Beddard, F.R.S., 523
- Man and His Ancestor: a Study in Evolution, Charles Morris, 101
- Man, from Matter to: a New Theory of the Universe, A. Redcote Dewar, Prof. R. Meldola, F.R.S., 493
- Manchester, Earthshake near, 17
- Manchester Literary and Philosophical Society, 46, 616
- Manna, Bamboo, David Hooper, 127
- Marbles, the Flow of, Prof. F. D. Adams and J. T. Nicolson, 335
- March (F.), Action of Monochloroacetic Esters on Sodium Derivative of Acetylacetone, 47
- Marchant (E. W.), Permeability of Iron under the Influence of the Oscillatory Discharge from a Condenser, 413
- Marckwald (Dr.), Peculiarities of Picric Acid and its Solutions in Light of Ionic Hypothesis, 37
- Margerison (Samuel), British Sylviculture, 611
- Marine Biology: Fixation of Clay in Suspension in Water by Porous Bodies, J. Thoulet, 191; Marine Biological Association: Annual General Meeting, 230; Use of Diver for Collection of Specimens, 253; the Plankton of the Bay of Biscay, G. Herbert Fowler, 317; the Cruise and Deep-sea Exploration of the *Siboga* in the Indian Archipelago, 327; Deep-sea Deposits from *Valdivia* Expedition, Sir John Murray and Dr. Philippi, 360; Lectures from the Marine Laboratory at Woods' Holl, U.S.A., for 1899, 411; Place of Copepoda in Nature, Isaac C. Thompson, 498
- Marine Engineering: H. M. S. *Viper*, 322
- Marine Meteorology, a Manual of, William Allingham, 268
- Markwick (Colonel E. E.), the Total Eclipse Observed at Sea, 183
- Marloth (Dr.), Barnacle-growth on Southern Bight Whale, 19
- Marr (J. E.), Geology of Lake District, 534; on the Formation of Reef Knolls, 587; on the Geological Evidence of the Conditions under which Coal was Formed, 588
- Marriott (W.), Rainfall in West and East England in Relation to Altitude, 215
- Marshall (Arthur), Atmospheric Electricity and Dew-ponds, 495
- Marshall (G. A. K.), Mosquitoes and Malaria, 375
- Martell (B.), the Use of Steel in Ship-building, 90
- Martin (Geoffrey), Physical Structure of Asbestos, 369
- Marvin (Prof. C. F.), Anemometer Tests, 280
- Marx (E.), Fall of Potential in Flame Gases, 568; Hall Effect in Flame Gases, 568
- Maryland Weather Service, 292
- Mascart (Jean), Meteor of September 24, 1900, 592
- Massol (G.), a New Thermo-calorimeter, 23
- Mathematics: Dynamics of Pseudo-spherical Space, Prof. D. de Francesco, 18; *Éléments de la Théorie des Nombres*, E. Cohen, 52; Bulletin of American Mathematical Society, 69, 189, 260, 381; Transactions of American Mathematical Society, 260, 519; American Journal of Mathematics, 92, 381; Families of Transformations of Straight Lines into Spheres, Dr. E. O. Lovett, 92; Memoirs of Mathematical Section of Novorossian (Odessa) Society, 93; Mathematical Society, 94, 262; the London Mathematical Society, R. Tucker, 294; Edinburgh Mathematical Society, 95, 191; Quaternion Methods Applied to Dynamics, W. G. Barnett, 174; Theory of Differential Equations, A. R. Forsyth, F.R.S., 170; Elementary Illustrations of the Differential and Integral Calculus, Augustus De Morgan, 196; an Introduction to the Differential and Integral Calculus and Differential Equations, F. G. Taylor, 221; Locus of Centre of Hyper-spherical Curvature for Normal Curve of  $n$  Dimensional Space, Prof. P. H. Schoute, 232; Two Remarkable Groups of Geometrical Loci, E. Mathias, 240; Machine for Solving Algebraic Equation, George Meslin, 253; the Teaching of Mathematics, Prof. John Perry, F.R.S. 317; Oliver Heaviside, F.R.S., 548; the Reform of Mathematical Teaching, David Mair, 389; Henry Woollen, 436; W. F. Beard, 466; C. E. Stromeyer, 523; Continuous Binary A Linearoid Groups, E. J. Wilczynski, 381; Invariant Scrolls in Collineations which leave a group of Five Points Invariant, V. Snyder, 381; Paris International Congress of Mathematicians, 418; Autotomic Curves, A. B. Basset, F.R.S., 572
- Mathew (John), the Peopling of Australia, 549
- Mathias (E.), Two Remarkable Groups of Geometrical Loci, 240; Distribution of Horizontal Component of Earth's Magnetism in France, 592
- Matruchot (L.), Structure-Modifications in Vegetable Cells in True Fermentation, 47
- Matter,  $\text{Ether}$  and, Joseph Larmor, Prof. Geo. Fras. Fitzgerald, F.R.S., 265
- Mau (August), Pompeii, its Life and Art, 7
- Maurain (Charles), Properties of Magnetic Deposits in Magnetic Field, 408
- Maximum Duration of a Total Solar Eclipse, C. T. Whitmell, 64, 86
- Meacham (F. G.), Condition of Mine after 15 Months' Closing, 627
- Measurements in Schools, Collateral Heredity, Prof. Karl Pearson, F.R.S., 173
- Mechanics: the Principles of Mechanics Presented in a New Form, Heinrich Hertz, 50; the Mechanics of Flight, Lord Rayleigh, 108; Strength of Ductile Materials under Combined Stresses, J. J. Guest, 118; Papers on Mechanical and Physical Subjects, Osborne Reynolds, 243; Deformations of Contact of Elastic Bodies, A. Lafay, 544
- Mechanism, Idea or Nature, 25
- Mechanism of Weaving, T. W. Fox, 21
- Medicine: Atlas of Urinary Sediments, Dr. Hermann Riedel, 53; Death of Dr. Julius Althaus, 157; Death and Obituary Notice of Dr. D. J. Leach, 228; Medicine as a Science and Medicine as an Art, Dr. P. H. Pye-Smith, F.R.S., 356; Death and Obituary Notice of Dr. W. H. Lowe, 456; Association of German Physicians, 553; the Opening of the Medical Schools, Prof. F. W. Tunncliffe, 572; Death of Sir H. W. D. Acland, F.R.S., 602; Obituary Notice of, 627; Historical Aspects of the Discovery of the Circulation of the Blood, Prof. T. Clifford Allbutt, F.R.S., 630
- Mediterranean: The Recent Cretan Discoveries and their bearing on the Early Culture and Ethnography of the East Mediterranean Basin, Arthur J. Evans, 526
- Megaphotography, A. R. Hunt, 79
- Meiklejohn (A. H.), Mode of Carriage of Cuckoo of Egg, 201
- Meinhof (K.), Proof of Old Semitic Influence in South Africa, 606
- Melbourne University Bacteriological Laboratory, the, 578
- Meldola (Prof. R., F.R.S.), Christian Friedrich Schönbein, 1799-1868, G. W. A. Kahlbaum, Ed. Schaer, 97; from Matter to Man, a New Theory of the Universe, 493; Homochronous Heredity and the Acquisition of Language, 572
- Melting Points of Rock-forming Minerals, the, J. A. Cunningham, 368
- Memoirs of Kazan Society of Naturalists, 93
- Memoirs of Mathematical Section of Novorossian (Odessa) Society of Naturalists, 93
- Mental Lapses, H. H. Bawden, 108
- Merrifield (Mr.), the Pupa of *Aporia crataegi*, 261
- Merrill (G. P.), Structure and Constitution of Two New Meteorites, 459
- Mersey, the, Sir George Nares' Annual Report, 231
- Meslin (George), Machine for Solving Algebraic Equation, 253
- Mésosaires-Spongiaires, *Traité de Zoologie Concrète*, Yves Delage and Edgard Hérouard, 122
- Metallurgy: the Open-hearth Continuous Steel Process, B. Talbot, 67; Apparatus for Equalising Hot Blast Temperatures, L. F. Gjerns and J. H. Harrison, 67; Death and Obituary Notice of G. F. Goransson, 83; Solution Theory Applied to Molten Iron and Steel, John Parry, 128; Present Position of Solution Theory of Carburised Iron, Dr. A. Stansfeld, 536; the Cyanide Process of Gold Extraction, James Park, 148; Crystallisation Produced by Pressure in Solid Metal, W. Campbell, 166; Metallurgy of Lead and Silver, Henry F. Collins, 194; Egyptian Gold, Daniel Berthelot, 464; the

- Solidification of Alloys, Fred T. Trouton, F.R.S., 523; Iron and Steel Institute, 535; Development of Iron Industry in France, H. Pinget, 535; Iron and Phosphorus, J. E. Stead, 535; New Aluminium Method of Producing High Temperatures, E. F. Lange, 536; on the Chemical Compounds contained in Alloys, F. H. Neville, 566; on the Crystalline Structure of Metals, Prof. J. A. Ewing, 211, 567; W. Rosenhain, 211, 567
- Metals, Crystalline Structure of (ii), Prof. J. A. Ewing, F.R.S., and Walter Rosenhain, 211, 567
- Metals: the Cause of Fracture of Steel Rails, 437
- Metals, Hardness of, F. Auerbach, 639
- Meteorology: the Climate of San Francisco, A. G. McAdie and G. H. Willson, 18; Drunkenness and the Weather, Dr. Edwin G. Dexter, 31; Climate of St. Christopher, W. B. Alexander, 35; the Winds of Kimberley, J. R. Sutton, 35; Symons's Monthly Meteorological Magazine, 93, 335; Meteorological Extremes, Wind-force, 93; Meteorological Society, 95, 215; the Wiltshire Whirlwind of October, 1, 1899, G. J. Symons, F.R.S., 95; Dynamics of Cyclones and Anticyclones, ii, John Aitken, F.R.S., 95; Ocean Current Papers, H. C. Russell, 108; Heat-wave in London, 157; Severe Thunder-storm in London, 199; the Weather in London, 231; the Warm Weather in London, 272; Cannon-fire as a Hail Preventive in Italy, 158; Dynamical Theory of Atmospheric Circulation, Prof. V. Bjerknes, 200; Rainfall in West and East England in Relation to Altitude, W. Marriott, 315; Kite-flying at Blue-Hill Observatory, 252; High Kite Flight at Blue-Hill, Lawrence Rotch, 350; on the Use of Kites for Meteorological Observations, A. L. Rotch, 563; Temperature of Free Air, Dr. Hergesell, 253; a Manual of Marine Meteorology, William Allingham, 268; Frost Fighting, A. G. McAdie, 274; Anemometer Tests, Prof. C. F. Marvin, 280; Maryland Weather Service, 292; the Daily Weather Report of the Meteorological Office, W. N. Shaw, F.R.S., 300; the Week's Weather, 302, 323, 350, 395; the Meteorological Service in Japan, 323; Indian Famine-causing Droughts, E. D. Archibald, 335; Müller-Pouillet's Lehrbuch der Physik und Meteorologie, 361; a Remarkable Hailstorm, J. G. Roberts, 341; Globe Lighting, Prof. Max Toëpler, 350; Atmospheric Electricity, C. T. R. Wilson, 149, John Aitken, F.R.S., 366; the Air Thermometer at High Temperatures, L. Holborn and A. Day, 381; Snow-drifts on Ingleborough in July, Prof. T. McKenny Hughes, F.R.S., 389; Nile Floods and Monsoon Rains, 391; Indian Thunderstorm Observations, W. L. Dallas, 395; Meteorology of Cooking in New Mexico, 421; Greatest Heat of Century, E. Roger, 421; Velocity of Atlantic Cyclones, 421; Observations at Rousden for 1899, Sir Cuthbert Peek, 422; Symons's British Rainfall, H. Sowerby Wallis, 435; on the Rainfall of the Northern Counties of England, J. Hopkinson, 563; the Past Ten Years' Rainfall Deficiency in Kent and Surrey, 604; the Climate of Norway, A. S. Steen, 457; Disastrous Hurricane in United States, 489; Atmospheric Electricity and Dew-ponds, Arthur Marshall, 495; Sunshine in Mexico, M. Moreno, 499; the History of Modern Weather Prediction, Prof. C. Abbe, 499; Report of the British Association Committee on Meteorology, 562; Report of the British Association Committee on Solar Radiation Experiments conducted by Prof. Callendar on the Modified Copper-cube Actinometer, 562; on a Novel Form of Mercurial Barometer, A. S. Davies, 562; on the Weather of the North Atlantic Ocean during the Winter 1898-99, Captain Campbell Hepworth, 563; on the Physical Effects of Wind in Towns and their Influence upon Ventilation, J. W. Thomas, 563; the Annual March of Temperatures, R. J. A. Barnard, 579; Elevation and Depression of Lake Level by Wind Action, Prof. A. J. Henry, 579; Tide Oscillation on Lake Erie, Prof. A. J. Henry, 579; Sunspots and Frost, Alex. B. Macdowell, 599; Mirage over Needles, Captain G. A. Daubeny, 605; on the Climatic and other Physical Conditions under which Coal was Formed, Mr. Seward, 610; on the Possible Richness in CO<sub>2</sub> of the Atmosphere of the Coal Period, 610; Track of Galveston Hurricane, 628
- Meteors: The Perseid Meteoric Shower, W. F. Denning, 173; the August Perseids of 1900, W. F. Denning, 398; Ancient Records of Meteor Showers, M. D. Eginitis, 203; Meteoric Theory of the Gegenschein, F. R. Moulton, 305; Meteor of July 17, 305; Large Meteor off Roche's Point, W. Kennedy, 395; Velocities of Meteors, Dr. W. L. Elkin, 398; the Daylight Meteor of Sunday September 2, W. F. Denning, 491; T. Rooke, 524, B. St. G. Lefroy, 524; the Fireball of Sunday September 2, 535; on a Method of Observing and Recording the Paths of Meteors, John Herschel, 565; the Stability of a Swarm of Meteorites and of a Planet and Satellite, Prof. A. Gray, F.R.S., 582; Meteor of September 24, 1900, Jean Mascart, 592
- Meteorites: New Meteorite from New South Wales, R. T. Baker, 384; Meteorite in Spain, 421; Structure and Constitution of Two New Meteorites, G. P. Merrill, H. N. Stokes, 459
- Meulen (H. ter), Indican, 47
- Meunier (Stanislas), the Ravine of Chevalleyres and Torrent Retrogression, 592
- Mexican Symbolism, Carl Lumholtz, Alfred C. Haddon, 600
- Meyer (Dr. Hermann), Second Expedition to Head Waters of Xingu, 36
- Meyer (S.), Atomic and Molecular Magnetism, 92; the Additive Character of Atomic Heats, 211
- Miall (Prof. L. C.), On the Respiratory Organs of Aquatic Insects, 589
- Michel-Lévy (A.), New Observations on High Dordogne Valley, 432
- Michigan Board of Agriculture, Annual Report 1898-99, 365
- Micro-Organisms and Fermentation, Alfred Jörgensen, 195
- Microcephalic Brain, On the, Prof. J. D. Cunningham, 633
- Micrometer, On a Cheap Form of, for Determining Star Positions on Photographic Plates, Prof. Turner, 565
- Micrometer, Electric, P. E. Shaw, 67
- Microphotography, A. R. Hunt, 79
- Microscopy: Photo-micrography, Dr. Edmund J. Spitta, 4; Microscopical Society, 143, 287; Journal of Microscopical Society, 520; Modern Microscopes, Alfred N. Disney, 154; Application of Striae Method to Illumination of Objects, Prof. Wood, 166; Modification of Rousselet Compressor, G. H. J. Rogers, 287; the Structure of Palaeozoic Plants, Mr. Carruthers, F.R.S., 287; Swift and Son's Electric Lamp for Microscopy, 351; the Eyespot in Euglena, H. Wager, 605; Untersuchungen über Mikrostrukturen deserstarnten Schwefels nebst Bemerkungen über Sublimation, O. Bütschli, 619; Untersuchungen über die Microstruktur künstlicher und natürlicher Kieselsäuregallerten (Tabaschir, Hydrophan, Opal), O. Bütschli, 619; Double Staining of Spores and Bacilli, R. G. Smith, 640
- Middel (T.), Thermal Deformation of Balances, 211
- Migration of Swifts, the, Oswald H. Latter, 413; William Andrew, 436
- Mill (Dr. H. R.), On Profs. Pettersson and Nansen's New Insulating Water-bottle, 591; On the Treatment of Regional Geography, 591; Through the First Antarctic Night 1898-99, Frederick A. Cook, 624; the Antarctic Regions, Dr. Karl Fricker, 624
- Milne (Prof. J.), Report of the Seismological Committee of the British Association, 587
- Milne-Edwards (Prof. A.), Death and Obituary Notice of, 13
- Milroy (Dr. T. H.), Histology of the Blood: Normal and Pathological, P. Ehrlich and A. Lazarus, 410
- Minakata (Kumagusu), Artificial Deformation of Heads and some Customs connected with Polyandry, 437
- Mineral Production of Canada, E. D. Ingall, 499
- Mineralogy: Mineralogical Composition of Teschenites, A. Lacroix, 72; the Formation of Silica, Prof. J. Joly, 84; Mineral-formation in Granite, C. E. Stromeyer, 84; the Copper-bearing Rocks of Wisconsin, Dr. U. S. Grant, 181; Mineralogical Society, 239; Conchite, Agnes Kelly, 239; Method for Determination of Refractive Indices of Minerals of Low Symmetry, G. F. Herbert Smith, 239; Alteration of Pyrites by Underground Water, Dr. J. W. Evans, 239; the Fayalite of Callobrières, A. Lacroix, 240; the Order of Crystallisation of Silicates in Igneous Rocks, Prof. J. Joly, F.R.S., 262; Theory of Order of Crystallisation of Minerals in Igneous Rocks, J. A. Cunningham, 262, 368; the Statement of Rock Analyses, II. S. Washington, 286; the Empirical Formula of the Tourmaline Acid, S. L. Penfield, 286; the Flow of Marble, Prof. F. D. Adams and J. T. Nicolson, 335; the Ore Deposits of the United States and Canada, J. F. Kemp, 365; Carnotite, W. F. Hillebrand and F. L. Ransome, 432; Monazite, O. A. Derby, 568; Diamonds Discovered in Kamenka River, 603; Determination

- of Minerals in thin Rock Sections, L. V. Pirsson and H. H. Robinson, 638
- Minguin (J.), Action of Hydrogen Bromide on Dextro-rotatory Benzylidene Camphor, 119
- Mines, Coal, Accidents in, Prof. Le N. Foster, 136
- Mining : the Cyanide Process of Gold Extraction, James Park, 148 ; Diamond Drilling for Gold and other Minerals, G. A. Denny, 435 ; Condition of Mine after Fifteen Months' Closing, F. G. Meacham, 627
- Mirage over Needles, Isle of Wight, Captain G. A. Daubeny, 605
- Mississippi, the Lower, the Navigation of, L. M. Haupt, 604
- Missouri Botanical Garden, Eleventh Annual Report, 495
- Mixer (W. G.), Products of Explosion of Acetylene, 639
- Mixtures : On the Creeping of Liquids and on the Surface Tension of Mixtures, Dr. Trouton, 562
- Modern Explosives, Some, Sir Andrew Noble, K.C.B., F.R.S., 86, 111
- Modern Microscopes, Alfred N. Disney, 154
- Modern Physical Chemistry, H. C. Jones, 121
- Modern University, a, 184, 203
- Moir (J. Paxton), on the Stone Implements of the Natives of Tasmania, 636
- Moissan (Henri), Manganous Fluoride, 47 ; Thionyl Fluoride, 136 ; Le Fluor et ses Composés, 291 ; Two New Silicon Borides, 312 ; Carbides of Neodymium and Praseodymium, 639
- Molecular Energy, on the Partition of, Prof. G. H. Bryan, F.R.S., 562 ; Prof. Fitzgerald, 562
- Molliard (M.), Structure-modifications in Vegetable Cells in True Fermentation, 47
- Mollusca : Church Stretton. Vol. I. Molluscs, Robert A. Buddicom, 571
- Monazite, O. A. Derby, 568
- Monckman (Dr.), on the Glacial Phenomena of the West Riding, 588
- Mondy (Edmund F.), the Action of Water upon Glass, 246
- Mongoose and Snake Venom, the, Captain R. H. Elliot, 180
- Monism, Probleme, Kritische Studien über den, Dr. H. v. Schoeler, 435
- Monistische Gottes- und Weltanschauung, J. Sack, 172
- Monsoon Rains, Nile Floods and, 391
- Mont Blanc Railway, the Proposed, J. and H. Vallot, 62
- Montelius (Prof. O.), Earliest Communications between Italy and Scandinavia, 167
- Morbology : the Causes and Prevention of Consumption, N. C. Collier, 181 ; Leprosy in France, 198 ; the Plague, 231 ; Rats and Plague, Dr. Frank Tidswell, 273 ; the Plague in Glasgow, 456, 498, 577 ; Elephantiasis and Mosquitoes, 374 ; Mosquitoes and Malaria, G. A. K. Marshall, 375 ; Dr. L. O. Howard, 500 ; H. J. Elwes, F.R.S., 554 ; Major Ronald Ross, 589 ; Investigations of Drs. Sambon and Low on Mosquitoes and Malaria in the Campagna, 531 ; Prof. Grassi's Experiment on Mosquitoes and Malaria, 578, 627 ; Mosquitoes and *Filaria immitis*, Prof. Grassi and G. Noe, 627 ; Plumbism in Pottery Workers, W. Burton, 616 ; the Causes of Sunstroke, E. H. Freeland, 396
- Morley (Mr.), Relative Advantages of Alternate and Continuous Currents for General Electrical Supply with regard to Interference with other Interests, 417
- Moreno (M.), Sunshine in Mexico, 499
- Morgan (Prof. C. Lloyd, F.R.S.), the Relation of Stimulus to Sensation, 278 ; Experiments on the Avoidance of Distasteful Forms by Birds, 590
- Morgan (G. T.), Action of Formaldehydes on Naphthalene Amines (II.), 215
- Morocco, the Ginn in, Dr. E. Westermarck, 499
- Morphology : Morphological Anatomy of Vertebrates : the Air chambers in Mammalian Skull, Dr. S. Paulli, 323 ; the Brain of the Pond-tortoise, Dr. B. Haller, 324 ; the Origin of Vertebrates deduced from Study of Ammocoetes, Dr. Gaskell, 423
- Morris (Charles), Man and his Ancestor, a Study in Evolution, 101
- Morse (Prof. E. S.), "Cuckoo-spit," 109
- Morton (Alex.), a Large Tasmanian Crab, 496
- Morton (Prof. W. B.), Results Obtained by Applying J. J. Thomson's and Sommerfeld's Solution of the Propagation of an Electric Wave along a Single Wire, 563
- Moscou, Bulletin de la Société des Naturalistes de, 93
- Mosquitoes, W. R. Colledge, 201 ; Mosquitoes and Malaria, G. A. K. Marshall, 375 ; Dr. L. O. Howard, 500 ; H. J. Elwes, F.R.S., 554 ; Major Ronald Ross, 589 ; Prof. Grassi, 578, 627 ; Models of Infected Blood Corpuscles, Delta Emett, 208 ; Investigations of Drs. Sambon and Low in the Campagna, 531 ; Mosquitoes and Elephantiasis, 374 ; Mosquitoes and *Filaria immitis*, Prof. Grassi and G. Noe, 627
- Mosses : Untersuchungen ueber d. Vermehrung d. Laubmoose durch Brutorgane und Stecklinge, Dr. Carl Correns, 339
- Mosse (A.), Physiological Action of Compressed Oxygen, 492
- Moulton (F. R.), Meteoric Theory of the Gegenschein, 305
- Mount Kenya Expedition, 1899, Preliminary Notes on the Results of the, H. J. Mackinder, 12
- Mount St. Elias (Alaska). La Spedizione di sua Altezza Reale il Principe Luigi Amadeo de Savoia, Duca degli Abruzzi, al Monte Sant' Elia (Alaska), 1897, Dottore Filippo de Filippi, 1, 529
- Mountaineering : La spedizione di sua Altezza Reale il Principe Luigi Amadeo di Savoia, Duca degli Abruzzi, al Monte Sant' Elia (Alaska), 1897, Dottore Filippo de Filippi, 1, 529 ; the Highest Andes, E. A. Fitzgerald, Edward Whympy, 38
- Moureu (Charles), Acetyl-phenylacetylene and Benzoyl-Phénylacetylene, 72
- Moutouri (Dr. Adolfo), the Loss of Power of Absorbing Oxygen by Blood caused by Injection of Carbonic Oxide, 18
- Moving Pavement, the Elevated, at the Paris Exhibition, 107
- Moving Platforms, Railways and, Prof. John Perry, F.R.S., 412 ; Lieut.-Colonel W. Sedgwick, 436
- Mud Island in Walfisch Bay, 336 ; Mr. Cleverley, 464
- Muff (H. B.), on the Glacial Phenomena of the West Riding, 588
- Müller (J. J. A.), the Total Eclipse of the Sun of May 17-18, 1901, 389
- Müller-Pouillet's Lehrbuch der Physik und Meteorologie, 361
- Multiple Space in Applied Mathematics, on the Use of, H. S. Carslaw, 561
- Mummy-Cereals, Edmond Gain, 191
- Mundy (A. J.), Acoustical Triangulation, 422
- Murray (Sir John, K.C.B., F.R.S.), a Bathymetrical Survey of the Freshwater Lochs of Scotland, 65, 263 ; Physical, Chemical, and Biological Conditions of Black Sea, 191 ; Deep Sea Deposits from *Valdivia* Expedition, 360
- Muscle Testing, Therapeutic Electricity and Practical, W. S. Hedley, 30
- Museums, Descriptive and Illustrated Catalogue of the Physiological Series of Comparative Anatomy contained in the Museum of the Royal College of Surgeons of England, 385
- Musker Steam Motor Waggon, the, 554
- Myers (W.), Standardisation of Anti-venomous Serum, 215
- Myres (J. L.), on the Cave of Psychró in Crete, 637
- Nagaoka (Dr. H.), Elastic Constants of Rocks and Velocity of Seismic Waves, 36
- Nansen (Fridtjof), the Norwegian North Polar Expedition, 1893-1896, to Franz Josef Land, Scientific Results, 146 ; Prof. Nansen's New Insulating Water Bottle : Dr. H. R. Mill, 591
- Naphthalene Derivatives, Isomeric, Report of the Committee of the British Association on, 567
- Nares (Sir George, F.R.S.), Annual Report on the Mersey, 231
- Nathorst (A. G.), the Norwegian North Polar Expedition, 1893-1896, to Franz Josef Land, Scientific Results, 146
- Natural History : Notes on Sport and Travel, George Henry Kingsley, 5 ; the Unveiling of the Huxley Memorial Statue, 10 ; Preliminary Notes on the Results of the Mount Kenya Expedition, 1899, H. J. Mackinder, 12 ; Death and Obituary Notice of Prof. A. Milne-Edwards, 13 ; Linnean Society, 46, 143, 215, 262 ; New South Wales Linnean Society, 640 ; a Vertebrate Fauna of the Shetland Isles, A. H. Evans and T. E. Buckley, 75 ; Memoirs of Kazan Society of Naturalists, 93 ; Bulletin de la Société des Naturalistes de Moscou, 93 ; Temperatures of Recently Killed Chamois, G. Stallard, 293 ; Nature in Downland, W. H. Hudson, 417 ; the Birds of Cheshire, T. A. Coward and Charles Oldham, 417 ; in Birdland with Field Glass and Camera, Oliver G. Pike, 417 ; the Preservation of Big Game in Africa, E. N. Buxton, 550 ; Association of German Naturalists, 553 ; Church Stretton, vol. i., Geology, E. S. Cobbold ; Macro-Lepidoptera, F. B.

- Newnham; Molluscs, Robert A. Buddicom, 571; Antelopes and their Recognition Marks, R. I. Pocock, 584; Unusual Modes of Development in Batrachia, Miss Sampson, 605; Tenacity of Life of the Albatross, Prof. John Perry, F.R.S., 621; Captain Wm. J. Reed, 621; the Elephant-Seals of Kerguelen Island, R. Hall, 628
- Natural Selection: Lamarckiens et Darwiniens, Félix Le Dantec, 388; Albinism and, Walter Garstang, 620
- Naturalism and Agnosticism, James Ward, 25
- Naturvölker, Psychologie der, Dr. J. Schultze, 220
- Naval Architecture: the Use of Steel in Ship-building, B. Martell, 90; the Steadying of Ships, Prof. G. H. Bryan, F.R.S., 186
- Navigation: Self-instruction in the Practice and Theory of Navigation, the Earl of Dunraven, 337; Acoustical Triangulation, A. J. Mundy, 422
- Nebula, New Planetary, R. G. Aitken, 606
- Needham (Prof. J. G.), Insect Visitors to Iris, 201
- Neptune, Photographic Observations of Satellite of, M. S. Kostinsky, 161
- Neville (F. H.), on the Chemical Compounds contained in Alloys, 566
- New Instrument to Measure and Record Sounds, a, Dr. Benjamin F. Sharpe, 80
- New Mexico, Meteorology of Cooking in, 421
- New South Wales Linnean Society, 640
- New South Wales Royal Society, 288, 384
- New York Meeting of the American Association, the, 269
- New Zealand Volcanoes, Dr. B. Friedländer, 180
- Newcomb (Prof. S.), Determination of Solar Parallax from Opposition of Eros, 20
- Newnham (F. B.), Church Stretton, vol. i., Macro-Lepidoptera, 571
- Newton (Prof. Alfred, F.R.S.), Specimens of *Dromaius ater*, 151
- Newton's Rings from Selenium Rays, A. C. Longden, 273
- Niagara Falls Power Company's Works, the, 422
- Nicaragua, Lake, the Permanence of, Prof. A. Heilprin, 395
- Nicholson (J. T.), the Flow of Marble, 335
- Nidd Valley Waterworks of Bradford, J. Watson, 609
- Nile, Effect on Lower Nile of "Sudd" Cutting on Upper, 180
- Nile Floods and Monsoon Rains, 391
- Nile, Upper, the White Rhinoceros on the, Oldfield Thomas, 599
- Nimier (H.), les Armes Blanches, leur Action et leurs Effets Vulnérants, 313; les Projectiles des Armes de Guerre, leur Action Vulnérante, 313; les Explosifs, les Poudres, les Projectiles d'Exercice, leur Action et leurs Effets Vulnérants, 313
- Nineveh and Babylon, the Reports of the Magicians and Astrologers of, R. C. Thompson, 51
- Nipher (Prof. F. E.), Exposure and Development of Photographic Plates in Ordinary Light, 62; Photographic Reversal, 159; the Zero Photographic Plate, 192; Eclipse Photography, 246; Method of obtaining Zero Photographic Plate, 396
- Noble (Sir Andrew, K.C.B., F.R.S.), Some Modern Explosives, 86, 111
- Noè (G.), Mosquitoes and *Filaria immitis*, 627
- Nogue (M.), Spider-silk Manufacture in Madagascar, 17
- Normandie, les Vieux Arbres de la, Henri Gadeau de Kerville, 7
- North Atlantic, Circulation of Surface Waters, H. N. Dickson, 286
- Norway: the Norwegian North Polar Expedition 1893-1896 to Franz Josef Land, Scientific Results, Fridtjof Nansen, J. F. Pompeckj, A. G. Nathorst, R. Collett, 146; the Climate of Norway, A. S. Steen, 457
- Number, the Science of, *Éléments de la Théorie des Nombres*, E. Cahen, 52
- Object Lessons in Botany from Forest, Field, Wayside and Garden, Edward Snelgrove, 53
- Observatories: Unpublished Observations at Radcliffe Observatory, 1774-1838, Dr. A. A. Rambaut, 64; Oxford University Observatory, Prof. H. H. Turner, 110; Rousdon Observatory, Devon, Sir C. E. Peek, 110; Observations of Variable Stars, T Cassiopeia and R Cassiopeia, made at Rousdon Observatory, Devon, Sir C. E. Peek, 398; Liverpool Observatory, W. E. Plummer, 137; Harvard College Observatory, 137; the Royal Observatory, Greenwich, 233; Report of the Cape Observatory, Sir David Gill, 398; Paris Observatory Annual Report, M. Loewy, 606; Astronomical Work at Daramona Observatory, W. E. Wilson, 630
- Occultation of Saturn, 137, 425
- Ocean Current Papers, H. C. Russell, 108
- Oceanography: a Partial Explanation of some of the Principal Ocean Tides, R. A. Harris, 258; Explorations of the *Albatross* in the Pacific, 307
- Oddone (Dr. E.), Negative Effects of Solar Eclipse on Atmospheric Electricity, 532
- Odessa: Memoirs of Mathematical Section of Novorossian Society of Naturalists, 93
- Ogawa (M.), Ammonium Imidosulphite, 143
- Oldham (Charles), the Birds of Cheshire, 417
- Oldham (R. D.), the Great Earthquake of June 12, 1897, 305; on the Geological Evidence of the Conditions under which Coal was Formed, 588; on the Mode of Formation of the Basal Carboniferous Conglomerate of Ullswater, 588; on the Formation of New Beaches on the Shore of Thirlmere Reservoir, 588
- Olivier (Louis), Poulsen's Telegraphone, 273
- Ontario, on the Paganism of the Iroquois of, David Boyle, 635
- Ophthalmology: the Refraction of the Eye, including a Complete Treatise on Ophthalmometry, A. Edward Davis, 6
- Optics: *Leçons d'Optique Géométrique à l'Usage des Éléves de Mathématiques Spéciales*, E. Wallon, 30; Coma, Prof. S. P. Thompson, 118; the "Orthostigmat" Lens, 188; Objective Presentation of Properties of Polarised Light, N. Umow, 211; Action of Light on Silver as Demonstrated by Vapour-condensation, General Waterhouse, 254; Colour Photometry (iii.), Sir William Abney, 273; Action of Light on Magnetism, J. H. Hart, 286; an Optical Phenomenon, Prof. A. M. Worthington, F.R.S., 293; the Production of Monochromatic Light, Charles Fabry and A. Pérot, 350; Electrical Effect of Light on Green Leaves, Dr. A. D. Waller, F.R.S., 358; Living Light, Raphael Dubois, 464; a Dark Lamp, Gustave Le Bon, 532; J. W. Gifford's Quartz-calcite Lens with Identical Visual and Photographic Focus, 563; Colour Changes in Prawns, Dr. Gamble and Mr. Keeble, 555; *Lehrbuch der Optik*, Dr. Paul Drude, 595; Range-finders, Prof. W. Stroud, 607
- Ore Deposits of the United States and Canada, the, J. F. Kemp, 365
- Oreamnus Kennedyi*, a New American Mountain Antelope, D. G. Elliott, 321
- Orientation of the Field of View of the Siderostat and Coelostat, A. Fowler, 428
- Origin and Character of the British People, Nottidge Charles Macnamara, 172
- Origin of the British Flora, the, Clement Reid, F.R.S., 268
- Ornithology: a Key to the Birds of Australia and Tasmania, with their Geographical Distribution in Australia, R. Hall, 6; Robin's Nest in Water-can, F. W. Haselgrove, 17; Racket Feathers, L. W. Wigglesworth, 54; the Reviewer, 54; British Birds, C. W. Wyatt, 100; Our Native (American) Birds, D. Lange, 100; a Third Specimen of the Extinct *Dromaius ater*, Vieillot, found in the R. Zoological Museum, Florence, Prof. Henry H. Giglioli, 102; Specimens of *Dromaius ater*, Prof. Alfred Newton, F.R.S., 151; the Norwegian North Polar Expedition, 1893-1896, to Franz Josef Land, Scientific Results, Fridtjof Nansen, J. F. Pompeckj, A. G. Nathorst, R. Collett, 146; among the Birds in Northern Shires, Charles Dixon, 177; Mode of Carriage by Cuckoo of Egg, A. H. Meiklejohn, 201; the Eider Duck's Summer Moulting Plumage, Witmer Stone, 201; the Study of Bird-life, W. P. Pycraft, 221; Nesting Habits of Australian Diamond Bird, Robert Hall, 303; the Birds of Surrey, J. A. Bucknill, 339; the Migration of Swifts, Oswald H. Latter, 413; William Andrews, 436; Nature in Downland, W. H. Hudson, 417; the Birds of Cheshire, T. A. Coward and Charles Oldham, 417; in Birdland with Field Glass and Camera, Oliver G. Pike, 417; a Swallow-cum-Sparrow Nest, J. H. Allchin, 532; Fancy Water-fowl, F. Finn, 547; the Bobolink as a Rice-pest, F. E. L. Beal, 605
- "Orthostigmat" Lens, the, 188
- Orton (K. J. P.), Substituted Nitrogen Chloride and Bromide Derivatives of Ortho- and Para-acet-toluide, 71; Estimation of Hypoidites and Reaction of Iodine Monochloride with Alkalis, 71; Transformation Product of Phenylacetyl Nitrogen Chloride, 143

- Osborn (Prof. H. F.), Correlation between Tertiary Mammalian Horizons of Europe and America, 424
- Osmotic Properties, on the, and their Causes in the Living Plant and Animal Cell, Prof. Overton, 612
- Osteology, the Origin of Mammals, J. S. Kingsley, 254
- Ousounify, a New Edible Tuber from the Soudan, Maxime Cornu, 72
- Outlines of Plant Life, with Special Reference to Form and Function, Prof. Charles Reid Barnes, 30
- Overton (Prof.), on the Osmotic Properties and their Causes in the Living Plant and Animal Cell, 612
- Owens College, the New Physical Laboratory at, 250
- Oxford University Museum, Catalogue of Eastern and Australian Lepidoptera Heterocera in the Collection of the, 548
- Oxford University Observatory, Prof. H. H. Turner, 110
- Oxfordshire, on the Occurrence of Flint Implements of Palæolithic Type on an Old Land Surface in, A. M. Bell, 636
- Oxy-gas Blowpipe Flame, Working Silica in the, W. A. Shenstone, F.R.S., and H. G. Lacell, 20
- Oxygen, Compressed, Physiological Action of, A. Mosso, 492
- Pacific, Explorations of the *Albatross* in the, 307
- Paganism of the Iroquois of Ontario, on the, David Boyle, 635
- Paix-Séailles (C.), Product of Decomposition of a Diiodhydrin of Glycerol, 191
- Palæobotany: Sigillaria, M. Grand'Eury, 23; the Arizona "Chalcedony Park," L. F. Ward, 62; the Norwegian North Polar Expedition, 1893-96, to Franz Josef Land, Scientific Results, Fridtjof Nansen, J. F. Pompeckj, A. G. Nathorst, R. Collett, 146; the Structure of Palæozoic Plants, Mr. Caruthers, F.R.S., 287; *Eléments de Paléobotanique*, R. Zeiller, 315
- Palæolithic Implements from Stellenbosch, L. Peringuey and G. S. Corstophine, 464
- Palæolithic Man in Africa, Sir John Evans, F.R.S., 190
- Palæontology: Cambrian Fossils of Eastern Salt-range (India), Dr. K. Redlich, 36; Cordaites, M. Grand'Eury, 47; an Anomodont Reptile from Bunter Sandstone of Reichen, Prof. H. G. Seeley, F.R.S., 94; Theriodont Reptile from Bavians River, Cape Colony, Prof. H. G. Seeley, F.R.S., 262; Undescribed Trilobites in Oxford University Museum, H. H. Thomas, 262; Radiolaria from Coulsdon Upper Chalk, W. M. Holmes, 262; Correlation between Tertiary Mammalian Horizons of Europe and America, Prof. H. F. Osborn, 424; Restoration of *Stylonurus Lacoanus*, C. E. Beecher, 432; *Rhamphorhynchus* in Bavaria, 577
- Pangan Tribe of Aborigines in the Malay Peninsula, on some Anthropological Observations of the, W. L. H. Duckworth, 633
- Paris: Paris Academy of Sciences, 23, 46, 71, 95, 119, 143, 167, 191, 216, 240, 264, 288, 312, 336, 383, 408, 432, 464, 492, 520, 544, 568, 592, 616, 639; the Elevated Moving Pavement at the Paris Exhibition, 107; Automobile Trials at, 158; Artificial Ant-hills, C. Janet, 490; Prize Subjects of the Paris Société d'Encouragement, 380; American Institute and English Institution of Electrical Engineers at Paris, 415; Paris International Congress of Mathematicians, 418; Paris International Physical Congress, Dr. Ch. Ed. Guillaume, 425; a Night with the Great Paris Telescope, C. P. Butter, 574; Paris Observatory Annual Report, M. Loewy, 606
- Park (James), the Cyanide Process of Gold Extraction, 148
- Parker (M. A.), an Introduction to Analytical Chemistry, 292
- Parkin (J.), on Fungi found in Ceylon Growing on Scale-insects, 613
- Parmentier (F.), Composition of Mont Dore Gas, 47
- Parry (E. J.), Santalol, 322
- Parry (John), Solution Theory Applied to Molten Iron and Steel, 128
- Parsons' Steam Turbine System, H.M.S. *Viper*, 322
- Patagonia, on Recent Explorations in, Prof. W. B. Scott, 587; on the Miocene Fauna of Patagonia, Prof. W. B. Scott, 589
- Patent Law, the Law and Practice relating to Letters Patent for Inventions, R. W. Wallace, J. B. Williamson, 618
- Pathology, Research in, H. T. Butlin, 254
- Paulli (Dr. S.), the Air Chambers in Mammalian Skull, 323
- Paulsen (Herr), the Telephonograph, 61
- Paulson (Robert), Disease of Birch Trees in Epping Forest and Elsewhere, 599
- Peachey (S. J.), Dextromethylethylpropyl Tin Dextrobromocamporsulphonate, 143
- Pearson (H. H. W.), the Flora of the Andes, 46
- Pearson (Prof. Karl, F.R.S.), the Grammar of Science, 49; Measurements in Schools. Collateral Heredity, 173, 599; Correlation between Life-duration and Number of Offspring, 381
- Peat, the Textile Uses of, Herr Zschörner, 108
- Peek (Sir C. E.), Rousdon Observatory, Devon, 110; Rousdon Observatory (Devon), Variable Stars of Cassiopeia and R Cassiopeia, 398; Observations at Rousdon for 1899, 422
- Pélabon (H.), Action of Hydrogen on Arsenic Sulphides, 408
- Pelew Islands, Dugong Vertebra as Bracelet in, Dr. O. Finsch, 36
- Pelletier (Bertrand) and J. B. Caventou, Unveiling of a Monument to, 421
- Penfield (S. L.), the Empirical Formula of the Tourmaline Acid, 286; Calcite Crystals, 568
- Peopling of Australia, the, John Mathew, 549; Sidney H. Ray, 621
- Percival (John), Agricultural Botany, 570
- Percussion Caps for Shooting in Schools, Sir Lauder Brunton, F.R.S., 54
- Peringuey (L.), Palæolithic Implements from Stellenbosch, 464
- Perkin (Dr. F. Mollwo), Advancement of Electrical Chemistry, 138
- Perkin, (W. H. jun., F.R.S.), Brazilin (iv.), 71; Hæmatoxylin (v.), 71; New Series of Pentamethylene Derivatives (i.), 261; Action of Sodium and Methyl Iodide on Ethyl Dimethylbutanetricarboxylate, 261; Opening Address in Section B of the British Association, 476
- Perkins (R. C. L.), on the Zoology of the Sandwich Islands, 589
- Permeability of Iron under the Influence of the Oscillatory Discharge from a Condenser, E. W. Marchant, 413
- Pérot (A.), the Production of Monochromatic Light, 350
- Perry (Prof. John, F.R.S.), Valve Motions of Engines, 31; England's Neglect of Science, 221; the Teaching of Mathematics, 317; Railways and Moving Platforms, 412; Tenacity of Life of the Albatross, 621
- Perseid Meteoric Shower, the, W. F. Denning, 173
- Perseids of 1900, the, August, W. F. Denning, 398
- Peru, Rubber Forest in, 578
- Petaval's (G. E.), Apparatus for Experiments on the Explosive Pressures of Gases, 563
- Peters (C. A.), Separation and Determination of Mercury as Mercurous Oxalate, 210
- Peters (G. H.), Colour Screens for Refracting Telescopes, 37
- Pettersson's (Prof.) New Insulating Water Bottle, Dr. H. R. Mill, 591
- Petty (S. L.), a Tour through Great Britain in 1727, 496
- Phaseolus, on the Behaviour during Karyokinesis of the Nucleolus in the Root-apex of, Harold Wager, 612
- Philippi (Dr.), Deep-sea Deposits from *Valdivia* Expedition, 360
- Phillipines, Earthquakes of 1897 in, P. J. Coronas, 555
- Phillips (C. E.), on the Apparent Emission of Kathode Rays from an Electrode at Zero Potential, 564
- Philology: Homochronous Heredity and Changes of Pronunciation, Charles G. Stuart-Menteth, 524; Proof of Old Semitic Influence in South Africa, K. Meinhof, 606
- Philosophy: Death of Prof. Henry Sidgwick, 456; Untersuchungen über Philons und Platons Lehre von der Welt-schöpfung, Jacob Horovitch, 494
- Phisalix (C.), Bacillus Anthracis Brevigemmans, 408
- Phonetics, Introduction to English, French and German, with Reading Lessons and Exercises, Laura Soames, 220
- Phosphorescence: Phosphorescence unaffected by Magnetic Field, A. de Hemptinne, 323; a "Dark Lamp," Gustave Le Bon, 532; Phosphorescent Glow in Gases, J. B. B. Burke, 564; Simple Experiments on Phosphorescence, 599
- Photography: Photo-micrography, Dr. Edmund J. Spitta, 4; Exposure and Development in Ordinary Light, Prof. F. E. Nipher, 62; Micro-photography, Iso-photography, Mega-photography, A. R. Hunt, 79; Photographic Observation of Eros, Prof. Howe, 137; Howe's Photographic Observation of Eros, A. C. D. Crommelin, 184; Photographic Observations of Satellite of Neptune, M. S. Kostinsky, 161; Eclipse Photography, Prof. Francis E. Nipher, 246; Automatic Photography of the Corona, Prof. C. Burckhalter, 535; on use of Wedge of Yellow Optical Glass in giving Correctly Graduated Photographic Exposures of the Partial Phases of an Eclipse and the Corona, Prof. Todd, 565; Photographic "Reversal," Prof. Nipher, 159; the Zero Plate, Prof.



- Nipher, 192; Method of Obtaining "Zero" Plate, Prof. F. E. Nipher, 396; the "Orthostigmat" Lens, 188; Photography in Colours, R. C. Bayley, 195; a Handbook of Photography in Colours, Thomas Bolas, Alexander A. K. Tallent, Edgar Senior, 434; Thos. Thorp's Modification of Prof. Wood's Diffraction Process of Colour Photography, 580; Action of Light on Silver as Demonstrated by Vapour-condensation, General Waterhouse, 254; Lehrbuch der Photochromie (Photographie der Natürlichen Farben), Wilhelm Zenker, Philip E. B. Jourdain, 316; Analytical Portraiture, Francis Galton, F.R.S., 320; Photographic Side of Mr. F. Galton's Analytical Portraiture Suggestions, 374; the Photography of Sound Waves, Prof. R. W. Wood, 342; Dark Images of Photographed Lightning Discharges, J. B. Hannay, 389; the Royal Photographical Society's Exhibition, 556; the "Panoram" Kodak, 556; J. W. Gifford's Quartz-calcite Lens with Identical Visual and Photographic Focus, 563; on some Points connected with the Photography of a Moving Object, W. E. Plummer, 565; A. R. Hinks, 565
- Photometric Revision of Harvard Photometry, 37
- Photometry of Corona, April 16, 1893, Prof. H. H. Turner, 86
- Photometry, Colour (iii.), Sir William Abney, 273
- Physical Geography: Circulation of Surface Waters of North Atlantic, H. N. Dickson, 286
- Physics: Working Silica in the Oxy-gas Blowpipe Flame, W. H. A. Shenstone, F.R.S., and H. G. Lacell, 20; Physical Society, 23, 70, 118, 166, 214; Astronomical Applications of Physical Problems Investigated at Solar Physics Observatory, Sir Norman Lockyer, 23; Some Speculations as to the Part Played by Corpuscles in Physical Phenomena, Prof. J. J. Thomson, F.R.S., 31; Escape of Gases from Planetary Atmospheres, S. R. Cook, 54; Dr. G. Johnstone Stoney, F.R.S., 78, 359; the Kinetic Theory of Planetary Atmospheres, Prof. G. H. Bryan, F.R.S., 126, 189; Annalen der Physik, 92, 211, 335, 381, 568, 639; Scientific Papers, Peter Guthrie Tait, Secretary R.S.E., Prof. Horace Lamb, F.R.S., 99; a Simple Experiment on Thermal Radiation, Dr. K. T. Fischer, 103; the Theory of Electrolytic Dissociation, H. C. Jones, 121; Viscosities of Mixtures of Liquids, Dr. C. H. Lees, 166; Death of M. Boutan, 179; the Weight of Hydrogen Desiccated by Liquid Air, Lord Rayleigh, F.R.S., 189; a Surface-tension Experiment, T. J. Baker, 196; Prof. Henry Bourget, 269; Measurement of Surface-tension, J. S. Stevens, 568; Dynamical Theory of Atmospheric Circulation, Prof. V. Bjerknes, 200; Method of Studying Diffusion of Air through Water, C. Barus, 210; the Law of Cailletet and Mathias and the Critical Density, Prof. S. Young, 214; Papers on Mechanical and Physical Subjects, Osborne Reynolds, 243; the New Physical Laboratory at Owens College, 250; Ether and Matter, Joseph Larmor, Prof. Geo. Fras. Fitzgerald, F.R.S., 265; Viscosity of Gases as Affected by Temperature, Lord Rayleigh, F.R.S., 287; Demonstration of Earth's Rotation with 1-Metre-long Pendulum, Alphonse Berget, 288; le Fluor et ses Composés, Henri Moissan, 291; Some Results Obtained with a Storage Battery of Twenty Thousand Cells, Prof. John Trowbridge, 325; the Conductivity Produced in Gases by the Motion of Negatively-charged Ions, J. S. Townsend, 340; Motion in an Infinite Elastic Solid caused by Motion through it of a Body Acting on it only by Attraction and Repulsion, Lord Kelvin, 360; Müller-Pouillet's Lehrbuch der Physik und Meteorologie, 361; Observation of the Circular Components in the "Faraday Effect," Prof. D. B. Brace, 368; Physical Structure of Asbestos, Geoffrey Martin, 369; Recent Studies in Gravitation, Prof. John H. Poynting, F.R.S., 403; Paris International Physical Congress, Dr. Ch. Ed. Guillaume, 425; Difference of Potential between Solid Salt and its Solution, Dr. A. Campetti, 458; the Theory of Ions, 524; Deformation of Contact of Elastic Bodies, A. Lafay, 544; the Rate of Increase of Underground Heat, James Stirling, 555; Simple Experiments on Phosphorescence, 599; Untersuchungen über Mikrostrukturen des erstarrten Schwefels nebst Bemerkungen über Sublimation, O. Butschli, 619; Untersuchungen über die Microstruktur künstlicher und natürlicher Kieselsäuregallerten (Tabaschir, Hydrophan, Opal), O. Butschli, 619; Elementary Physics and Chemistry, R. A. Gregory, A. T. Simmons, 620; Hardness of Metals, F. Auerbach, 639; Introduction to Physical Chemistry, James Walker, Prof. Arthur Smithells, 76; Theoretical and Physical Chemistry, Part. ii. Chemical Statics, J. H. van't Hoff, 245; a Text-book of Physical Chemistry, Dr. R. A. Lehfeldt, 292; Physico-chemical Reaction: its Driving Energy and Temperature Coefficients, Prof. T. W. Richards, 351. *See also* Section A of the British Association
- Physiography: a Monograph of Christmas Island (Indian Ocean), Physical Features and Geology, C. W. Andrews, 193; the School Journey: a Means of Teaching Geography, Physiography and Elementary Science, Joseph H. Cowham, 619
- Physiology: the Loss of Power of Absorbing Oxygen by Blood Caused by Injection of Carbonic Oxide, Dr. Adolfo Moutuori, 18; Physiological Action of Compressed Oxygen, A. Mosso, 492; Absorption of Free Oxygen by Normal Urine, Daniel Berthelot, 592; Influence of Temperature on Activity of Motor Nerves of Frog, J. Carvallo; Functions of Crystalline Tube of Acephela, Henri Coupin, 47; Action of Anti-leucocytic Serums on Blood Coagulation, C. Delezenne, 144; Presence of Iodine in Blood, E. Gley and P. Bourcet, 216; Arsenic and Iodine in Animal Organism, Armand Gautier, 383; Iodine in Organism, P. Bourcet, 384; Anti-coagulating Power of Serum in Pathological State, Ch. Achard and A. Clerc, 216; Function of Cell Nucleus in Absorption, H. Stassano, 240; Action of High-frequency Currents on Elementary Respiration, M. Tripet, 240; die Moderne Physiologische Psychologie in Deutschland, W. Heinrich, 245; the Relation of Stimulus to Sensation, Prof. C. Lloyd Morgan, F.R.S., 278; Experimental Parthenogenetic Segmentation in Amphibia and Fish, E. Bataillon, 288; Beiträge zur Physiologie des elektrischen Organes der Zitterrochen (Torpedo), Siegfried Garten, 290; Experimentation on Emotion, Prof. C. S. Sherrington, F.R.S., 328; Lessons in Elementary Physiology, Thos. H. Huxley, LL.D., F.R.S., Prof. E. A. Schäfer, F.R.S., 363; an Introduction to the Study of the Comparative Anatomy of Animals, G. C. Bourne, 354; Physiology for the Laboratory, Bertha Millard Browne, 365; Rechts-und Linkshändigkeit, Dr. Fritz Lueddeckens, W. L. H. Duckworth, 409; Relation of Cell to Enzymes, Sir J. Burdon-Sanderson, 423; Generative Process in Hæmamebids, Prof. E. R. Lankester, 424; the Last Sign of Life Determined by Electricity, A. D. Waller, 492; Effects of Work of Active on Inactive Muscular Groups, MM. Kronecker and Cutter, 492; Hæmoglobin not Estimable by Absorbing Power of Blood, L. G. de St. Martin, 520; the Nitro-celluloses, Léo Vignon, 520; on the Effects of Copper on the Human Body, Dr. T. W. Hieme, 566; Physiology, Plant: Chlorophyll a Sensitiser, Prof. Clement Timiriazeff, 102; Dr. Horace T. Brown, F.R.S., 103; Recent Investigations on Rust of Wheat, William G. Smith, 352; Fungus Diseases of Citrus Trees in Australia, and their Treatment, D. Macalpine, 494; Ascent of Sap, Dr. Henry H. Dixon, Dr. J. Joly, F.R.S., 572; Tobacco, 576
- Pickering (Prof. W.), Swift's Comet (1892 I.), 501
- Pigments, Note on some Blue and Red, Prof. T. D. A. Cockerell, 31
- Pike (Oliver G.), in Birdland with Field-glass and Camera, 417
- Pinget (H.), Development of Iron Industry in France, 535
- Pirsson (L. V.), Determination of Minerals in thin Rock Sections, 638
- Pisciculture in the United States, Dr. Whitten, 423
- Pitcairn Islands, Stone Implements from, J. Allen Brown, 119
- Pitmanese Phonetics, Laura Soames, 220
- Pitt-Rivers (Lieut.-General, F.R.S.), Death of, 33; Obituary Notice of, 59
- Plague: the Plague, 231; Rats and Plague, Dr. Frank Tidswell, 273; the Plague in Glasgow, 456, 498, 577
- Planets: Ephemeris for Eros, 20, 110, 184, 459, 501, 535, 581, 606, 630; Determination of Solar Parallax from Opposition of Eros, Prof. S. Newcomb, 20; Photographic Observation of Eros, Prof. Howe, 137; Howe's Photographic Observation of Eros, A. C. D. Crommelin, 184; Opposition of Eros, M. Loewy, 630; Escape of Gases from Planetary Atmospheres, S. R. Cook, 54; Dr. G. Johnstone Stoney, F.R.S., 78; the Kinetic Theory of Planetary Atmospheres, Prof. G. H. Bryan, F.R.S., 126; Occultation of Saturn, 137; Rotation Period of Venus, Prof. A. Belopolsky, 160; Photographic Observations of Satellite of Neptune, M. S. Kostinsky, 161; Jeremiah Horrocks and the Transit of Venus, 257; the Stability of a Swarm of Meteorites and of a Planet and Satellite, Prof. A. Gray, F.R.S., 582; New Planetary Nebula, R. G. Aitken, 606

- Plankton of the Bay of Biscay, the, G. Herbert Fowler, 317  
 Plant Hybrids, Wilfred Mark Webb, 174  
 Plant Life, Outlines of, with Special Reference to Form and Function, Prof. Charles Reid Barnes, 30  
 Plant Physiology: Chlorophyll a Sensitiser, Prof. Clement Timiriacheff, 102; Dr. Horace T. Brown, F.R.S., 103; Recent Investigations on Rust of Wheat, William G. Smith, 352; Fungus Diseases of Citrus Trees in Australia and their Treatment, D. McAlpine, 494; Ascent of Sap, Dr. Henry H. Dixon, Prof. J. Joly, F.R.S., 572; Tobacco, 576  
 Plants, a New Geography of, Prof. Alfred Kirchoff, Dr. Otto Stapf, 569  
 Plants of the Past, R. Zeiller, 315  
 Plarr (Victor), the Centenary of the Royal College of Surgeons, 294  
 Platforms, Moving, Railways and, Prof. John Perry, F.R.S., 412; Lieut.-Colonel W. Sedgwick, 436  
*Platopus caninus* and the "Snake-stone," Dr. Hervey, 79  
 Plumbism, Pottery and, Dr. T. E. Thorpe, F.R.S., 42  
 Plumbism in Pottery Workers, W. Burton, 616  
 Plummer (W. E.), Liverpool Observatory, 137; on some Points connected with the Photography of a Moving Object, 565  
 Pochettino (A.), Evaporation not Productive of Loss of Electricity, 458  
 Pocklington (Dr. H. C.), on the Radiation of a Black Body on the Electro-magnetic Theory, 564  
 Pooock (R. I.), Antelopes and their Recognition Marks, 584  
 Point Groups, the Present State of the Theory of, Miss F. Hardcastle, 561  
 Poirault (M.), Observations on Pythium, 613; Observations on Chytridinae, 614  
 Polyandry, Artificial Deformation of Heads and some Customs connected with, Kumagusu Minakata, 437  
 Pompeckj (J. J. F.), the Norwegian North Polar Expedition, 1893-1896, to Franz Josef Land, Scientific Results, 146  
 Pompeii, its Life and Art, August Mau, 7  
 Poncelet (F.), Human Body as Screen in Wireless Telegraphy, 568  
 Pope (W. J.), Dextromethylethylpropyl Tin Dextrobromocamphorsulphonate, 143; Ions, 564; on Recent Developments in Stereochemistry, 567  
 Porta (Dr. A.), the Common Frog-hopper, 532  
 Portable Gas Producers, Dr. J. A. Purves, 601  
 Portraiture, Analytical, Francis Galton, F.R.S., 320; Photographic Side of Mr. F. Galton's Suggestions, 374  
 Potholes and Caves of the Mountain Limestone District of North-west Yorkshire, on the, S. W. Cuttriss, 587  
 Potsdam Great Refractor, the New Spectrographs for the, Prof. C. H. Vogel, 459  
 Pottery and Plumbism, Dr. T. E. Thorpe, F.R.S., 42  
 Pottery Workers, Plumbism in, W. Burton, 616  
 Potts (L. M.), Rowland's New Method for Measuring Electric Absorption, 432  
 Pouget (M.), the Alkaline Selenio-antimonites, 24  
 Poulsen's Telegraphone, Louis Olivier, 273  
 Poulton's (Prof. E. B.), Photographs illustrating the General Principles of Müllerian Mimicry, 590  
 Pourret (Ch.), Bromination with Aluminium Bromide, 47  
 Power (Dr. F. P.), Precipitated Mercurous Iodide, 322  
 Poynting (Prof. John H., F.R.S.), Recent Studies in Gravitation, 403  
 Practical Navigation, 337  
 Prawns, Colour-changes in, Dr. Gamble and Mr. Keeble, 555, 590  
 Precocity, a Physical Basis of, 578  
 Preece (Sir William H., F.R.S.), Relative Advantages of Alternate and Continuous Current for General Electrical Supply, with regard to interference with other Interests, 415; Wireless Telephony, 564; on the Proposed Mono-rail High Speed Electric Railway between Manchester and Liverpool, 610  
 Prehistoric Antiquities of Rumbold's Moor (near Bradford), on the, Butler Wood, 637  
 Preservation of Big Game in Africa, the, E. N. Buxton, 550  
 Preservation of Local Antiquities, on the, Butler Wood, 637; Dr. A. C. Haddon, 637  
 Primes, on the Determination of Successive High, Lieut.-Colonel Cunningham, H. J. Woodall, 561  
 Principles of Bacteriology, the, Dr. Ferdinand Hueppe; Dr. A. C. Houston, 73  
 Principles of Mechanics presented in a New Form, the, Heinrich Hertz, 50  
 Prize Subjects of the Paris Société d'Encouragement, 380  
 Projectiles: Les Projectiles des Armes de Guerre; Leur Action Vulnérante, H. Nimier and Ed. Laval, 313; Les Explosifs, Les Poudres, Les Projectiles d'Exercice; Leur Action et leurs Effets Vulnérants, H. Nimier and Ed. Laval, 313  
 Pronunciation, Homochronous Heredity and Changes of, Charles G. Stuart-Menteath, 524  
 Protoplasm, Prof. Dr. Max Kassowitz, Prof. H. Marshall Ward, F.R.S., 217  
 Psychology: Psychology of Fishes, Dr. R. W. Shufeldt, 63; Mental Lapses, H. H. Bawden, 108; Monistische Gottes- und-Weltanschauung, J. Sack, 172; Psychologie der Naturvölker, Dr. J. Schultz, 220; Die Moderne Physiologische Psychologie in Deutschland, W. Heinrich, 245; Zur Prinzipienfragen der Psychologie, W. Heinrich, 245; an Outline Sketch, Psychology for Beginners, Hiram M. Stanley, 245; Experimentation on Emotion, Prof. C. S. Sherrington, F.R.S., 328; Psychology of Reasoning, Alfred Binet, 388  
 Psychró, on the Cave of, in Crete, D. G. Hogarth, 637; Arthur J. Evans, 637; J. L. Myres, 637  
 Puff Balls, Large, W. A. Sanford, 496  
 Pullar (Fred P.), a Bathymetrical Survey of the Fresh-water Lochs of Scotland, 65, 263  
 Purves (Dr. J. A.), Portable Gas Producers, 601  
 Purvis (Dr. G. C.), a Possible Preventive of African Horse-sickness, Dr. G. C. Purvis, 83  
 Puss Moth, Functions of an Organ of a Larva of the, Arthur S. Thorn, 389; Function of the Whips of the Larva of the, W. F. Kirby, 413  
 Pycraft (W. P.), the Study of Bird-life, 221  
 Pye-Smith (Dr. P. H., F.R.S.), Medicine as a Science and Medicine as an Art, 356  
 Pythium, Observations on, M. Poirault, 613; E. J. Butler, 613; on the Biology and Cytology of, Prof. Trow, 613  
 Qualitative Analysis, Elements of, Dr. G. H. Bailey and G. J. Fowler, 412  
 Quantics, Binary, on the Aszygetic and Perpetuative Covariants of Systems of, Major MacMahon, 561; Quantics, Binary and other, on the Symbolism appropriate to the Study of Orthogonal and Boolean Invariant Systems which appertain to, Major MacMahon, 561; Quantics, *n*, a Property of the Characteristic Symbolic Determinant of any, in *n* Variables, Major MacMahon, 561; Quaternion Methods Applied to Dynamics, W. G. Barnett, 174  
 Quintic Curve cannot have more than Fifteen Real Points of Inflection, on the Result that a, A. B. Basset, F.R.S., 561  
 Rabl (Dr. Carl), Ueber den Bau und die Entwicklung der Linse, 125  
 Races of Europe, the, a Sociological Study, William Z. Ripley, Prof. A. C. Haddon, F.R.S., 27  
 Racket Feathers, L. W. Wiglesworth, 54; the Reviewer, 54  
 Radcliffe Observatory, Unpublished Observations at, 1774-1838, Dr. A. A. Rambaut, 64  
 Radiation, on the Relation of Radiation to Temperature, Dr. Larmor, 562; Prof. Fitzgerald, 562  
 Radiography: the Radium Radiation, P. Villard, 47; Behaviour of Radium at Low Temperatures, O. Behrenden, 335; an Experiment of M. Jaumann, P. Villard, 47; Temperature of Potential Gradient in Rarefied Gases, G. C. Schmidt, 92; Mechanical Motions under Influence of Kathode and Röntgen Rays, L. Graetz, 92; Energy of Kathode Rays, W. Cady, 93; the Kathode Rays, P. Villard, 191; Discontinuity of Kathodic Emission, P. Villard, 240; Production of Kathode Rays by Ultra-violet Light, P. Lenard, 335; Significance of Kathode Rays in connection with Mechanism of Discharge, Dr. Otto Berg, 628; Reflection and Mechanical Effect of Kathode Rays, 639; Sources and Properties of Becquerel Rays, Prof. G. H. Bryan, F.R.S., 151; Meeting of Röntgen Society, 179; the American Holtz Machine, 179; Dr. Rémy's Localising Apparatus, 180; the Radiation of Uranium, Henri Becquerel, 191; the Uranium Radiation, Henri Becquerel, 312; Production of X-Rays by Battery Current, J.

- Trowbridge, 211; Cadett and Neall's X-Ray Paper, 253;  
 Influence of Spur-gap on Generation of Röntgen Rays, A. Winkelmann, 568; Newton's Rings from Selenium Rays, A. C. Longden, 273; Phosphorescence Unaffected by Magnetic Field, A. de Hemptinne, 323; Artificial Radio-active Borium, A. Debiernis, 383; a "Dirk" Lumo, Gustave le Bon, 532; Radiation of a Black Body on the Electro-magnetic Theory, Dr. H. C. Pocklington, 564  
 Ruffels (Sir Stanford), England in the Far East, H. E. Egerton, 548  
 Rails, Steel, the Cause of Fracture of, 437  
 Railways: The Proposed Railway up Mont Blanc, J. and H. Vallot, 62; the Metropolitan District Short Electric Railway Line, 107; the Halford Gradient Railway, 180; the Conditions of High Speed on Railways, 181; Specially built Tram for Experiment on Atmospheric Resistance, 200; the Transbaikalian Railway, 253; What Pressure is Dangerous on Electric Railways with Overhead Trolley, William Rung, 399; Railways and Moving Platforms, Prof. John Perry, F.R.S., 412; Lieut.-Colonel W. Sedgwick, 436; Electric Traction in Germany, 532; on the Question of a Railway Connection between Europe and India, Colonel Sir Thomas W. Holdich, 590  
 Rainfall of the Northern Counties of England, on the, J. Hopkinson, 563  
 Rainfall, Symons's British, H. Sowerby Wallis, 435  
 Ramage (H.), on a Method of Investigating Correspondence between Spectra, 563  
 Rambaut (Dr. A. A.), Unpublished Observations at Radcliffe Observatory, 1774-1838, 64  
 Randall-MacIver (D.), on the Present State of our Knowledge of the Modern Population of Egypt, 636  
 Range-finders, Prof. W. Stroud, 607  
 Ransome (W. L.), Carnotite, 432  
 Rats: Bacteriological Methods of Exterminating Rats, J. Danysz, 84; Rats and Plague, Dr. Frank Tidswell, 273  
 Ravenstein (E. G.), on Foreign and Colonial Surveys, 590; on the Geographical Distributions of Relative Humidity, 590  
 Ray (Sidney H.), the Peopling of Australia, 621  
 Rayet (G.), Comet 1900b (Borely-Brooks), 464  
 Rayleigh (Lord, F.R.S.), the Mechanics of Flight, 108; the Weight of Hydrogen Desiccated by Liquid Air, 189; Viscosity of Gases as affected by Temperature, 287  
 Reorganisation of the Education Department, the, 209  
 Reale Accademia dei Lincei, Anniversary Meeting of, 430  
 Reasoning, the Psychology of, Alfred Binet, 388  
 Rebière (A.), Pages Choises des Savants Modernes, 6  
 Reclamation of Land from Tidal Waters, the, Alexander Beazeley, 266  
 Recognition Marks, Antelopes and their, R. I. Pocock, 584  
 Recording Telephones, 371  
 Red and Blue Pigments, Note on some, Prof. T. D. A. Cockerell, 31  
 Red Sea, Origin and Formation of, A. Issel, 201  
 Redlich (Dr. K.), Cambrian Fossils of Eastern Salt-Range (India), 36  
 Reed (F. R. C.), Igneous Rocks of Waterford Coast, 167  
 Reed (Captain Wm. J.), Tenacity of Life of the Albatross, 621  
 Reef-knolls, on the Formation of, R. H. Tiddeman, 587; J. E. Marr, 587  
 Reform of Mathematical Teaching, the, David Mair, 389; Henry Woollen, 436; W. F. Beard, 466; C. E. Stromeyer, 523; Oliver Heaviside, 548  
 Reflecting Telescopes, Colour Screens for, T. J. J. See and G. H. Peters, 37  
 Refraction of the Eye, the, including a Complete Treatise on Ophthalmometry, A. Edward Davis, 6  
 Reid (Clement, F.R.S.), the Origin of the British Flora, 268  
 Relation of Stimulus to Sensation, the, Prof. C. Lloyd-Morgan, F.R.S., 278  
 Religion: Malay Magic: being an Introduction to the Folklore and Popular Religion of the Malay Peninsula, W. W. Skeat, 145  
 Rémy's (Dr.) Localising Apparatus for Röntgen Rays, 180  
 Repington (C.), Eggs of Wood Leopard Moth, 321  
 Reservoir-burst at Forres, 457  
 Resins: Die Harze und die Harzebehälter, A. Tschirch, 316  
 Resistance Coils, improved Standard, R. S. Waipple, 563
- REVIEWS AND OUR BOOKSHELF:—  
 La Spedizione di sua Altezza Reale il Principe Luigi Amedeo di Savoia, Duca degli Abruzzi, al Monte Sant' Elia (Alaska), 1897, Dottore Filippo de Filippi, 1  
 Vorlesungen über Hydrodynamische Fernkräfte nach C. A. Bjerknes' Theorie, V. Bjerknes, Prof. G. H. Bryan, F.R.S., 3  
 Photo-micrography, Dr. Edmund J. Spitta, 4  
 Notes on Sport and Travel, George Henry Kingsley, 5  
 Irrigation and Drainage, Principles and Practice of: their Cultural Phases, F. H. King, 5  
 The Refraction of the Eye, including a Complete Treatise on Ophthalmometry. A Clinical Text-book for Students and Practitioners, A. Edward Davis, 6  
 A Key to the Birds of Australia and Tasmania, with their Geographical Distribution in Australia, R. Hall, 6  
 Pages Choises des Savants Modernes, A. Rebière, 6  
 Les Vieux Arbres de La Normandie, Henri Gadeau de Kerville, 7  
 Pompeii: its Life and Art, August Mau, 7  
 Naturalism and Agnosticism, James Ward, 25  
 The Races of Europe: a Sociological Study, William Z. Ripley, Prof. A. C. Haddon, F.R.S., 27  
 Historische Beiträge, Heft VI.: Ueber Reaktionstheilung, Spindelbildung, Centrosomen und Cilienbildner im Pflanzenreich, E. Strasburger, Prof. J. B. Farmer, 28  
 Mechanism of Weaving, T. W. Fox, 29  
 Leçons d'Optiques Géométrique à l'Usage des Élèves de Mathématiques Spéciales, E. Wallon, 30  
 Therapeutic Electricity and Practical Muscle Testing, W. S. Hedley, 30  
 Lessons in Botany, Prof. George F. Atkinson, 30  
 Outlines of Plant Life, with Special Reference to Form and Function, Prof. Charles Reid Barnes, 30  
 The Grammar of Science, Karl Pearson, F.R.S., 49  
 The Principles of Mechanics Presented in a New Form, Heinrich Hertz, 50  
 The Reports of the Magicians and Astrologers of Nineveh and Babylon, R. C. Thompson, 51  
 Éléments de la Théorie des Nombres, E. Cahen, 52  
 Atlas of Urinary Sediments, with Special Reference to their Clinical Significance, Dr. Herman Riedel, 53  
 Dante, Edmund G. Gardner, 53  
 The Farmstead, Prof. J. P. Roberts, 53  
 Object Lessons in Botany from Forest, Field, Wayside and Garden, Edward Snelgrove, 53  
 The Principles of Bacteriology, Dr. Ferdinand Hueppe, Dr. A. C. Houston, 73  
 Vinification dans les Pays Chauds—Algérie et Tunisie, J. Dugast, 74  
 A Vertebrate Fauna of the Shetland Islands, A. H. Evans, T. E. Buckley, 75  
 Introduction to Physical Chemistry, James Walker, Prof. Arthur Smithells, 76  
 Catalogue of the Lepidoptera Phalaenæ in the British Museum, Vol. II. Catalogue of the Arctiadae (*Nolinæ*, *Lithosianæ*) in the Collection of the British Museum, Sir George F. Hampson, Bart., 77  
 Giordano Bruno, zur Erinnerung an den 17 Februar, 1600, Alois Reihl, 77  
 Christian Friedrich Schönbein, 1799-1868, George W. A. Kahlbaum und Ed. Schaer, Prof. R. Meldola, F.R.S., 97  
 Scientific Papers, Peter Guthrie Tait, Sec. R.S.E., Prof. Horace Lamb, F.R.S., 99  
 British Birds, with some Notes in Reference to their Plumage, C. W. Wyatt, 100  
 Our Native (American) Birds, how to Protect them and Attract them to our Homes, D. Lange, 100  
 Der Ursprung der Kultur, L. Frobenius, 101  
 The Amateur's Practical Garden Book, C. E. Hunn, L. H. Bailey, 101  
 Man and His Ancestor: a Study in Evolution, Charles Morris, 101  
 A First Geometry Book, J. G. Hamilton, F. Kettle, 101  
 The Theory of Electrolytic Dissociation, H. C. Jones, 121  
 Traité de Zoologie Concrète. T. II. 1<sup>re</sup> Partie. Mésozoaires—Spongiaires, Yves Delage, Edgard Hérouard, 122  
 Les Charbons Britanniques et leur Épuisement, E. Lozé, Bennett H. Brough, 124

- Ueber den Bau und die Entwicklung der Linse, Dr. Carl Rabl, 125
- Building Construction for Beginners, J. W. Riley, 125
- Catalogue of the Fossil Bryozoa in the Department of Geology, British Museum (Natural History). The Cretaceous Bryozoa. Vol. i. Dr. J. W. Gregory, 125
- Malay Magic: being an Introduction to the Folklore and Popular Religion of the Malay Peninsula, W. W. Skeat, 145
- The Norwegian North Polar Expedition, 1893-96, Fridtjof Nansen, J. F. Pompeckj, A. G. Nathorst and R. Collett, 146
- The Cyanide Process of Gold Extraction, James Park, 148
- The Cause and Prevention of Decay in Teeth, J. Sim Wallace, Dr. Harold Austen, 149
- Erinnerungen aus meinem Leben, A. Kolliker, 169
- Theory of Differential Equations, A. R. Forsyth, F.R.S., 170
- Origin and Character of the British People, Nottidge Charles Macnamara, 172
- The Geography of the Region about Devil's Lake and the Dalles of the Wisconsin, Prof. R. D. Salisbury, W. W. Atwood, 172
- Monistische Gottes- und Weltanschauung, J. Sack, 172
- First Stage Hygiene, Robert A. Lyster, 173
- Among the Birds in Northern Shires, Charles Dixon, 177
- A Monograph of Christmas Island (Indian Ocean), Physical Features and Geology, C. W. Andrews, 193
- Metallurgy of Lead and Silver. Part II. Silver. Henry F. Collins, 194
- The History of Language, Henry Sweet, 195
- Micro-organisms and Fermentation, Alfred Jörgensen, 195
- Photography in Colours, R. C. Bayley, 195
- Leçons Nouvelles sur les Applications Geometriques du Calcul Différentiel, W. de Fannenberg, 196
- Elementary Illustrations of the Differential and Integral Calculus, Augustus De Morgan, 196
- Allgemeine Biologie, Prof. Dr. Max Kassowitz, Prof. H. Marshall Ward, F.R.S., 217
- Introduction to English, French and German Phonetics, Laura Soames, 220
- Psychologie der Naturvölker, Dr. J. Shultze, 220
- The Study of Bird-life, W. P. Pycraft, 221
- An Introduction to the Differential and Integral Calculus and Differential Equations, F. G. Taylor, 221
- Monographie der Turbellarien II. Tricladida Terricola (Landplanarien), Prof. Ludwig von Graff, F. W. Gamble, 241
- Papers on Mechanical and Physical Subjects, Osborne Reynolds, F.R.S., 243
- Sette Anni di Caccia Grossa e Note di Viaggio in America, Asia, Africa, Europa, Count Felice Scheibler, 244
- Die Moderne Physiologische Psychologie in Deutschland, W. Heinrich, 245
- Zur Prinzipienfragen der Psychologie, W. Heinrich, 245
- An Outline Sketch: Psychology for Beginners, Hiram M. Stanley, 245
- Rural Wealth and Welfare, Economic Principles Illustrated and Applied in Farm Life, Geo. T. Fairchild, 245
- Lectures on Theoretical and Physical Chemistry, J. H. van 't Hoff, 245
- Ether and Matter, Joseph Larmor, Prof. Geo. Fras. Fitzgerald, F.R.S., 265
- The Reclamation of Land from Tidal Waters, Alexander Beazeley, 266
- Handbuch der Anatomie und Vergleichenden Anatomie des Centralnervensystems der Säugetiere, Dr. Edw. Flatau, Dr. L. Jacobsohn, 267
- The Origin of the British Flora, Clement Reid, F.R.S., 268
- A Manual of Marine Meteorology for Apprentices and Officers of the World's Merchant Navies, William Allingham, 268
- Babylonians and Assyrians: Life and Customs, Rev. A. H. Sayce, 289
- Beiträge zur Physiologie des Electricischen Organes der Zitterrochen (Torpedo), Siegfried Garten, 290
- Le Fluor et ses Composés, Henri Moissan, 291
- A Text-book of Physical Chemistry, Dr. R. A. Lehfeldt, 292
- An Introduction to Analytical Chemistry, G. G. Henderson, M. A. Parker, 292
- Maryland Weather Service, 292
- Volta e la Pila, Prof. Augusto Righi, 293
- Les Armes Blanches, leur Action et leurs Effets Vulnérants, H. Nimier, Ed. Laval, 313
- Les Projectiles des Armes de Guerre; leur Action Vulnérante, H. Nimier, Ed. Laval, 313
- Les Explosifs, les Poudres, les Projectiles d'Exercice; leur Action et leurs Effets Vulnérants, H. Nimier, Ed. Laval, 313
- Éléments de Paléobotanique, R. Zeiller, 315
- Lehrbuch der Photochromie (Photographie der Natürlichen Farben), Wilhelm Zenker, Philip E. B. Jourdain, 316
- Die Harze und die Harzebehälter, A. Tschirch, 316
- The Lepidoptera of the British Islands, Charles G. Barrett, 317
- Self-instruction in the Practice and Theory of Navigation, the Earl of Dunraven, 337
- Le Café, Culture—Manipulation—Production, Henri Lecomte, 338
- The Birds of Surrey, J. A. Bucknill, 339
- Untersuchungen ueber d. Vermehrung d. Laubmoose durch Brutorgane und Stecklinge, Dr. Carl Correns, 339
- Village Notes and Some Other Papers, Pamela Tennant, 340
- Müller-Pouillet's Lehrbuch der Physik und Meteorologie, 361
- Lessons in Elementary Physiology, Thomas H. Huxley, F.R.S.; Prof. E. A. Schäfer, F.R.S., 363
- Die Glykoside, Dr. J. J. I. van Rijn, 363
- An Introduction to the Study of the Comparative Anatomy of Animals, G. C. Bourne, 364
- The Ore Deposits of the United States and Canada, J. F. Kemp, 365
- Physiology for the Laboratory, Bertha Millard Brown, 365
- Michigan Board of Agriculture, Annual Report, 1898-99, 365
- Descriptive and Illustrated Catalogue of the Physiological Series of Comparative Anatomy contained in the Museum of the Royal College of Surgeons of England, 385
- Textbook of Zoology, treated from a Biological Standpoint, Part I., Mammals, O. Schmeil, 386
- The Carbonic Anhydride of the Atmosphere, Prof. E. A. Letts, R. F. Blake, 387
- The Air of Rooms, Francis Jones, 387
- Lamarckiens et Darwiniens; Discussion de Quelques Théories sur la Formation des Espèces, Felix Le Dantec, 388
- Helen Keller, Souvenir, 388
- The Psychology of Reasoning, Alfred Binet, 388
- Electric Batteries, How to Make and Use Them, P. Marshall, 388
- Rechts- und Linkshändigkeit, Dr. Fritz Lueddeckens, W. L. H. Duckworth, 409
- Histology of the Blood: Normal and Pathological, P. Ehrlich and A. Lazarus, Dr. T. H. Milroy, 410
- Biological Lectures from the Marine Laboratory at Woods' Holl, U.S.A., for 1899, 411
- Brief Guide to the Commoner Butterflies of the Northern United States and Canada, Samuel Hubbard Scudder, 411
- Elements of Qualitative Analysis, G. H. Bailey and G. J. Fowler, 412
- Nature in Downland, W. H. Hudson, 417
- The Birds of Cheshire, T. A. Coward and Charles Oldham, 417
- In Birdland with Field-glass and Camera, Oliver G. Pike, 417
- Introduction to Zoology: a Guide to the Study of Animals, for the Use of Schools, C. B. Davenport and Gertrude C. Davenport, 433
- A Handbook of Photography in Colours, Thomas Bolas, Alexander A. K. Tallent and Edgar Senior, 434
- Probleme, Kritische Studien über den Monismus, Dr. H. v. Schoeler, 435
- Diamond Drilling for Gold and other Minerals, G. A. Denny, 435
- Symons' British Rainfall, H. Sowerby Wallis, 435
- The Structure and Functions of Bacteria, Alfred Fischer, Dr. A. C. Houston, 465
- A Walk through the Zoological Gardens, F. G. Aflalo, 466
- From Matter to Man: a New Theory of the Universe, A. Redcote Dewar, Prof. R. Meldola, F.R.S., 493
- Untersuchungen über Philons und Platons Lehre von der Welterschöpfung, Jacob Horowitz, 494

- Fungus Diseases of Citrus Trees in Australia, and their Treatment, D. McAlpine, 494  
 Missouri Botanical Garden, Eleventh Annual Report, 495  
 The Fauna of South Africa: Mammals, Vol. I. Primates, Carnivora and Ungulata, W. L. Sclater, 521  
 Acetylene: a Handbook for the Student and Manufacturer, Vivian B. Lewes, 522  
 Wireless Telegraphy and Hertzian Waves, S. R. Bottone, 522  
 The Ascent of Mount St. Elias (Alaska), H. R. H. Prince  
 Luigi Amedeo di Savoia, Duke of the Abruzzi, 529  
 A Treatise on Zoology, Part III.: the Echinoderma, F. A. Bather, J. W. Gregory, E. S. Goodrich, E. Ray Lankester, F. R. S., 545  
 Illustrations of the Botany of Captain Cook's Voyage Round the World in H. M. S. *Endeavour*, in 1768-71, Right Hon. Sir Joseph Banks and Dr. Daniel Solander, Prof. W. Botting Hemsley, F. R. S., 547  
 Fancy Water-fowl, F. Finn, 547  
 Catalogue of Eastern and Australian Lepidoptera Heterocera in the Collection of the Oxford University Museum, Part ii.: Noctuidae, Geometridae and Pyralidina, Colonel C. Swinhoe; Pterophoridae and Tineina, Right Hon. Lord Walsingham, John Hartley Durrant, 548  
 Sir Stamford Raffles: England in the Far East, H. E. Egerton, 548  
 Pflanzen- und Tierverbreitung, Alfred Kirchoff, Hann, Hochstetter and Pokorny, Dr. Otto Stapf, 569  
 Agricultural Botany, Theoretical and Practical, John Percival, 570  
 Surveying and Exploring in Siam, James McCarthy, 571  
 Church Stretton, Vol. I.: Geology, E. S. Cobbold; Macro-Lepidoptera, F. B. Newnham; Molluscs, Robert A. Buddicom, 571  
 Surveying with the Tacheometer, N. Kennedy, 571  
 The Foundations of Zoology, William Keith Brooks, 593  
 Lehrbuch der Optik, Dr. Paul Drude, 595  
 Year-book of the United States Department of Agriculture, 1899, Prof. R. Warington, F. R. S., 597  
 Lehrbuch der Anorganischen Chemie, Dr. A. F. Holleman, 598  
 Flora of Bournemouth, including the Isle of Purbeck, E. F. Linton, 598  
 Carnations and Picotees for Garden and Exhibition, H. W. Weguelin, 598  
 Symbolism of the Huichol Indians, Carl Lumholtz, Prof. Alfred C. Haddon, F. R. S., 600  
 Xenia, or the Immediate Effect of Pollen in Maize, Herbert J. Webber, 601  
 Memoirs of the Geological Survey of the United Kingdom. The Cretaceous Rocks of Britain, Vol. I.: the Gault and Upper Greensand of England, A. J. Jukes-Browne, Prof. T. G. Bonney, F. R. S., 617  
 The Law and Practice relating to Letters Patent for Inventions, R. W. Wallace, J. B. Williamson, 618  
 Lectures on the History of the Development of Chemistry since the Time of Lavoisier, Dr. A. Ladenburg, 618  
 Untersuchungen über Mikrostrukturen des erstarrten Schwefels nebst Bemerkungen über Sublimation, O. Bütschli, 619  
 Untersuchungen über die Mikrostruktur künstlicher und natürlicher Kieselsäuregallerten (Tabaschir, Hydrophan, Opal), O. Bütschli, 619  
 The School Journey: a Means of Teaching Geography, Physiography, and Elementary Science, Joseph H. Cowham, 619  
 Air, Water and Food, Ellen H. Richards and Alpheus G. Woodman, 620  
 Elementary Physics and Chemistry, R. A. Gregory and A. T. Simmons, 620  
 Principles d'Hygiene Coloniale, Dr. Georges Treille, 620  
 The Antarctic Regions, Dr. Karl Fricker, Dr. Hugh Robert Mill, 624  
 Through the First Antarctic Night, 1898-99, Frederick A. Cook, Dr. Hugh Robert Mill, 624  
 Reynolds (J. E.), Silico-diphenyl diimide and Silicotriphenylguanidine, 215  
 Reynolds (Osborne), Papers on Mechanical and Physical Subjects, 243  
 Rheins (George), Wastage of Electrical Properties of Cables under Continuous Currents, 520  
 Rhinoceros, the White, on the Upper Nile, Oldfield Thomas, 599  
 Rhinoceros-Birds in British East Africa, Change of Feeding-habits of, Captain Hinde, Prof. E. Ray Lankester, F. R. S., 366  
 Rhys (Prof. John), Opening Address in Section H of the British Association, 513  
 Rhythms and Geologic Time, G. K. Gilbert, 275  
 Richards (Ellen H.), Air, Water and Food, 620  
 Richards (Prof. T. W.), the Atomic Weight of Iron, 160; Physico-Chemical Reaction, its Driving Energy and Temperature Coefficients, 351  
 Richardson (F. W.), on Bradford Sewage and its Treatment, 567  
 Richarz (Prof. R.), an Illustration of Doppler's Principle, 35  
 Ries (Dr. H.), the Clays of Alabama, 274  
 Riedel (Dr. Hermann), Atlas of Urinary Sediments, 53  
 Riehl (Alois), Giordano Bruno, zur Erinnerung an den 17 Februar, 1600, 77  
 Righi (Prof. Augusto), Volta e la Pila, 293  
 Right- and Left-Handedness, Dr. Fritz Lueddeckens, W. L. H. Duckworth, 409  
 Rijn (Dr. J. J. I. van), "Die Glykoside," 363  
 Riley (J. W.), Building Construction for Beginners, 125  
 Ring Nebula in Lyra, 425  
 Ripley (William Z.), the Races of Europe, a Sociological Study, 27  
 Ristori (E.), Researches on Modern Explosives, II, 46  
 Ritter (W. E.), *Harrimania Maculosa*, a New Enteropneustum, 579  
 Rivers (Dr. W. H. R.), Genealogical Researches in Torres Straits, 71  
 Rivière (M.), Researches in Presence of Saturated Mercury Vapour, 191  
 Rixon (F. W.), on the Specific Heat of Gases up to a Temperature of 400°, 566  
 Road Locomotion, Prof. Hele-Shaw, F. R. S., 139  
 Robbins (W. C.), Locust Destruction in South Africa, 134  
 Roberts (J. G.), a Remarkable Hailstorm, 341  
 Roberts (Prof. J. P.), the Farmstead, 53  
 Roberts-Austen (Prof. Sir W. C., F. R. S.), Properties of Gold and Copper Alloys, 93  
 Robertson (Sir George), Presidential Address in Section E of the British Association, 590  
 Robin's Nest in Water-can, F. W. Haselgrove, 17  
 Robinson (H. H.), Determination of Minerals in thin Rock-sections, 638  
 Rock-forming Minerals, the Melting Points of, J. A. Cunningham, 368  
 Rock-structures in the Isle of Man and in South Tyrol, Dr. Maria M. Ogilvie Gordon, 7  
 Roger (E.), Greatest Heat of Century, 421  
 Rogers (G. H. J.), Modification of Rousselet (Microscopical) Compressor, 287  
 Röntgen Rays: Mechanical Motions under Influence of Röntgen Rays, L. Graetz, 92; Meeting of Röntgen Society, 179; the American Holtz Machine, 179; Dr. Rémy's Localising Apparatus, 180; Production by Battery Current of, J. Trowbridge, 211; Cadett and Neall's X-Ray Paper, 253; Influence of Spark-gap on Generation of Röntgen Rays, A. Winkelmann, 568  
 Rood (O. N.), Experiments on High Electrical Resistance, 638  
 Rooke (T.), the Daylight Meteor of Sunday, September 2, 524  
 Rooper (T. G.), on the Teaching of Geography in the Elementary Schools of the West Riding, 591  
 Rooms, the Air of, Francis Jones, 387  
 Root-structure, on a Fourth Type of Transition of Stem to, Miss Ethel Sargant, 611  
 Rose (T. K.), Properties of Gold and Copper Alloys, 93  
 Rosenhain (Walter), Crystalline Structure of Metals, 211, 567; on the Making of a Malay "Kris" and on the Malay Method of Producing Chains by Casting, 634  
 Ross (Major Ronald), on Malaria and Mosquitoes, 589  
 Rotation Period of Venus, Prof. A. Belopolsky, 160  
 Rotch (A. Lawrence), High Kite Flight at Blue Hill, 350; on the Use of Kites for Meteorological Observations, 563  
 Roth (H. Ling), on Permanent Artificial Skin Marks, 634; on the Stone Implements of the Natives of Tasmania, 637  
 Rotuma, on Nine Crania Collected by J. Stanley Gardiner during his Expedition to, W. H. L. Duckworth, 633

- Rousdon Observatory, Devon, Sir C. E. Peek, 110; Variable Stars, T Cassiopeiae and R Cassiopeiae, Sir C. E. Peek, 398; Meteorological Observations at, Sir C. E. Peek, 422
- Rowland (Sydney), Influence of Temperature of Liquid Hydrogen on Bacteria, 286
- Royal College of Surgeons, the Centenary of the, Victor Plarr, 294
- Royal Geographical Society, Medal Awards, 34
- Royal Society, 46, 93, 189, 211, 238, 286, 335, 358, 381, 615; Royal Society Selected Candidates, 56; *Conversazione*, 67, 208
- Rubber-cultivation in Samoa, 136
- Rubber Forests in Peru, 578
- Ruhemann (S.), Condensation of Ethyl Acetylenedicarboxylate with Bases and  $\beta$ -Ketonic Ester, 215; Condensation of Phenols with Ethyl Phenylpropionate, 215
- Rumbald's Moor (Near Bradford), on the Prehistoric Antiquities of, Butler Wood, 637
- Rung (William), what Pressure is Dangerous on Electric Railways with Overhead Trolley Wires, 399
- Runge (C.), the Spectrum of Radium, 568
- Rural Wealth and Welfare, Geo. T. Fairchild, 245
- Russell (Alex.), Variation of Condenser and Choking Coil Currents with Shape of Electromotive Wave, 375
- Russell (H. C.), Ocean Current Papers, 108
- Rust of Wheat, Recent Investigations on, William G. Smith, 352
- Sabatier (Paul), Addition of Hydrogen to Acetylene in Presence of Copper, 168; Addition of Hydrogen to Acetylene in Presence of Reduced Iron and Cobalt, 191; Addition of Hydrogen to Acetylene and Ethylene in Presence of Finely-divided Platinum, 264; Action of Reduced Nickel on Acetylene, 312; Action of Finely-divided Metals on Acetylene and Ethylene, 336; Addition of Hydrogen to Ethylene in Presence of Reduced Metals, 240
- Sack (J.), *Monistische Gottes-und-Weltanschauung*, 172
- Sacral Index, on the, Prof. J. D. Cunningham, 633
- St. Christopher, Climate of, W. B. Alexander, 35
- Saint Lawrence Electrical Power Works, 135
- St. Louis Academy of Science, 192
- St. Martin (L. G. de), Hæmoglobin not Estimable by Absorbing Power of Blood, 520
- St. Paul's, the Lightning Conductors of, K. Hedges, 68
- St. Petersburg, Bulletin de l'Académie de, 70, 211
- Salisbury (Prof. R. D.), the Geography of the Regions about Devil's Lake and the Dalles of the Wisconsin, 172
- Salmon Fishery for 1899, the Scotch, 303
- Sambon (Dr.), Mosquitoes and Malaria in the Campagna, 531
- Samoa, Rubber-cultivation in, 136
- Sampson (Miss), Unusual Modes of Development in Batrachia, 605
- San Francisco, Climate of, A. G. McAdie and G. H. Willson, 18
- Sand-binding Plant of the Dunes on the Scotch Coast, near Berwick, the, Prof. Bower, 611
- Sandwich Islands, on the Zoology of the, R. C. L. Perkins, 589
- Sanford (W. A.), Large Puff Balls, 496
- Sap, Ascent of, Dr. Henry H. Dixon, Prof. J. Joly, F.R.S., 572
- Sarawak, Decorative Arts of Sea Dayaks, Prof. A. C. Haddon, F.R.S., 68
- Sarawak, on the Animal Cults of the Natives of, and their Bearing on the Problems of Totemism, Dr. C. Hose, W. McDougall, 634; Mr. Hartland, 635
- Sargent (Miss Ethel), on a Fourth Type of Transition of Stem to Root-structure, 611
- Saturn: Occultation of Saturn, 137, 425; Notes on Saturn and his Markings, W. F. Denning, 237
- Savants Modernes, Pages Choises des, A. Rebière, 6
- Sayce (Rev. A. H.), Babylonians and Assyrians, Life and Customs, 289
- Scale-insects on Fungi found in Ceylon, Growing on, J. Parkin, 613
- Schaer (Ed.), Christian Friedrich Schönbein, 1799-1868, 97
- Schäfer (Prof. E. A., F.R.S.), Lessons in Elementary Physiology, Thomas H. Huxley, LL.D., F.R.S., 363
- Schiebler (Count Felice), Sette Anni di Caccia Grossa é Note di Viaggio in America, Asia, Africa, Europa, 244
- Schloeswig (Th.), Solubility of Calcium Phosphate in Soil-water in presence of Carbon Dioxide, 312
- Schmauss (A.), Anomalous Electro-magnetic Rotatory Dispersion, 335
- Schmeil (O.), Text-book of Zoology, Treated from a Biological Standpoint, 386
- Schmidt (G. C.), Temperature Potential Gradient in Rarefied Gases, 92
- Schoeler (Dr. H. v.), Probleme, Kritische Studien über den Monismus, 435
- Schokalsky (J. de), Area of Basins of Russia in Asia, 408
- Schönbein (Christian Friedrich), 1799-1868, Georg W. A. Kahlbaum, Ed. Schaer, Prof. R. Meldola, F.R.S., 97
- School Journey, the, a Means of Teaching Geography, Physiography, and Elementary Science, Joseph H. Cowham, 619
- Schools, Collateral Heredity Measurements in, Prof. Karl Pearson, F.R.S., 173, 599
- Schools, Percussion Caps for Shooting in, Sir Lauder Brunton, F.R.S., 54
- Shoute (Prof. P. H.), Locus of Centre of Hyperspherical Curvature for Normal Curve of  $n$  Dimensional Space, 232
- Schryver (S. B.), Morphine (1), 260
- Schultz (Dr. J.), *Psychologie der Naturvölker*, 220
- Schwartz (E. H. L.), the Snake-stone, 302; Bushman Drawings, 336
- Science: Science in Relation to Art and Industry, 32; the Grammar of Science, Prof. Karl Pearson, F.R.S., 49; Scientific Papers, Peter Guthrie Tait, Sec. R.S., Prof. Horace Lamb, F.R.S., 99; Some Scientific Aspects of Trade, 117; the International Catalogue of Scientific Literature, 197, 206; England's Neglect of Science, Prof. John Perry, F.R.S., 221; Medicine as a Science, and Medicine as an Art, Dr. P. H. Pye-Smith, F.R.S., 356; Mr. Balfour on Scientific Progress, 358; Forthcoming Books of Science, 558
- Slater (W. L.), the Fauna of South Africa; Mammals, 521
- Scotland: a Bathymetrical Survey of the Fresh-water Lochs of Scotland, Sir John Murray, K.C.B., F.R.S., and Fred P. Pullar, 65, 263; the Salmon Fishery for 1899, 303
- Scott (Dr. D. H., F.R.S.), on the Presence of Seed-like Organs in certain Palæozoic Lycopods, 611; on the Primary Structure of certain Palæozoic Stems referred to *Aracarioxylon*, 612
- Scott (Prof. W. B.), on Recent Explorations in Patagonia, 587; on the Miocene Fauna of Patagonia, 589
- Scripts, on the New, discovered by Arthur J. Evans in Crete, 526, 634
- Scudder (Samuel Hubbard), Brief Guide to the Commoner Butterflies of the Northern United States and Canada, 411
- Sea, the Total Eclipse Observed at, Colonel E. E. Markwick, 183
- Sea Coast Destruction and Littoral Drift, W. H. Wheeler, 400
- Sea-dredging, Building-land made by, 158
- Sea-Dayaks, on the Textile Patterns of the, Dr. A. C. Haddon, 634
- Seals of Kerguelen Island, the Elephant, R. Hall, 628
- Sedgwick (Lieut.-Colonel W.), Railways and Moving Platforms, 436
- See (T. J. J.), Colour Screens for Refracting Telescopes, 37
- Seed-like Organs in certain Palæozoic Lycopods, on the Presence of, Dr. D. H. Scott, F.R.S., 611
- Seeley (Prof. H. G., F.R.S.), an Anomodont Reptile from Bunter Sandstone of Reichen, 94; Theriodont Reptile from Baviaans River, Cape Colony, 262
- Seismology: Elastic Constants of Rocks and Velocity of Seismic Waves, Dr. H. Nagaoka, 36; Action of Horizontal and Vertical Pendulums, Dr. G. Agamennone, 62; Greek Earthquakes, 1893-8, M. Eginitis, 85; Bollettino della Società Italiana Sismologica, 93, 286; the Colaba (Bombay) Observatory, 181; the Great Earthquake of June 12, 1897, R. D. Oldham, 305; Earthquakes of 1897 in Philippines, P. J. Coronas, 555; Report of the Seismological Committee of the British Association, 562; Prof. J. Milne's Report of the Seismological Committee of the British Association, 587
- Self-instruction in the Practice and Theory of Navigation, the Earl of Dunraven, 337
- Sell (W. J.), Aminochloropyridines, 143
- Sella (A.), Evaporation not Productive of Loss of Electricity, 458
- Sellon (R. P.), Standardisation of Electrical Engineering Plant, 135

- Semmola (Prof. E.), Variations with Altitude of Air Potential, 375
- Sendersens (J. B.), Addition of Hydrogen to Acetylene in the Presence of Copper, 168; Addition of Hydrogen to Acetylene in Presence of Reduced Iron and Cobalt, 191; Addition of Hydrogen to Acetylene and Ethylene in Presence of Finely-divided Platinum, 264; Action of Reduced Nickel on Acetylene, 312; Action of Finely-divided Metals on Acetylene and Ethylene, 336; Addition of Hydrogen to Ethylene in Presence of Reduced Metals, 240
- Senior (Edgar), a Handbook of Photography in Colours, 434
- Sensation, the Relation of Stimulus to, Prof. C. Lloyd Morgan, F.R.S., 278
- Serotherapy: a Possible Preventive of African Horse-sickness, Dr. G. C. Purvis, 83; Standardisation of Anti-venomous Serum, W. Myers, 215
- Seurat (L. G.), Morphology of Respiratory Apparatus of Larva of *Bruchus ornatus*, 639
- Seyn Bore, the, Vaughan Cornish, 126
- Sewage: the Bacterial Treatment of Sewage, Dr. Frank Clowes and Dr. Houston, 128; on Bradford Sewage and its Treatment, F. W. Richardson, 567; W. Leach, 568; W. B. Bottomley, 568; on the Relation of *Ulva latissima* to the Pollution of Sea-water by Sewage, Prof. Letts, J. Hawthorn, 611
- Seward (Mr.), on the Climatic and other Physical Conditions under which Coal was formed, 610
- Seward (Prof. A. C., F.R.S.), on the Structure and Affinities of *Dipleris conjugata*, 612
- Sharpe (Dr. Benjamin F.), a New Instrument to Measure and Record Sounds, 80
- Shaw (P. E.), Electric Micrometer, 67
- Shaw (W. N., F.R.S.), the Daily Weather Report of the Meteorological Office, 300
- Shenstone (W. A., F.R.S.), Working Silica in the Oxy-gas Blowpipe Flame, 20
- Sherrington (Prof. C. S., F.R.S.), Experimentation on Emotion, 328
- Shetland Isles, a Vertebrate Fauna of the, A. H. Evans and T. E. Buckley, 75
- Shimizu (S.), a String Alternator, 286
- Ship-building, the Use of Steel in, B. Martell, 90
- Ships, the Steadying of, Prof. G. H. Bryan, F.R.S., 186
- Shooting in Schools, Percussion Caps for, Sir Lauder Brunton, F.R.S., 54
- Shove (Miss R. F.), on the Structure of the Stem of *Angiopteris evecta*, 612
- Shufeldt (Dr. R. W.), Psychology of Fishes, 63
- Siam, Surveying and Exploring in, James McCarthy, 571
- Siboga, the Cruise and Deep-sea Exploration of the, in the Indian Archipelago, 327
- Siderostat and Cœlostast, Orientation of the Field of View of the, A. Fowler, 428
- Sidgwick (Prof. Henry), Death of, 456; Obituary Notice of, 496
- Silica in the Oxy-gas Blowpipe Flame, W. A. Shenstone, F.R.S., and H. G. Lacell, 20
- Silk, Spider, Manufacture in Madagascar, M. Nogue, 17
- Silver, Metallurgy of Lead and, Henry F. Collins, 194
- Simmons (A. T.), Elementary Physics and Chemistry, 620
- Simmonds (C.), Huxley and his Work, 495
- Simon (L. J.), New Pyrogenous Product from Tartaric Acid, 616; Isopyrotaric Acid, 639
- Skeat (W. W.), Malay Magic: being an Introduction to the Folklore and Popular Religion of the Malay Peninsula, 145; Report of the Committee of the British Association on the Natural History and Ethnography of the Malay Peninsula, 636
- Skeleton, Human, on the Developmental Changes in the, from the Point of View of Anthropology, Dr. David Waterson, 633
- Skeletons, Ancient Egyptian, on Perforate Humeri from, Prof. A. Macalister, 633
- Skin Marks, on Permanent Artificial, H. Ling Roth, 634
- Sladen (Walter Percy), Death of, 179; Obituary Notice of, 256
- Smith (Dr. C. A.), the Clays of Alabama, 274
- Smith (G. F. Herbert), Method for Determining Refractive Indices of Minerals of Low Symmetry, 239
- Smith (H. G.), Amyl Ester of Eudesmic Acid in Eucalyptus Oils, 384
- Smith (R. G.), Double Staining of Spores and Bacilli, 640
- Smith (William G.), Recent Investigations on Rust of Wheat, 352
- Smithells (Prof. Arthur), Introduction to Physical Chemistry, James Walker, 76
- Smithsonian Expedition, the Total Solar Eclipse as observed by the, 246
- Smyth (the late Prof. Piazzini), some Notes on his Work in Spectroscopy, Prof. A. S. Herschel, F.R.S., 161
- Smoke Cloud of the North of England and its Influence on Plants, the Great, Albert Wilson, 611
- "Snake-stone," *Plotosus canius* and the, D. Hervey, 79
- Snake-stone, the, E. H. L. Schwartz, 302
- Snake-venom, Captain R. H. Elliott, 180; Standardisation of Anti-venomous Serum, W. Myers, 215; the South Indian Snake-men, Captain R. H. Elliott, 324
- Snake (H. L.), Racemic and Optically Active Forms of Isoamarine, 143
- Snelgrove (Edward), Object Lessons in Botany from Forest, Field, Wayside, and Garden, 53
- Snow-drifts on Ingleborough in July, Prof. T. McKenny Hughes, F.R.S., 389; Prof. T. G. Bonney, F.R.S., 412
- Snyder (V.), Invariant Scrolls in Collineations which leave a Group of Five Points Invariant, 381
- Soames (Laura), Introduction to English, French, and German Phonetics, with Reading Lessons and Exercises, 220
- Sociology: the Races of Europe, a Sociological Study, William Z. Ripley, Prof. A. C. Haddon, F.R.S., 27
- Solander (Dr. Daniel), Illustrations of the Botany of Captain Cook's Voyage Round the World in H.M.S. *Endeavour*, in 1768-71, 547
- Solar Parallax, Determination of, 377
- Solar Radiation, Report of the British Association Committee on Solar Radiation on Experiments conducted by Prof. Callendar on the Modified Copper-cube Actinometer, 562
- Solidification of Alloys, the, Fred. T. Trouton, F.R.S., 523
- Sollas (Prof. W. J., F.R.S.), Opening Address in Section C of the British Association, 481; on a Concealed Coal Field Beneath the London Basin, 587
- Solution Theory Applied to Molten Iron and Steel, John Parry, 128
- Sound Waves, the Photography of, Prof. R. W. Wood, 342
- Sounds, a New Instrument to Measure and Record Sounds, Dr. Benjamin F. Sharpe, 80
- Sources and Properties of Becquerel Rays, Prof. G. H. Bryan, F.R.S., 151
- South African Philosophical Society, 216, 264, 464
- Space, Pseudospherical, Dynamics of, Prof. D. de Francesco, 18
- Species, the Subordination of the Individual to the Welfare of the, 593
- Spectrum Analysis, Comparison of Stellar with Laboratory Spectra, Sir Norman Lockyer, 23; Spectrum of  $\beta$  Lyrae and  $\eta$  Aquilae, O. Belopolsky, 70; Temperature Control of Spectrograph, Prof. W. W. Campbell, 137; some Notes on the late Prof. Piazzini Smyth's Work in Spectroscopy, Prof. A. S. Herschel, F.R.S., 161; the Band Spectrum of Aluminium, G. A. Hemsalech, 335; Spectrum of Radium, Eug. Demarcay, 336; Spectrum of Radium, C. Runge, 568; Influence of Slight Impurities on Argon and Helium Spectra, P. Lewis, 381; Fluorescence and Phosphorescence in Electric Discharge through Nitrogen, P. Lewis, 381; the New Spectrographs for the Potsdam Great Refractor, Prof. C. H. Vogel, 459; Dr. S. P. Langley's Chart of the Infra Red Spectrum from 0.7 to 5.3  $\mu$  obtained by the Bolometric Method, 562; H. Ramage, on a Method of Investigating Correspondence between Spectra, 563; Spectra of Hydrogen and Aqueous Vapour, J. Trowbridge, 568; Spectroscopic Examination of Colour Produced by Simultaneous Contrast, G. J. Burch, 615
- Spencer (Herbert), Genesis of the Vertebrate Column, 620
- Speyers (C. L.), Boiling Point Curves, 92
- Spider-silk Manufacture in Madagascar, M. Nogue, 17
- Spitta (Dr. Edmund J.), Photo-micrography, 4
- Sport and Travel, Notes on, George Henry Kingsley, 5
- Sporting Tour, Count Scheibler's, 244
- Stability of a Swarm of Meteorites and of a Planet and Satellite, the, Prof. A. Gray, F.R.S., 582
- Staffordshire, North, on Rapid Changes in the Thickness and Character of the Coal Measures of, W. Gibson, 587
- Standards for Faint Stellar Magnitudes, 398

- Stanley (Hiram M.), an Outline Sketch, Psychology for Beginners, 245
- Stansfeld (Dr. A.), Present Position of Solution Theory of Carburised Iron, 536
- Stapf (Dr. Otto), Pflanzen- und Tierverbreitung, Prof. Alfred Kirchhoff, 569
- Stapleton (H.), Condensation of Ethyl Acetylenedicarboxylate with Bases and  $\beta$ -Ketonic Ester, 215
- Starch, from Glycollic Aldehyde by Green Plants, on the Formation of, Henry Jackson, 611
- Stark (J.), Change of Conductivity of Gases by Continuous Currents, 211
- Starke (H.), Reflection and Mechanical Effect of Kathode Rays, 639
- Stars: New Variable in Taurus, Madame Ceraski, 19; New Variable in Auriga, Dr. T. D. Anderson, 161; New Variable Star observed in Cepheus, Madame Ceraski, 183; New Variable in Hercules, Madame Ceraski, 305; Variable Stars in Clusters, 352; Rousdon Observatory (Devon), Variable Stars, T Cassiopeiæ and R Cassiopeiæ, Sir C. E. Peek, 398; New Star in Aquila, 305; Catalogue of Double Stars, Prof. S. W. Burnham, 324; New Double Stars, R. G. Aitken, 630; Standards for Faint Stellar Magnitudes, 398
- Stassano (H.), Function of Cell-nucleus in Absorption, 240
- Stather (J. W.), on the Glaciation of the East Riding, 588
- Statistics: Accidents in Coal Mines, Prof. Le N. Foster, 136
- Stallard (G.), Temperature of Recently-killed Chamois, 293
- Stead (J. E.), Iron and Phosphorus, 536
- Steading of Ships, the, Prof. G. H. Bryan, F.R.S., 186
- Steel: the Use of Steel in Shipbuilding, B. Martell, 90; Solution Theory applied to Molten Iron and Steel, John Parry, 128; the Cause of Fracture of Steel Rails, 437
- Steele (B. D.), Diacetylaceton Derivatives, 260
- Steen (A. V.), the Climate of Norway, 457
- Steinmann (Emile), Electromotive Force of Nickel-Steel, 264
- Stem to Root-structure, on a Fourth Type of Transition of, Miss Ethel Sargant, 611
- Stephanos (Prof. Cyparissos), Sur les Relations entre la Géométrie Projective et la Mécanique, 561
- Stevens (J. S.), Measurement of Surface Tension, 568
- Stimulus to Sensation, the Relation of, Prof. C. Lloyd Morgan, F.R.S., 278
- Stirling (James), the Rate of Increase of Underground Heat, 555
- Stock (Alfred), Two New Silicon Borides, 312
- Stokes (H. N.), Structure and Constitution of Two New Meteorites, 459
- Stokes (Sir William), Death and Obituary Notice of, 394
- Stone Age in Borneo, on Relics of the, Dr. A. C. Haddon, 637; Dr. C. Hose, 637
- Stone Implements from Pitcairn Island, J. Allen Brown, 119
- Stone Implements of the Natives of Tasmania, on the, J. Paxton Moir, 636; Prof. E. B. Tylor, 636; H. Ling Roth, 637
- Stones (Witmer), the Eider Duck's Summer Moulting Plumage, 201
- Stoney (Dr. G. Johnstone, F.R.S.), Escape of Gases from Atmospheres, 78, 359
- Storage Battery of Twenty Thousand Cells, Some Results obtained with a, Prof. John Trowbridge, 325
- Strahan (A.), on the Physical Conditions during the Growth of the Coal Measures, 587
- Strasburger (E.), Histologische Beiträge, Heft IV., 28
- Streintz (F.), Electric Conductivity of Pressed Powders, 639
- Stresses, Strength of Ductile Materials under Combined, J. J. Guest, 118
- Stromeyer (C. E.), Mineral Formation in Granite, 84; the Reform of Mathematical Teaching, 523
- Stroud (Prof. W.), Range-finders, 607
- Structure and Constitution of Two New Meteorites, G. P. Merrill, H. N. Stokes, 459
- Stuart-Menteath (Charles G.), Homochronous Heredity and Changes of Pronunciation, 524
- Subterranean Drainage of the Limestone, on the, Rev. W. Lower Carter, A. R. Dwerryhouse, 587
- "Sudd" Cutting on Upper Nile, Effect on Lower River of, 180
- Sugar-canes: the Destruction of the "Moth-bore" Caterpillar, 182
- Sun: the Nature of the Solar Corona, Prof. Geo. Fras. Fitzgerald, F.R.S., 7; Photometry of Corona, April 16, 1893, Prof. H. H. Turner, 86; Automatic Photography of the Corona, Prof. C. Burckhalter, 535; Relation between Solar Activity and Earth's Motion, W. G. Thackeray, 20; Determination of Solar Parallax from Opposition of Eros, Prof. S. Newcomb, 20; the Total Eclipse of the Sun, 54, 132, 398; Charles P. Butler, 54; Sir Norman Lockyer, K.C.B., F.R.S., 104; M. Deslandres, 233; French Observations of the Total Eclipse of the Sun, 183; the Total Eclipse observed at Sea, Colonel E. E. Markwick, 183; the Total Solar Eclipse as observed by the Smithsonian Expedition, 246; Maximum Duration of a Total Solar Eclipse, C. T. Whitmell, 64, 86; Duration of Totality of Solar Eclipses at Greenwich, Chas. T. Whitmell, 269; the Dark Fringes observed during Total Solar Eclipses, V. Ventosa, 86; the Next Total Eclipse of the Sun, 202; the Total Eclipse of the Sun of May 17-18, 1901, J. J. A. Muller, 389; Eclipse Photography, Prof. Francis E. Nipher, 246; Latitude Variation, Earth Magnetism and Solar Activity, Dr. J. Halm, 460; Sunspots and Frost, Alex. B. MacDowall, 599; see also British Association
- Sunderland (A. E.), Electrical Dyeing Machinery, 457
- Sunstroke, the Causes of, E. H. Freeland, 396
- Surface-tension Experiment, a, T. J. Baker, 196; Prof. Henry Bourget, 269
- Surface-tension of Mixtures, on the Creeping of Liquids and on the, Dr. Trouton, 562
- Surgery: Dr. Rémy's Localising Apparatus for Röntgen Rays, 180; the Centenary of the Royal College of Surgeons of England, 294, 331; Victor Plarr, 294; Descriptive and Illustrated Catalogue of the Physiological Series of Comparative Anatomy contained in the Museum of the Royal College of Surgeons of England, 385; Death and Obituary Notice of Sir William Stokes, 394
- Surrey, the Birds of, J. A. Bucknill, 339
- Surveying: Surveying and Exploring in Siam, James McCarthy, 571; Surveying with the Tacheometer, N. Kennedy, 571; on Foreign and Colonial Surveys, E. G. Ravenstein, Colonel Johnson, 590
- Sutherlandshire, on the Plutonic Complex of Cnoc-na-Sróine, J. J. H. Teall, 588
- Sutton (J. R.), the Winds of Kimberley, 35
- Suzuki (Dr. U.), Strontium and Barium unfit to replace Calcium in Plants, 136
- Sweet (Henry), the History of Language, 195
- Swamy (A. K. C.), Ceylon Rocks and Graphite, 239
- Swift and Son's Electric Lamp for Microscopy, 351
- Swifts, the Migration of, Oswald H. Latter, 413; William Andrews, 436
- Swifts' Comet (1892 I.), Prof. W. Pickering, 501
- Swifts' Comet (1894 IV.), 352, 459
- Syllis Vivipara, E. S. Goodrich, 215
- Sylviculture, on British, Samuel Margerison, 611
- Symbolism, Mexican, Carl Lumholtz, Alfred C. Haddon, 600
- Symons (G. J., F.R.S.), the Wiltshire Whirlwind of October 1, 1899, 95
- Symons's British Rainfall, H. Sowerby Wallis, 435
- Symons's Monthly Meteorological Magazine, 93, 335
- Tacheometer, Surveying with the, N. Kennedy, 571
- Tait (Peter Guthrie, Sec. R.S.), Scientific Papers, 99
- Talbot (B.), the Open Hearth Continuous Steel Process, 67
- Tallent (Alexander A. K.), a Handbook of Photography in Colours, 424
- Tansley (A. G.), on the Conducting Tissues of Bryophytes, 612
- Tasmania: a Key to the Birds of Australia and Tasmania, with their Geographical Distribution in Australia, R. Hall, 6; a Large Tasmanian Crab, Alex. Morton, 496; on the Stone Implements of the Natives of Tasmania, J. Paxton Moir, 636; Prof. E. B. Tylor, 636; H. Ling Roth, 637
- Tattooing: on Permanent Artificial Skin Marks, H. Ling Roth, 634
- Taurus, new Variable in, Madame Ceraski, 20
- Taylor (J. B.), Heat of Alloy Formation, 70
- Taylor (F. G.), an Introduction to the Differential and Integral Calculus and Differential Equation, 221
- Teaching of Mathematics, the, Prof. John Perry, F.R.S., 317; Oliver Heaviside, F.R.S., 548
- Teaching, the Reform of Mathematical, Henry Woollen, 436; W. F. Beard, 466
- Teall (J. J. H.), on the Plutonic Complex of Cnoc-na-Sróine, Sutherlandshire, 588



- Technical Education : Extensions of the Dyeing Department of Yorkshire College, 115 ; the Consultative Committee and Technical Education, Prof. J. Wertheimer, 294
- Teeth : the Cause and Prevention of Decay in Teeth, I. Sim Wallace, 149
- Telegraphone, Paulsen's, Louis Olivier, 273
- Telegraphy, Wireless : Maximum Sensitiveness in Coherers, A. Blondel and G. Dobkévitch, 23 ; Wireless Telegraphy from Free Balloon, J. Vallot and J. and L. Lecarme, 95 ; Wireless Telegraphy in French Navy, 396 ; Wireless Telegraphy and Hertzian Waves, S. R. Bottone, 522 ; Human Body as Screen in Wireless Telegraphy, E. Guarini and F. Poncelet, 568
- Telephonographs, the, Herr Paulsen, 61
- Telephony : Recording Telephones, 371 ; Wire Fence Communication in Indiana, 374 ; Telephony by Kites, 578
- Telescopes : Colour Screens for Refracting Telescopes, T. J. J. See and G. H. Peters, 37 ; on the new Form of Refracting Telescope recently erected at Cambridge, A. R. Hinks, 565 ; a Night with the Great Paris Telescope, C. P. Butler, 574
- Temperature Control of Spectrograph, Prof. W. W. Campbell, 137
- Temperature, on the Relation of Radiation to, Dr. Larmor, 562 ; Prof. Fitzgerald, 562
- Temperatures of Recently Killed Chamois, G. Stallard, 293
- Tenacity of Life of the Albatross, Prof. John Perry, F.R.S., 621 ; Captain W. J. Reed, 621
- Tennant (Pamela), Village Notes, and Some Other Papers, 340
- Tesla (Nikola), Recent Electrical Experiments, 116
- Textile Industries, on the Recent Improvements in the, Dr. A. Liebmann, 567
- Textile Patterns of the Sea Dayaks, on the, Dr. A. C. Haddon, 634
- Thackeray (W. G.), Relation between Solar Activity and Earth's Motion, 20
- Theoretical and Physical Chemistry, Part ii., Chemical Statics, J. H. van't Hoff, 245
- Therapeutic Electricity and Practical Muscle Testing, W. S. Hedley, 30
- Thermal Radiation, a Simple Experiment in, Dr. K. T. Fischer, 103
- Thermometry : Gas Thermometry, Dr. P. Chappuis, 214 ; a Comparison of Impure Platinum Thermometers, H. M. Tory, 214 ; the Thermal Properties of Fused Silicas, P. Villard and M. Dufour, 255 ; the Air Thermometer at High Temperatures, L. Holborn and A. Day, 381 ; E. H. Griffiths' Form of Wheatstone Bridge for determining the Freezing Points of Dilute Solutions by Platinum Thermometry, 563 ; the Gas Thermometer at High Temperatures, L. Holborn and A. L. Day, 568
- Thirlmere Reservoir, on the Formation of New Beaches on the Shores of, R. D. Oldham, 588
- Thomas (Miss Ethel N.), on Double Fertilisation in a Dicotyledon *Caltha palustris*, 612
- Thomas (H. H.), Undescribed Trilobites in Oxford University Museum, 262
- Thomas (J. W.), on the Physical Effects of Wind in Towns and their Influence on Ventilation, 563
- Thomas (Oldfield), the White Rhinoceros on the Upper Nile, 599
- Thomas (V.), the Estimation of Thallium, 96
- Thompson (Prof. J. Arthur, F.R.S.), Facts of Inheritance, 331
- Thompson (R. C.), the Reports of the Magicians and Astrologers of Nineveh and Babylon, 51
- Thompson (Prof. S. P.), an Electro-magnetic Experiment, 71 ; "Coma," 118 ; Relative Advantages of Alternate and Continuous Current for General Electrical Supply, with regard to Interference with other Interests, 417
- Thomson (Prof. J. J., F.R.S.), some Speculations as to the Part Played by Corpuscles in Physical Phenomena, 31
- Thomson (James), Death and Obituary Notice of, 83
- Thorn (Arthur S.), Functions of an Organ of a Larva of the Puss Moth, 389
- Thorp's (Thos.), Modification of Prof. Wood's Diffraction Process of Colour Photography, 580
- Thorpe (J. F.), Ethyl Sodio- and Methylsodio-cyanacetates, 143 ; the  $\alpha$ - $\beta$ -tetramethylglutaric acids, 143 ;  $\beta$ -isopropylglutaric Acid and *Cis*- and *Trans*-methylisopropylglutaric Acids, 143 ; New Series of Pentamethylene Derivatives (1) 261 ; Action of Sodium and Methyl Iodide on Ethyl Dimethylbutanetricarboxylate, 261
- Thorpe (Dr. T. E., F.R.S.), Pottery and Plumbism, 42 ; Report of Government Laboratory, 499 ; Writing Ink, 554
- Thoulet (J.), Fixation of Clay in Suspension in Water by Porous Bodies, 191
- Threlfall (R.), on Mr. E. H. Griffiths' Form of Wheatstone Bridge for Determining the Freezing Points of Dilute Solutions by Platinum Thermometry, 563
- Tibet, the High Level Flora of, W. B. Hemsley, 46
- Tidal Waters, the Reclamation of Land from, Alexander Beazeley, 266
- Tiddeman (R. H.), on the Formation of Reef-knolls, 587 ; on the Raised Beach of Gower in South Wales, 588
- Tides, a Partial Explanation of some of the Principal Ocean, R. A. Harris, 258
- Tidswell (Dr. Frank), Rats and Plague, 273
- Tiger Beetle, the, Fred. Enock, 208
- Timiriazeff (Prof. Clement), Chlorophyll a Sensitiser, 102
- Tobacco, 576
- Todd (Prof.), on the Application of the Electric Telegraph to the Furtherance of Eclipse Research, 565 ; on Operating Eclipse Instruments Automatically, 565 ; on the Use of a Wedge of Yellow Optical Glass in giving Correctly Graduated Photographic Exposures of the Partial Phases of an Eclipse and the Corona, 565
- Toepler (Prof. Max), Globe Lightning, 350
- Tommasi-Crudeli (Prof. Corrado), Death and Obituary Notice of, 228
- Torpedo-fish, Beiträge zur Physiologie des Elektrischen Organes der Zitterrochen (Torpedo), Siegfried Garten, 290
- Torres Straits, Genealogical Researches in, Dr. W. H. R. Rivers, 71
- Tory (H. M.), a Comparison of Impure Platinum Thermometers, 214
- Totemism, on the Animal Cults of the Natives of Sarawak and their bearing on the Problems of, Dr. C. Hose, W. McDougall, 634 ; Mr. Hartland, 635
- Tour through Great Britain in 1727, a, S. L. Petty, 496
- Touren (Charles), Solubility of Mixture of Salts having Common Ion, 72
- Townsend (J. S.), the Conductivity produced in Gases by the Motion of Negatively-charged Ions, 340
- Toxicology : *Plotosus caninus* and the "Snake-stone," D. Hervey, 79 ; the Poison of *Lotus Arabicus*, W. R. Dunstan, F.R.S., and T. R. Henry, 238
- Trade, some Scientific Aspects of, 117
- Transactions of American Mathematical Society, 260, 519
- Transbaikalian Railway, the, 253
- Transit of Venus, Jeremiah Horrocks and the, 257
- Traquair (Ramsay H., F.R.S.), Opening Address in Section D of the British Association, 502
- Travel, Notes on Sport and, George Henry Kingsley, 5
- Treille (Dr. Georges), Principes D'Hygiene Coloniale, 620
- Trembling of the Aspen Leaf, the, Henry J. Colbourn, 436
- Triangulation, Acoustical, A. J. Mundy, 422
- Tripet (M.), Action of High Frequency Currents on Elementary Respiration, 240
- Trolley Wires, Overhead, What Pressure is Dangerous on Electric Railways with, William Rung, 399
- Trouton (Fred. T., F.R.S.), the Solidification of Alloys, 523
- Trouton (Dr.), on the Creeping of Liquids and on the Surface Tension of Mixtures, 562
- Trow (Prof.), on the Biology and Cytology of Pythium, 613
- Trowbridge (Prof. John), Production by Battery Currents of X-rays, 211 ; some Results obtained with a Storage Battery of Twenty Thousand Cells, 325 ; Spectra of Hydrogen and Aqueous Vapour, 568
- Tschirch (A.), Die Harze und die Harzebehälter, 316
- Tucker (R.), the London Mathematical Society, 294
- Tunis : Vification dans les Pays Chauds—Algérie et Tunisie, J. Dugast, 74
- Tunnels, the Great Alpine, Francis Fox, 281
- Tunncliffe (Prof. F. W.), the Opening of the Medical Schools, 572
- Turbellarien, Monographie der, ii., Tricladida Terricola (Land-planarien), Prof. Ludwig von Graff, F. W. Gamble, 241
- Turbine System, Parson's Steam, H.M.S. *Viper*, 322
- Turner (Prof. H. H.), Photometry of Corona, April 16, 1893, 86 ; Oxford University Observatory, 110 ; on a Cheap Form

- of Micrometer for determining Star Positions on Photographic Plates, 565; on Preparations for Determining the Solar Parallax by Observations of Eros, 565
- Turner (Sir Wm., F.R.S.), Craniology of Indian Hill Tribes, 263; Inaugural Address at the Bradford Meeting of the British Association, 440
- Taylor (Prof. E. B.), on the Stone Implements of the Natives of Tasmania, 636
- Type Specimens, on the Registration of, Rev. J. F. Blake, 587
- Tyrer (C. T.), American, Russian and French Turpentine and Terenenes, 322
- Tyrol, South, Rock-structures in the Isle of Man and in, Dr. Maria M. Ogilvie Gordon, 7
- Udall (W.),  $\beta$ -Isopropylglutaric Acid and *Cis*- and *Trans*-Methylisopropylglutaric Acid, 143
- Uhlenhuth (Dr. R.), Preparation of Free Hydroxylamine, 376
- Ujfalvy (C. de), the White Huns, 323; Craniology of Irano-Indians, 351
- Ullswater, on the Mode of Formation of the Basal Carboniferous Conglomerate of, R. D. Oldham, 588
- Ulrich (Prof. G. H. F.), Death and Obituary Notice of, 272
- Ulva latissima*, on the Relation of to the Pollution of Sea-water by Sewage, Prof. Letts, J. Hawthorn, 611
- Ulva latissima*, on the Effect of Salts on the CO<sub>2</sub> Assimilation of, E. A. Newell Arber, 611
- Umberto, King, a Recollection of, Prof. W. E. Ayerton, F.R.S., 320
- Umow (N.), Objective Presentation of Properties of Polarised Light, 211
- Underground Heat, the Rate of Increase of, James Stirling, 555
- United States: Chemistry in the United States, Prof. Chandler, 301; the Ore Deposits of the United States and Canada, J. F. Kemp, 365; Biological Lectures from the Marine Laboratory at Woods' Holl for 1899, 411; Brief Guide to the Commoner Butterflies of the Northern United States and Canada, Samuel Hubbard Scudder, 411; Pisciculture in the United States, Dr. Whitten, 423; Disastrous Hurricane in the United States, 489; Year-book of the United States Department of Agriculture, Prof. R. Warington, F.R.S., 597
- Units at the International Electrical Congress, 414
- Universe, from Matter to Man, a New Theory of the, A. Redcote Dewar, Prof. R. Meldola, F.R.S., 493
- Universities: University Intelligence, 22, 45, 69, 91, 118, 141, 165, 188, 209, 238, 259, 284, 311, 334, 380, 431, 463, 492, 519, 543, 591, 614, 638; University of Birmingham, 141; a Modern University, 184, 203; the New Physical Laboratory at Owens College, 250; the New Senate of the University of London, Rev. Dr. A. Irving, 549
- Unveiling of the Huxley Memorial Statue, the, 10
- Ursprung der Kultur, der, L. Frobenius, 101
- Urinary Sediments, Atlas of, Dr. Hermann Riedel, 53
- Vaes (F. J.), Valve Motions of Engines, 31
- Vallot (J. and H.), the Proposed Mont Blanc Railway, 62
- Vallot (J.), Wireless Telegraphy from Free Balloon, 95
- Valve Motions of Engines, F. J. Vaes, 31; Prof. John Perry, F.R.S., 31
- Variable Stars: New Variable in Taurus, Madame Ceraski, 19; New Variable Star observed in Cepheus, Madame Ceraski, 183; New Variable in Hercules, Madame Ceraski, 305; New Variable in Auriga, Dr. T. D. Anderson, 161; Variable Stars in Clusters, 352; Rousdon Observatory (Devon); Variable Stars, T Cassiopeiae and R Cassiopeiae, Sir C. E.) Peck, 398
- Variation in Plants of the Herb Paris, Miss L. Eleanor Jex-Blake, 174
- Vaubel (Dr.), the Phenyl Derivative of Diimide, 255
- Velocities of Meteors, Dr. W. L. Elkin, 398
- Ventilation, on the Physical Effects of Wind in Towns and their Influence on, J. W. Thomas, 563
- Ventosa (V.), the Dark Fringes observed during Total Solar Eclipses, 86
- Venturi (M.), Manganous Fluoride, 47
- Venus: Rotation Period of Venus, Prof. A. Belopolsky, 160; Jeremiah Horrocks and the Transit of Venus, 257
- Verrill (A. E.), Geology of Bermudas, 92
- Vertebrates: Vertebrate Fauna of the Shetland Isles, A. H. Evans and T. E. Buckley, 75; New Subdivision in the Vertebrates, Dr. Fürbinger, 397; the Origin of Vertebrates, Deducd from Study of Ammocetes, Dr. Gaskell, 423; *Harrimania maculosa*, a New Enteropneustum, W. E. Ritter, 579; Genesis of the Vertebrate Column, Herbert Spencer, 620
- Vesuvius's Increased Activity due to Exceptional Rainfall, Dr. G. de Lorenzo, 605
- Vibrissae on the Fore-paws of Mammals, Frank E. Beddard, F.R.S., 523
- Vienna, Jubilee of the Imperial Geological Institute of, 258
- Vignon (Léo), the Nitrocelluloses, 520; Reduction of Nitrocellulose, 544; Oxycelluloses from Cotton, Flax and Hemp, 592; Acetyl Derivatives of Cellulose and Oxycellulose, 616
- Village Notes, and some other Papers, Pamela Tennant, 340
- Villard (P.), an Electrical Experiment of M. Jaumann, 47; the Radium Radiation, 47; the Kathode Rays, 191; Discontinuity of Kathodic Emission, 240; Permeability of Fused Silica to Hydrogen, 240; the Thermal Properties of Fused Silica, 255
- Villiaume (M.), the Carboniferous Strata of Nossi-Bé, 168
- Villiger (Herr), the New Hydride of Benzoylsuperoxide, 202; the Action of Permanganate on Hydrogen Peroxide, 629
- Vines (Prof. S. H., F.R.S.), Opening Address in Section K of the British Association, 536
- Vinification dans les Pays Chauds—Algérie et Tunisie, J. Dugast, 74
- Violle (J.), Actinometric Observations during Solar Eclipse of May 28, 1900, 216
- Viper, H.M.S., 322
- Viscosities of Mixtures of Liquids, Dr. C. H. Lees, 166
- Viscosity of Gases as affected by Temperature, Lord Rayleigh, F.R.S., 287
- Viscosity of Essential Oils, the, E. Dowzard, 322
- Viticulture: Vinification dans les Pays Chauds—Algérie et Tunisie, J. Dugast, 74
- Vogel (Prof. H. C.), the New Spectrographs for the Potsdam Great Refractor, 459
- Volcanoes: New Zealand Volcanoes, Dr. B. Friedländer, 180; Increased Activity of Vesuvius due to Exceptional Rainfall, Dr. G. de Lorenzo, 605
- Volta e la Pila, Prof. Augusto Righi, 293
- Vorlesungen über hydrodynamische Fernkräfte nach C. A. Bjerknes' Theorie, V. Bjerknes', Prof. G. H. Bryan, F.R.S., 3
- Vries (Hugo de), Mutability of *Oenothera Lamarckiana*, 592
- Vuillemin (Prof.), on the *Azygospores* of *Entomophthora gloeospora*, 613
- Wagner (Harold), the Eyespot in *Euglena*, 605; on the Behaviour during Karyokinesis of the Nucleolus in the Root-apex of *Phaseolus*, 612; on a Demonstration of the Structure and Attachment of the Flagellum in *Euglena viridis*, 612
- Waite (E. R.), *Leptocephalus* Young of Conger Eel, 324
- Wales, North, on the Ancient Penplains in, E. Greenley, 587
- Wales, South, on the Raised Beach of Gower in, R. H. Tiddeman, 588
- Waldfisch Bay, Mud Island in, 336; Mr. Cleverley, 464
- Walk through the Zoological Gardens, a, F. G. Aflalo, 466
- Walker (C.), New Series of Pentamethylene Derivatives (I.), 261
- Walker (James), Introduction to Physical Chemistry, 76
- Wallace (J. Sim), the Cause and Prevention of Decay in Teeth, 149
- Wallace (R. W.), the Law and Practice relating to Letters Patent for Inventions, 618
- Waller (Dr. A. D., F.R.S.), Electrical Effect of Light on Green Leaves, 358; Electrical Determination of Last Sign of Life, 492
- Wallis (H. Sowerby), Symons' British Rainfall, 435
- Wallon (E.), *Leçons d'Optique Géométrique à l'Usage des Élèves de Mathématique Spéciale*, 30
- Walmisley (A. T.), on the Use of Expanded Metal in Concrete, 610
- Warburg (E.), Point Discharges, 335
- Ward (Prof. H. Marshall, F.R.S.), *Allgemeine Biologie*, Prof. Dr. Max Kassowitz, 217; Embryonic Tissues, 611
- Ward (James), Naturalism and Agnosticism, 25
- Ward (L. F.), the Arizona Chalcedony Park, 62

- Warington (Prof. R., F.R.S.), Obituary Notice of Sir John Bennet Lawes, Bart., F.R.S., 467; Year-book of the United States Department of Agriculture, 597
- Washington (H. S.), the Statement of Rock Analyses, 286
- Water, Air, Water and Food, Ellen H. Richards, Alpheus G. Woodman, 620
- Water upon Glass, the Action of, Edmund F. Mondy, 246
- Water-fowl, Fancy, F. Finn, 547
- Water Supply, on the Distribution of Chlorine in West Yorkshire, and on the Limiting Standard of Acidity for Moorland Waters, W. Ackroyd, 566
- Waterhouse (General), Action of Light on Silver as demonstrated by Vapour condensation, 254
- Waterson (Dr. David), on the Developmental Changes in the Human Skeleton from the Point of View of Anthropology, 633
- Watson (J.), on the Nidd Valley Waterworks of Bradford, 609
- Wealden Series, English, on the Evidence as to the Age of the, G. W. Lamplugh, 588
- Weapons and Wounds, H. Nimier and Ed. Laval, 313
- Weather, Drunkenness and the, Dr. Edwin G. Dexter, 31
- Weather Report of the Meteorological Office, the Daily, W. N. Shaw, F.R.S., 300
- Weather Service, Maryland, 292
- Weaving, Mechanism of, T. W. Fox, 29
- Webb (Wilfred Mark), Plant Hybrids, 174
- Webber (Herbert J.), Further Investigations of *Xenia* in Maize, 601
- Weguelin (H. W.), Carnations and Picotees for Garden and Exhibition, 598
- Weiss (Prof. F. E.), on a Gymnosporangium from China, 613
- Wellcome Research Laboratories, the, R. J. Friswell, 271
- Wertheimer (A.), American, Russian and French Turpentine and Terebenes, 322
- Wertheimer (Prof. J.), the Consultative Committee and Technical Education, 294
- West (J. H.), Persulphuric Acid, 215
- Westermarck (Dr. E.), the Ginn in Morocco, 499
- Wethey's (E. R.) Method of Teaching Geography, 591
- Whale, Southern Bight (South Africa), Barnacle Growth on, Dr. R. Marloth, 19
- Whales, Body Temperature of, Dr. G. Guldberg, 159
- Wheat, Rust of, Recent Investigations on, William G. Smith, 352
- Wheeler (W. H.), Sea Coast Destruction and Littoral Drift, 400
- Whetham (Mr.), Ions, 564
- Whipple (R. S.), Improved Standard Resistance Coils, 563
- Whips of the Larva of the Puss Moth, Function of the, W. F. Kirby, 413
- Whiteley (M. A.), Oxime of Mesoxamide, 260
- Whitmell (C. T.), Maximum Duration of a Total Solar Eclipse, 64, 86; Duration of Totality of Solar Eclipses at Greenwich, 269; on the Duration of Totality of the Solar Eclipse of May 28, 1900, 566
- Whittaker (E. T.), Report on the Proceedings in Section A (Mathematics) at the Meeting of the British Association, 561
- Whitten (Dr.), Pisciculture in United States, 423
- Whymper (Edward), the Highest Andes, 38
- Wiglesworth (L. W.), Racket Feathers, 54
- Wilczynski (E. J.), Continuous Binary  $\Delta$  Linearoid Groups, 381
- Williams (J. Lloyd), on the Germination of the Zoospore in Laminariceæ, 613; Dictyota, 613
- Williamson (J. B.), the Law and Practice relating to Letters Patent for Inventions, 618
- Willis (Dr. J.), on the Construction of Magic Squares, 561
- Willows (R. S.), Experiments on Striated Discharges, 240
- Wills (A. P.), Magnetic Screening for Galvanometers, 211
- Willson (D. H.), the Climate of San Francisco, 18
- Wilson (Albert), the Great Smoke Cloud of the North of England and its Influence on Plants, 611
- Wilson (C. T. R.), Atmospheric Electricity, 149
- Wilson (E.), on the Glacial Phenomena of the West Riding, 588
- Wilson (Dr. Gregg), Eggs and Embryos of *Ornithorhynchus*, 589
- Wilson (W. E.), Astronomical Work at Daramona Observatory, 630
- Wind, Anemometer Tests, Prof. C. F. Marvin, 280
- Wind-force, 93
- Winkelmann (A.), Influence of Spark-gap on Generation of Röntgen Rays, 568
- Wire Fence Telephony in Indiana, 374
- Wireless Telegraphy: Maximum Sensitiveness in Coherers, A. Blondell and G. Dobkévitch, 23; Wireless Telegraphy from Free Balloon, J. Vallot and J. and L. Lecarme, 95; Wireless Telegraphy in French Navy, 396; Wireless Telegraphy and Hertzian Waves, S. R. Bottoone, 522; Human Body as Screen in Wireless Telegraphy, E. Guarini and F. Poncelet, 568
- Wisconsin, the Geography of the Regions about Devil's Lake and the Dalles of the, Prof. R. D. Salisbury, W. W. Atwood, 172
- Wislicenus (W. F.), Astronomischer Jahresbericht, 553
- Wolff (Jules), a New Indicator in Acidimetry, 23
- Wood (Butler), on the Prehistoric Antiquities of Rumbald's Moor (near Bradford), 637; on the Preservation of Local Antiquities, 637
- Wood (Prof. R. W.), Application of Striae Method to Illumination of Objects, 166; the Photography of Sound Waves, 342; Thos. Thorp's Modification of Wood's Diffraction Process of Colour Photography, 580
- Woods' Holl, U.S.A., Biological Lectures from the Marine Laboratory at, for 1899, 411
- Woodall (H. J.), on the Determination of Successive High Primes, 561
- Woodhead (T. W.), on the Structure of the Root-nodules of *Alnus glutinosa*, 613
- Woodman (Alpheus G.), Air, Water and Food, 620
- Woolen (Henry), the Reform of Mathematical Teaching, 436
- Working Silica in the Oxy-gas Blowpipe Flame, W. A. Shentstone, F.R.S., and H. G. Lacell, 20
- Worms: the "Tall Army Worm," F. H. Chittenden, 109; *Syllis Vivipara*, E. S. Goodrich, 215; Didymorchis, Prof. W. A. Haswell, F.R.S., 640
- Worsdell (W. C.), on the Origin of Modern Cycads, 612
- Worthington (Prof. A. M., F.R.S.), an Optical Phenomenon, 293
- Wounds, Weapons and, H. Nimier and Ed. Laval, 313
- Writing in Ancient Egypt, on the System of, F. Ll. Griffiths, 634
- Writing Ink, Dr. T. E. Thorpe, 554
- Wyatt (C. W.), British Birds, 100
- Xenia* in Maize, Further Investigations of, Herbert J. Webber, 601
- Xingu, Second Expedition to Head Waters of, Dr. Hermann Meyer, 36
- Yatabe (Prof. Kyokichi), Death of, 15
- Yates (J.), Brazilin (iv.), 71; Hæmatoxylin (v.), 71
- Yorkshire: Extension of the Dyeing Department of Yorkshire College, 115; on the Distribution of Chlorine in West Yorkshire, and on the Limiting Standard of Acidity for Moorland Waters, W. Ackroyd, 566; on the Potholes and Caves of the Mountain Limestone District of North-west Yorkshire, S. W. Cuttriss, 587; on the Glacial Phenomena of the West Riding, Dr. Monckman, E. Wilson, A. Jowett, H. B. Muff, 588; on the Glaciation of the East Riding, J. W. Stather, 588; on the Anthropology of West Yorkshire, Dr. John Beddoe, 635; on some Yorkshire Earthworks, Mrs. Armitage, 637
- Young (Mr.), the Nest-building Brook Lamprey, 500
- Young (Prof. S.), the Law of Caillelet and Mathias and the Critical Density, 214
- Young (W. J.), the  $\alpha$ - $\beta$ -tetramethylglutaric Acids, 143
- Yule (G. U.), Correlation between Life-duration and Number of Offspring, 381
- Zeiller (R.), *Eléments de Paléobotanique*, 315
- Zenker (Wilhelm), *Lehrbuch der Photochromie (Photographie der Natürlichen Farben)*, 316
- Zeppelin's (Count von), Navigable Balloon, 180, 231, 396, 626
- Zoology: Zoological Society, 94, 119, 261; Reports for 1899, 16; Barnacle-growth on Southern Bight Whale, Dr. R. Marloth, 19; Additions to Zoological Gardens, 19, 37, 61, 64, 85, 110, 137, 160, 183, 202, 233, 256, 275, 304, 324, 351, 376, 397, 425, 459, 491, 501, 534, 556, 581, 606, 629; a Walk through the Zoological Gardens, F. G. Aflalo, 466; the Sub-species of Giraffe, 35; the Wood Bison, J. A.





A WEEKLY ILLUSTRATED JOURNAL OF SCIENCE.

“To the solid ground  
Of Nature trusts the mind which builds for aye.”—WORDSWORTH.

THURSDAY, MAY 3, 1900.

MOUNT ST. ELIAS.

*La spedizione di sua Altezza Reale il Principe Luigi Amedeo di Savoia, Duca degli Abruzzi al Monte Sant'Elia (Alaska) 1897.* Da Dottore Filippo de Filippi; illustrata da Vittorio Sella. Pp. xvii + 273; with 34 plates, 4 panoramic views, 2 maps and 115 figures in text. A beneficio delle Guide Alpine Italiane. (Milano: U. Hoepli, 1900.)

MOUNT ST. ELIAS, with an altitude, as now ascertained, of 18,092 feet, stands—a majestic corner-post—exactly at the angle where the Alaskan boundary-line ceases to run parallel to the coast and strikes northward along the 141st meridian, and its summit is now generally acknowledged to lie on the Canadian side of the frontier. Whether it maintain its supposed pre-eminence among the mountains of the North American continent, or whether it eventually prove to be overtopped by Mount Logan, its great neighbour on the north, or, as the most recent explorations seem to indicate, by Mount McKinley, one of the yet unvisited peaks to the westward, it must, from its commanding position on the verge of the open ocean, always impress the imagination as the grandest of the Alaskan Chain. In recalling the fact that the mountain was for long erroneously supposed to be a volcano, Mr. Douglas Freshfield has told us, on the authority of the poet himself, that Tennyson had Mount St. Elias in mind when he described the landscape of a volcano among snow as one of the pictures on the walls of “The Palace of Art” (see *The Alpine Journal*, vol. xix. p. 174).

So far as our present knowledge goes, nowhere else on the face of the globe is there so great a vertical range of snow and ice as among these Alaskan mountains. On Mount St. Elias the permanent snow-line comes down to within about 3000 feet of the sea, while the enormous glaciers nourished by the excessive humidity of the climate not only descend to sea-level, but unite and spread out in a vast plain of ice covering an estimated area of 1500 square miles between the foot of the mountain and the ocean.

Thus entrenched in ice sheets, so that even its base is defended, it is not surprising that the mountain withstood several attacks before it was conquered. The first attempt was made, in 1886, by Messrs. Libbey, Schwatka and Seton-Karr; the next, in 1888, by Messrs. Topham, Broke and Williams; the third and fourth, by Prof. I. C. Russell, in 1890 and 1891; and the fifth, by Prof. H. G. Bryant, in 1897, almost simultaneously with the successful Italian expedition. Of these explorers, Prof. Russell achieved in every way the most important results, bad weather alone preventing his complete success in 1891, after an altitude of 14,500 feet had been attained and the practicability of the ascent had been demonstrated. Prof. Russell correctly determined the height of the mountain, and carried out investigations upon its physical characteristics which proved of high scientific importance. Lieut. Seton-Karr had previously called attention to the singular condition of the glaciers at the foot of the mountain, where immense piles of morainic debris, in places overgrown with dense vegetation, hide the marginal surface of the ice; but it was not until Prof. Russell published his more adequate descriptions that geologists fully recognised the value of the phenomena of the “piedmont” ice in elucidating the conditions of ice-covered lowlands in general during the Glacial Period, and especially during its closing stages. So closely has Prof. Russell's name become associated with the mountain, that one cannot stifle a regret that the satisfaction of being first upon the summit did not fall to his lot. In the volume before us, however, we are glad to find a graceful acknowledgment of the work of previous explorers, in a chapter having for its motto this quotation, from Mr. D. Freshfield:—

“Those who went first and opened the way are not less entitled to credit than those who came afterwards and reaped the fruit of their predecessors' labours.”

The leader of the Italian expedition, H.R.H. Prince Louis of Savoy, in planning an ascent higher than the Alps could offer, had at first contemplated an attack upon one of the great peaks of the Himalayas. Forced by unfavourable circumstances to abandon this idea, he turned for consolation to Mount St. Elias. He could not have selected a more princely amusement, or a better exercise in skilful organisation and patient endurance. That he

achieved his object without mishap, and that he and his little band of fellow-countrymen had the patriotic satisfaction of planting the Italian flag on a summit assuredly never before trodden by the foot of man, was due to the careful forethought with which all the preliminary arrangements of the expedition were planned.

A graphic account of the ascent was communicated by one of the party, Dr. Filippo de Filippi, to the English Alpine Club a few months afterwards, and was published in the *Alpine Journal* for May 1898. As chronicler of the expedition, Dr. Filippi has now expanded his story in the handsome and portly volume before us, in which he deals at full length with the conditions of the climb, and describes in glowing language the wild grandeur of the scenery. The beautiful photogravure plates and the illustrations in the letterpress, with which the book is so bountifully provided, are reproduced from photographs taken, for the most part, by Vittorio Sella, who was also of the party, and these are especially valuable as a faithful and permanent record of the physical characters of this seldom-visited region, and particularly of the untraversed wilderness of snow and mountain peaks to the northward of St. Elias. Among many that are excellent, there is one plate (p. 136), showing the snowy eastern spurs of St. Elias delicately fluted by innumerable avalanches, which seems to us peculiarly impressive.

Of the ten chapters of the book, only five deal with the actual ascent; the first three, and also the final chapter, are devoted to the outward and homeward journeys; the fourth to the previous history of the mountain; and appendices, covering seventy-four pages, to the equipment and scientific results of the expedition.

As Russell had foretold, the mountaineering difficulties encountered during the climb were slight, and the adventure resolved itself into a long, arduous struggle upward for thirty days, usually in wretched weather, over interminable snow-fields and glaciers. The character of the climb was pithily given by one of the guides, in answer to inquiries after his return:—"C'est comme le Breithorn, seulement beaucoup plus haut." The expedition, consisting of the Prince with four compatriots, five Italian guides, and ten Americans who acted as porters, landed safely near Point Manby, at the foot of the moraine of the Malaspina ice-field, on the evening of June 23, and on July 1 started forward across the ice, all subsequent encampments being upon snow. Traversing the Malaspina in three days, partly in dense fog, the party struck upward along the eastern flank of its great tributary the Seward Glacier, which was afterwards crossed, and the Agassiz Glacier gained, at an altitude of only 3480 feet, by Russell's previous route through the Dome Pass, on July 13. Thence the explorers forced their way slowly up the Newton Glacier, through labyrinths of crevasses and ice-falls, for thirteen days, of which only three were fine. Fortunately the fog and snow which fell to their lot were unaccompanied by either wind or electrical disturbance; nor did the party suffer from cold, the temperature ranging steadily between 25° and 35° F. Their progress along this glacier averaged only about 1 mile 500 yards daily. At this stage they received news that the expedition led by Prof. Bryant, which had set out a few days ahead of them, had been compelled to

return to the coast owing to the illness of one of its members, after having reached the foot of the Newton Glacier.

The Italians were greatly impressed with the vivid colouring of the névé and ice even in the thickest weather, the tints ranging from brilliant turquoise and azure to the deepest blue, without the greenish tinge familiar to them in the Alps. This and the weird atmospheric effects in these mountain solitudes are eloquently described by Dr. Filippi.

Having left the American porters behind, and established their advance camp on the col at the head of the Newton valley, at an altitude of 12,287 feet, the success of the mountaineers depended solely upon the weather. Fortunately this proved more favourable than at the lower elevations, and they were able, without delay, to attack the summit. It was absolutely calm and clear on July 31, when after a heavy climb of 5800 feet from their last bivouac, during which the majority of the party were more or less affected by mountain-sickness, the Prince and his comrades reached the crest just before noon. The thermometer registered a temperature of 10.5° F., and the barometer stood at 15 inches 15 lines. The height of the mountain as determined by the barometer was 18,092 feet, which is in remarkably close agreement with Russell's figures, 18,100 feet, obtained by triangulation.

From the summit they saw the majestic mass of Mount Logan to the north-eastward, sinking north-westward into a very intricate lower chain, while to the westward was a chaos of low ridges, névés and glaciers, overtopped at a distance of some hundred miles or so by three great snowy giants as yet unexplored, which proffer substantial work for the future.

Then came the descent and the return to the coast, which was safely reached in ten days. Some of the lower ridges overlooking the Malaspina Glacier, where they had previously found snow, were now knee-deep in blossoming plants.

The appendices to the volume are, from a scientific standpoint, not particularly important. The first describes the equipment of the expedition in detail, and should be of service to explorers of similar regions. The excellent plan was adopted of packing the supplies in tin boxes, each containing sufficient material of every kind for twenty-four hours. The second appendix consists of meteorological tables, giving the simultaneous observations made daily between June 25 and August 3 by the expedition, and by the Rev. C. J. Hendricksen, of the Swedish Mission at Yakutat, at the foot of the mountain. The third deals with the health of the party. The absence of colds, rheumatism, or other ill results from the trying conditions of the journey is made the subject of comment; and the symptoms which effected most of the explorers during the final stages of the ascent are fully discussed, but it is thought that these might be in part attributed to excitement and want of sleep. The only case of real illness was that of one of the American porters, who, after having passed a night, during the return, on ground covered by vegetation, on the Hitchcock Hills, was seized with an attack of malaria while crossing the Malaspina Glacier. The terrible plague of mosquitoes on the coastal strip of forest is especially

mentioned. Another appendix, on the zoological material, is principally devoted to the description of a new arachnid and of a new oligochaete annelid collected on the snow. An appendix on the rocks and minerals is for the most part a discussion of Russell's previous work, but contains the information that the outcrops near the summit of the mountain consist of typical diorite passing locally into hornblende.

The ascent of Mount St. Elias was an achievement worthy of a prince, and this handsome volume is worthy of the achievement. Beautifully printed, magnificently illustrated and tastefully bound, it reflects credit upon all concerned in its production. But (alas! the inevitable but!) it has no index. G. W. L.

#### A HYDRODYNAMICAL THEORY OF ACTION AT A DISTANCE.

*Vorlesungen über hydrodynamische Fernkräfte nach C. A. Bjerknæs' Theorie.* Von V. Bjerknæs. Band i. Pp. 338; with 40 figures. (Leipzig: Johann Ambrosius Barth, 1900.)

THEORIES of matter—or should we not rather call them theories of *force*, since, in “explaining” the properties of matter, we are mainly concerned with those manifestations which we say are due to “force”—naturally fall into two distinct classes. The first class includes those hypotheses which regard continuous matter as being built up of discrete particles, and the direct action of finite portions of matter as being due to action at a distance of these particles. The second class includes those hypotheses which regard these particles as singularities in a continuous medium, and which attribute their action at a distance to the direct agency of the medium. In a certain sense, these two theories are reciprocal. In both, certain attributes are localised at points, and it is necessary to bridge over the distance between these points. According to the first hypothesis, a field of force pervades the intervening gaps; according to the second, they are filled with a distribution of mass. The belief that both hypotheses are possible, enables us to imagine that there may be no limit to the smallness of the scale on which Nature conducts her operations, the phenomena occurring in any region being made to depend in their turn on others occurring in the far more minute regions which are regarded as constituting its ultimate elements, and these elements being in turn capable of further subdivision, and so on indefinitely.

In 1852, Lejeune-Dirichlet, being unacquainted with the works of Green and Stokes on this subject, published a paper containing the solution of the problem of the motion of a sphere in an incompressible fluid. In a course of lectures given at Göttingen in 1855-56, Dirichlet gave the corresponding solution for a sphere fixed in a steady current, and invited his pupils to attempt the solution for an ellipsoid. Among these pupils were Schering, who solved the problem, and C. A. Bjerknæs, who gave a generalisation for space of  $n$  dimensions. At this time the doctrine of action at a distance may have been said to be at its zenith, and Göttingen had given birth only a few years previously to the last brilliant product of that doctrine, Weber's Law. As a foreigner,

Bjerknæs was, however, less influenced by the views then prevailing in the Göttingen school, and a volume of Euler's correspondence falling into his hands caused him to oppose the doctrine of action at a distance. A fresh light was thrown on the hypothesis of a continuous all-pervading medium by Dirichlet's discovery that a sphere moving in an incompressible perfect fluid experiences no retardation from the fluid, and an impetus was given to Bjerknæs to develop Dirichlet's investigations in a direction widely differing from anything then contemplated by his professor.

From the effects of purely translational motions of two spheres, Bjerknæs was led on to consider the mutual actions of two pulsating spheres, and discovered that such spheres attract or repel one another according as their phases are the same or opposite, the law of force being that of the inverse square. Bjerknæs found, moreover, that the expressions for the forces acting on a sphere moving in liquid consisted of two terms, which he distinguished as “inductional forces” and “energy forces,” a result which he arrived at by considering the expressions for the pressures on the spheres, but which might have been found more readily had Thomson and Tait's application of Hamilton's principle been then known to him. About 1875, Bjerknæs published a paper in which he established the hydrodynamical law of action and reaction, and the analogy with electric and magnetic action at a distance; and in the following year he gave an independent investigation based on the Hamiltonian principle.

From 1875 onwards, Bjerknæs appears to have occupied himself chiefly with the terms of lowest order in the expressions for the forces; and in 1878 he discovered the law of rotation for oscillating spheres. Since then he seems to have devoted his attention mainly to electric and magnetic analogies, and in the middle of his eightieth year he completed the discussion of the “inductional forces,” and by this means pushed the analogy between hydrodynamic action at a distance and electromagnetic phenomena as far as it could be pushed without departing from the fundamental hypotheses.

A complete account of these investigations was never published, and it remained for his son, Prof. V. Bjerknæs, to embody them in the present volume. For three years Prof. V. Bjerknæs has delivered courses of lectures on the subject at the University of Stockholm, and the book is practically based on these lectures. It is divided into four parts: the first, an introductory part, dealing with the general principles of vector fields and hydrodynamical equations; the second, dealing with the motion of the liquid surrounding a system of moving spheres treated from a kinematical standpoint; the third, dealing with the influence of the pressures on the motion of the spheres themselves; and the fourth, with the theory of apparent actions at a distance, of hydrodynamical origin. In the second part, the diagrams of the stream lines due to a moving, oscillating or pulsating sphere in various fields of force are noticeable for their elegance.

It is to be wished that the courses of lectures which Prof. V. Bjerknæs delivered on the work of his father could be taken as models of what university lectures should be, for the development of a theory such as the present affords an excellent and not difficult insight into

the methods of mathematical analysis. So long as our English university colleges are, to a great extent, in the hands of oligarchies, who attach more importance to such trifles as the handwriting and spelling of matriculation or medical preliminary students than to higher scientific study, such courses of training will only be accessible to those who seek them in countries more enlightened in the matter of scientific education than Great Britain. We can readily imagine that Bjerknæs' theories may find their way into many transatlantic universities among the "classics of science." They have, indeed, no small claim to be regarded as classical. It is true, as Prof. V. Bjerknæs points out, that his father's and Kirchhoff's work in several cases somewhat overlapped, but it would appear that in developing the theory of motion of spheres in liquids as a basis for explaining the properties of matter, Bjerknæs stood entirely on ground of his own making. Other theories involving the conception of a continuous medium have sprung up; we have had the vortex-atom theory before us, and we now find it necessary to postulate the existence of an ether, whose attributes resemble those of an elastic solid rather than a fluid. At the present time few will regard the hypothesis of pulsating spheres as of more than classical interest. As having been first developed in the face of a prevalent belief in the doctrine of action at a distance, and as ingenious methods of replacing this action at a distance by the action of an intervening medium, the application of the term "classical" to these investigations of C. A. Bjerknæs may not be altogether without justification.

G. H. BRYAN.

#### PHOTO-MICROGRAPHY.

*Photo-micrography.* By Dr. Edmund J. Spitta. Pp. xi + 163. (London: The Scientific Press, Ltd., 1899.)

A QUARTER of a century has now elapsed since the renaissance of the art and science of photo-micrography. Up to that time much of the best work in this direction was accomplished in America by Lieut.-Colonel Woodward, of Washington, whose successful photographs of diatoms excited the admiration of all microscopists who saw in his productions the faithful delineations of those "markings" on them, on which many hours of microscopical manipulation had been spent in bringing their delicate tracery to a correct definition. From that time to the present the fascination of transferring the minutest details of histological and biological science to the photographic plate has found many ardent votaries, with the result of improved apparatus and lenses corrected to such a degree of accuracy for this work that sharp and well-defined images can now be obtained in a manner that would have been a boon and a revelation to workers twenty-five years ago.

Amongst the latest exponents of this branch of microscopical science we must name that of the author of the book under consideration.

Dr. Spitta in this work on photo-micrography has dealt with the subject very fully and from a scientific standpoint, so that the student who takes up this branch of the photographic art is thoroughly furnished with all

the information necessary to the accomplishment of perfect work, leaving, however, only that amount of *personal experience* to be obtained and which will be demanded of every one who first embarks on this art, and without which he is liable to be landed in many difficulties.

In Chapter i. the author deals with illuminants, a by no means unimportant point for consideration; for although we have several good illuminants for low power work, it is when we come to work with the highest power objectives that either the lime-light or that of the electric arc lamp must be employed to produce the best possible results. These lights are not always readily accessible; but as the aspiring student most probably will try his 'prentice hand on low power work, the single wick lamp burning the best paraffin oil will furnish him with a light sufficiently rich in actinic rays that, provided the proper length of exposure be given, will result in a very successful negative. Dr. Spitta in Chapter ii. proceeds to give directions for obtaining photo-micrographs by low power objectives, dealing with this in such a lucid manner that the student who closely follows his clear description cannot fail in being rewarded by satisfactory results, being assisted in his work by algebraical formulæ and illustrations of simple but effective apparatus.

Chapter iii. deals with medium power photo-micrography, and contains some very necessary cautions relative to the avoidance of vibrations in the apparatus, for, as the author observes, "when photographing at 1000 diameters, 1/1000 of an inch shake in the specimen makes a shift of one inch in the photographic plate," or he might have said in the photographic *image*; therefore the absolute necessity of the most perfect stability, not only in the apparatus but even in the studio, can be readily understood and provided for—even a heavy tread on the floor of an adjoining room being sufficient to disturb the steadiness of the optical arrangement. Dr. Spitta describes different methods whereby this difficulty may be overcome. Allowance must also be made for the expansion of the metal of the microscope from the heat of the illuminant, for even in low power work, say of 250 diameters, the heat from the oil lamp must not be considered a negligible quantity, and must be considered so far that no photographic exposure should be attempted till the metal has had time to become fully expanded.

Chapter iv. is overloaded with woodcuts of different makes of microscopes valuable as affording the student a choice of various instruments, but by no means necessary to his work, as any one of these is sufficient for attaining good medium power work. This chapter also deals with the subject of lenses and eyepieces and the accessory fittings of the microscope generally; but there is one point that must have the greatest attention, and that is the fine adjustment, and Dr. Spitta does well in laying great stress upon its importance; nothing is more embarrassing to the operator, when perhaps everything else in the apparatus is working well, to find that the fine adjustment by which he hopes to obtain that sharp definition without which his work is valueless, is altogether useless from faulty construction, and Dr. Spitta describes the various forms of this all-important addition to the photo-micrographic installation.



The remaining three chapters of this work treat of such subjects as substage fittings, coloured screens, and the various subsidiary apparatus useful in high power or "critical" photo-micrography. These particulars do not bear the condensation that is necessitated by the space allotted to this report, but are full of information for the guidance of the photo-micrographic student and will materially assist him in his work. A valuable feature is included in the appendices, and is headed "25 common faults in photo-micrography; their causes and means of cure"; by a reference to p. 152 every error that may present itself in the beginner's work is described, the reason for it given, and the remedy indicated. Added at the end of the book are five plates of representative work in photo-micrography, the work of the author, while a copious index brings the work to a conclusion.

#### GEORGE KINGSLEY'S LIFE AND WRITINGS.

*Notes on Sport and Travel.* By George Henry Kingsley. With a memoir by his daughter, Mary H. Kingsley. Pp. viii + 544. (London: Macmillan and Co., Ltd., 1900.)

THIS is a book, we venture to think, that most readers will lay down with deep regret—regret that a very talented writer, an acute observer, and an ardent sportsman (in the best sense of the word) should have bequeathed so little of his experiences to the world. For George Kingsley, a member of a clever family (or, as his biographer will have it, a member of a clever generation of an ancient family), was evidently a man far above the ordinary intellectual level, and enjoyed unrivalled opportunities of adding to our store of knowledge by travel in distant lands at a time when they were still, to a great extent, populated by their native denizens and unspoiled by the march of civilisation. Unfortunately, however, he seems to have been devoid of those regular and methodical habits of work by which alone the results of a life of exploration and travel can be properly recorded, and we have consequently to be content with mere scraps and fragments of a vast store of information.

From such scraps and fragments as the editor, who is to a great extent also the author, of the present volume has been able to save from oblivion, we glean how keen an observer and how true a lover of nature was Dr. Kingsley. Whether among the coral-girt isles of the South Pacific, when they were yet in great part free from the "beach-comber," or on the prairies of the "wild west," at a time when the bison were still to be numbered by hundreds, if not by thousands, his descriptions of scenery and animals are life-like pictures.

The greater part of the account of the author's travels is given in the memoir by his daughter, which occupies more than a third of the whole volume, and is, in great measure, in the form of letters or of extracts from the same. And here we take the opportunity of expressing our sense of the excellent manner in which Miss Kingsley—herself a traveller and writer of world-wide repute—has discharged what must evidently have been a task of no ordinary difficulty.

Kingsley (in company with the late Lord Pembroke)

NO. 1592, VOL. 62]

visited the South Seas in the late "sixties"—a time when yachting in those latitudes had not come into vogue; and such descriptions as he has left of the natives and natural products only make us regret that they were not fuller. Fish seem especially to have attracted his attention; but when he states that he disbelieves the story of a *Chaetodon*<sup>1</sup> shooting water at a fly, the editor should have added that the only fish which performs this feat is a species of *Toxotes*, whose southern range only extends to North Australia, so that it could not have come under the ken of the author.

The travels in Canada and the United States were undertaken in company with Lord Dunraven, between 1870 and 1875; parts of them being described by the latter in "The Great Divide."

Of the various collected papers of Dr. Kingsley, perhaps the most interesting to the naturalist is the one entitled "Among the Sharks and Whales." Here the author graphically describes, as an eye-witness, certain encounters between the larger Cetaceans and smaller members of the same order, together, perhaps, with other denizens of the deep. We are told, for instance, how some of these creatures, of thirty feet or so in length, were seen to leap clean out of the water, and then to fall with a sounding "smack" that could be heard half a mile off. But whether the creatures in question were attacking a whale, or leaping for mere fun, the author was unable to determine. Neither could he say definitely whether or no they were "killers." And he seems, indeed, to be somewhat confused between "killers" and "threshers"; although, as to the sharks commonly called by the latter name, he denies that they ever attack whales, adding that he has never even known a shark of any kind throw itself out of the water. R. L.

#### OUR BOOK SHELF.

*Irrigation and Drainage, Principles and Practice of their Cultural Phases.* By F. H. King, Professor of Agricultural Physics in the University of Wisconsin, author of "The Soil." The Rural Science Series. Pp. xxi + 502. (New York: The Macmillan Company. London: Macmillan and Co., Ltd., 1899.)

THE object of this book, as stated in its preface, is "to present, in a broad yet specific way, the fundamental principles which underlie the methods of culture by irrigation and drainage," and we may say that we consider the author successfully does this.

The introductory chapter treats of the importance of water in cultivation, and in it a number of interesting experiments on the amount of water absorbed by cereals and other plants, and the weight of dry matter produced are described, from which it appears that with cereals the amount of water used varies from about 300 to 500 lbs. per pound of dry matter produced. The general result of these experiments is considered to show "that well-drained lands in Wisconsin, and in other countries having similar climatic conditions, are not supplied naturally with as much water during the growing season as most crops are capable of utilising, and hence that all methods of tillage which are wasteful of soil moisture detract by so much from the yield per acre."

<sup>1</sup> The editor avows a difficulty in deciphering some of the MS. which came into her hands, and therefore suggests the possibility of a certain amount of mis-spelling. Some naturalist friend would, however, doubtless have corrected the following errors, viz.:—P. 61, *Chaetodons* for *Chaetodons*; p. 222, *Haroldus* for *Harelda*; p. 414, *Megaptera australis* for *Balaena australis*; p. 421, *Ovules* and *Mutras* for *Olives* and *Mitras*; and p. 424, *Orcus* for *Ora*.

Similar experiments have been made with other crops, as, for instance, potatoes, and the importance of such experiments is, as stated further on in the book, "because only such knowledge as this can show how economical or how wasteful our methods of tillage may be, and how nearly we are realising the largest profits which are possible to the business."

The conditions of rainfall under which irrigation is practised in different parts of the world are discussed, and the means of "conserving the moisture of the subsoil" by proper tillage pointed out. An excellent account is given of the depth of root penetration in the soil, which is illustrated, as is the rest of the book, by some very good and instructive engravings. A short account is given of sewage irrigation; and the idea that the milk of cows fed on sewage produce is in any way detrimental is disposed of by quotations from Sir Henry Littlejohn, and from Mr. Spier, the Scottish Dairy Commissioner. Methods of diverting streams for irrigation are carefully described and fully illustrated, as also are the methods of applying the water to the ground. In Part ii. (a small portion at the end of the book) the necessity for soil drainage is insisted on, and the methods of carrying it out are described.

The book altogether is very readable, although the spelling of some of the words seems curious to an English reader. It is also well printed, and the only misprint noticed is on p. 403, where the word "denitrification" is used instead of "nitrification." W. H. C.

*The Refraction of the Eye, including a Complete Treatise on Ophthalmometry. A Clinical Text-book for Students and Practitioners.* By A. Edward Davis, A.M., M.D. Pp. 431. (New York: The Macmillan Co., 1900.)

THIS volume should prove a valuable addition to the library of the ophthalmic surgeon, for though several books on retinoscopy have been published, this is the only work on ophthalmometry yet written in English.

It comprises a description of Javal and Schiötz's modification of Helmholtz's ophthalmometer, together with full instructions in the use of the instrument; the necessity of forming a clear mental picture of the state of the eye from the results of an experiment being rightly insisted upon.

One hundred and fifty illustrative cases are included in the text, and a comprehensive index has been appended, so that the student can readily find a parallel to any case which may give him trouble. One hundred and nineteen diagrams, including a clear and well-drawn woodcut of the ophthalmometer of Javal and Schiötz, are distributed throughout the text.

Although the advantages which may be gained by the use of the ophthalmometer are insisted upon, the author has taken great pains to indicate the limitations of its usefulness. By its aid we may determine with accuracy the radii of curvature of the cornea in various meridians; but the author endorses the generally accepted opinion that there is no definite relation between the curvature of the cornea and the refractive condition of the eye, as far as hypermetropia or myopia are concerned. Myopia usually depends upon an elongation, and hypermetropia upon a shortening of the axis of vision. Strangely enough, in cases of extreme myopia, a somewhat flattened cornea is generally met with. Nevertheless, in cases of simple hypermetropia and myopia, the ophthalmometer eliminates the question of corneal astigmatism. The routine of examination followed by the author is (1) use the ophthalmometer; (2) use trial lenses and test cards; (3) use the ophthalmoscope; (4) if after two tests on different days the result is still unsatisfactory, employ a mydriatic and use the retinoscope in addition to the other tests. It is stated that (1) to (3) suffice for 99 per cent. of uncomplicated cases.

In the use of test glasses, it is recommended that a

series of positive lenses, gradually increasing in power, should first be employed. By this means spasmodic accommodation is avoided. The fact that the use of atropine can so often be dispensed with is of great importance, since many men might hesitate to have their eyes examined if this necessitated a temporary cessation of their business duties.

A number of instructive cases are included, showing the serious results which may follow on the prescription of unsuitable glasses for a patient. Not only severe pain and inability to use the eyes for any length of time, but even personal disfigurement may be produced. Thus a case is recorded (p. 307) of a patient whose eyes were being forced into a divergent squint by the use of prismatic glasses. After a careful examination, the prisms were discarded and suitable lenses were ordered, with the result that, after two weeks, complete comfort and the possibility of working with satisfaction were enjoyed for the first time for many years.

Altogether this book gives us a good idea of the vast advantages to the human race which have resulted from the optical researches of Helmholtz, culminating in the invention of the ophthalmometer and the ophthalmoscope.

E. E.

*A Key to the Birds of Australia and Tasmania, with their Geographical Distribution in Australia.* By R. Hall. Pp. xii + 116; plate and map. (Melbourne: Mullen and Slade; London: Dulau and Co., 1899.)

WERE it nothing more than a synopsis of Australian birds, with just sufficient in the way of description to enable the different species to be easily recognised, this well-printed little "Key" would be to a great extent of merely local interest. But since the author has very wisely made geographical distribution its leading feature, the work appeals to a much wider circle of students than would otherwise have been the case.

In his Report on the Zoology of the Horn Expedition, Prof. Baldwin Spencer recently divided Australia into three zoological sub-regions; namely, (1) the Torresian, embracing the northern and eastern districts as far as South Queensland; (2) the Barsian, comprising eastern New South Wales, Victoria and Tasmania; and (3) the Eyrean, including the remainder of the mainland. These sub-regions are further split up into "areas," and the fact that bird-distribution accords with such a parcelling-out of the continent from other lines of evidence affords important testimony in support of Prof. Spencer's views. It is noteworthy that the South Queensland area forms the headquarters of the Australian Passeres, a fact for which there must surely be some adequate physical reason, if only it could be discovered. The total number of species recorded is 767, among which the black emu is believed to be extinct; and, so far as we have been able to verify them, the diagnoses of the various groups and species seem well adapted to their purpose. The work appears singularly free from errors and misprints, and ought to be in the hands of every Australian bird-lover. R. L.

*Pages Choisies des Savants Modernes.* By A. Rebière. Pp. viii + 620. (Paris: Nony et Cie, 1900.)

THIS is a series of extracts (translated into French when not written in that language) from the works of eminent men of science. It appeals mainly to the general reader, and the best that can be hoped of it is that it may induce some members of this class to study the works of one or other man of science seriously. A scientific writer does not appear to the best advantage in "tit-bits" selected from his works; and, except as a possible stimulus, the value of such a miscellany as this cannot be reckoned very high. The portraits, of which there is a considerable number, will probably be found, by scientific readers, the most interesting feature of M. Rebière's compilation.

*Les Vieux Arbres de La Normandie.* By Henri Gadeau de Kerville. Fasc. iv. Pp. 219 + 352. (Paris: J. B. Baillière et fils, 1899.)

THIS instalment of M. de Kerville's careful monograph contains twenty views of trees from photographs by the author, accompanied by detailed descriptions and historical notes. The work is well and conscientiously done, whilst the illustrations are well selected and admirably reproduced in collotype. The trees here shown include ten oaks, six yews, two beeches, a lime and a poplar. As the photographs of the deciduous trees have been taken in very early spring, before the opening of the buds, their ramification and general architecture are shown to the greatest advantage. With this volume, *à propos* of a notable oak-tree growing at Isigny-le-Buat, the author includes an interesting account of recorded cases of mistletoe upon oaks in Normandy. He is able to produce evidence in support of some twenty-seven recorded instances. The book will appeal to all tree-lovers; may it stimulate some to similar studies. We remember to have seen something of the kind for Northumberland nearly thirty years ago in the *Transactions* of the Tyne-side Naturalists' Field Club.

LETTERS TO THE EDITOR.

[The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of NATURE. No notice is taken of anonymous communications.]

The Nature of the Solar Corona.

I SEE in the recently-published number of *Science Abstracts*, No. 802, that there is every reason to think that the corona line is not represented by any dark line in the solar spectrum. I write to call attention to the way this confirms the suggestion that the corona is an aurora round the sun. In the March number of the *Annalen der Physik* for this year, p. 462, Herr Cantor describes experiments from which he concludes that there is no absorption corresponding to the emission of light by a gas which is caused to radiate by an electric discharge. He makes certain deductions as to the temperature of the gas which emphasise the difficulty of defining "temperature" in the case of a non-steady state; but, whatever is to be deduced from his observation, it certainly lends weight to the suggestion that the corona is due to an emission of a similar character to that of a gas transmitting an electric discharge.

April 30.

GEO. FRAS. FITZGERALD.

Rock-structures in the Isle of Man and in South Tyrol.

MR. LAMPLUGH'S recent paper referred to in his letter in NATURE of April 26 (p. 612) is devoted to an elucidation of the "relations of the Carboniferous limestone to the Carboniferous volcanic rocks" in the Isle of Man (*Q.J.G.S.* 1900, p. 11). From Mr. Lamplugh's description, these relations are very similar to the relations which I described as subsisting between the Mid-Triassic dolomitic limestone ("Mendola Dolomite") and the tuffaceous "Wengen" beds of Enneberg. The "Buchenstein Agglomerate" of Enneberg, which I mentioned in my letter (NATURE, March 22), had been described in geological literature as a "Middle Triassic agglomerate" of local occurrence above "Mendola Dolomite," in the neighbourhood of eruptive outbursts of that age. My map and sections showed that the agglomerate had a limited occurrence in fault-zones and overthrust-planes where differential movement had taken place between the harder, more resisting "Mendola Dolomite" and the yielding, mixed "Wengen" series "comprising dust-tuffs and lavas, as well as fossiliferous shales and shaly limestones." I therefore explained the so-called "Triassic" agglomerate as a subsequent structure, of the nature of a shear-breccia, produced by the earth-movements of the later Alpine upheaval (*Q.J.G.S.* 1899, pp. 567, 584, Figs. 1, 4, 9, 10).

Mr. Lamplugh describes in the Carboniferous series of the Isle of Man rock-structures of brecciated limestone, tuffs with contained strips of limestone, and coarse agglomerate which had previously been referred to the effects of Carboniferous eruptive

action. Mr. Lamplugh's explanation is that the various complexities in the structure of these rocks "have not been caused by the volcanic outburst, but have been brought about at a later date by the differential movement of segments of the eruptive rocks upon their original floor of limestone" (*Q.J.G.S.* pp. 15, 19, Figs. 3, 4). The parallelism between the two cases is self-evident. In 1894, I had explained on precisely the same principle of subsequent differential movement, the occurrence of certain anomalous phenomena at the upper limit of the Wengen-Cassian series in Enneberg, *i.e.* the limit of this plastic and compressible series against the higher horizon of Triassic calcareo-dolomitic rock, termed "Schlern Dolomite" ("Coral in the Dolomites," *Geol. Mag.* 1894, p. 55).

The parallelism in the general sequence of events in the Isle of Man and in South Tyrol is as follows:—

Isle of Man.	Enneberg.
Pre-Carboniferous Movement.	Pre-Triassic Movement.
Lower Carboniferous Deposition.	Triassic Deposition.
Subsequent Movement.	Subsequent Movement.

The crust-movement immediately antecedent to Triassic deposition in South Tyrol was that which accomplished the upheaval of the Permian Alps, post-Triassic crust-movement culminated in the upheaval of the present Alps (aut. *Q.J.G.S.* 1899, p. 628, and NATURE, Sept. 7, 1899, pp. 445-6).

The farther issues of my paper in showing how differential movements twist the rocks by taking place in cross-directions were not touched in my letter of March 22, for the reason that Mr. Lamplugh did not in his paper enter into the torsional results of differential movements. But, as I have elsewhere expressed, rock-torsion or "warping" goes on all the time in crust-folding, and clearly, where from any cause whatsoever there is the greatest complexity in the differential movements, there will be the greatest complexity in the torsional phenomena.

MARIA M. OGILVIE GORDON.

POMPEII AND ITS REMAINS.<sup>1</sup>

THE city of Pompeii is one which will ever maintain a hold upon the imagination of cultured man, as much for what it represented in the history of civilisation, as for being the victim of one of the most awful visitations of the powers of nature which have ever befallen the abiding place of a great society of men. It is not the place here to descant upon the wealth and luxury of its

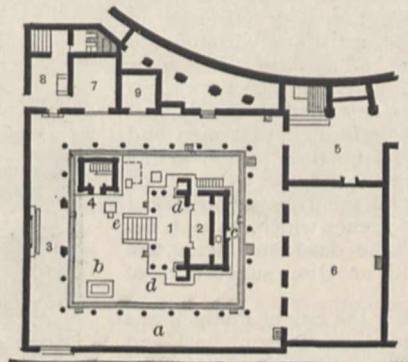


FIG. 1.—Plan of the Temple of Isis.

1, Portico; 2, cella; 3, shrine of Harpocrates; 4, purgatorium; 5, hall of initiation; 6, hall of mysteries; 7, 8, 9, abodes of priests; a, colonnade; b, refuse pit; c, niche for statue of Bacchus; d, d, niches; e, large altar.

inhabitants, on the bright and reckless lives which they led, on the splendour of its buildings, or even the fancied security wherein men and women lulled themselves, notwithstanding the violent shock of earthquake which shook the city to its very foundations on February 5, A.D. 63, for all these things are the commonplaces of history; but we are concerned with the remains left by the awful catastrophe which took place on August 24,

<sup>1</sup> "Pompeii, its Life and Art." By August Mau. Translated by F. W. Kelsey. Pp. xxii + 509. (New York: The Macmillan Co., 1899.)

A.D. 79, and buried the cities of Herculaneum and Pompeii in a layer of mingled mud, lava, pumice stone, dust and wet ashes. In less than thirty-six hours Vesuvius had completely blotted out these towns and had covered the ground around for miles with pumice stones, barely as large as walnuts, to the depth of ten

made themselves very busy, for the costly stones and marble used in the construction of porticos, vestibules and baths, not to mention the pillars, were eagerly sought after for the building of new villas and houses. When such human vultures had battered on the remains of the town, they left what they could not, or would not, carry away to decay and desolation. For fifteen hundred years, Pompeii and its dead slept in peace, and certain pious folk comforted themselves with the view that its inhabitants, like those of the Cities of the Plain, richly deserved their punishment. About A.D. 1600, D. Fontana, who was occupied in bringing water from the Sarno to Torre Annunziata, cut a conduit through a part of the site of Pompeii, and two inscriptions were found in the course of the work. In 1719, Count Elbeuf's workmen sank a shaft on the site of Herculaneum, and reached a level corresponding with the stage of the theatre. In 1754, a number of tombs at Pompeii were discovered by the road-makers who were working to the south of the city, but no systematic attempt to leave what had been excavated uncovered and visible to all was made until 1763, when the discovery of the inscription of Suedius Clemens definitely proved that the site was that of Pompeii. A year later, the theatres, the Street of Tombs, and the villa of Diomedes were un-



FIG. 2.—View of the Temple of Isis.

feet. Of the twenty thousand people who are estimated to have been in Pompeii when destruction came upon the doomed country, about two thousand perished, the rest saved themselves by flight; but fortunately for the people of our own time they were compelled to leave behind them most of the things which describe to the student and antiquary the manner of their lives, and reveal the high standard in luxury and artistic civilisation to which they had attained. The blow fell so suddenly, and the overwhelming of the city was so swiftly and effectively performed, that men and animals had no time to die in the usual manner, and the ashes which caked round them have preserved forms and scenes which, though belonging to the dead and dying, are replete with unerring suggestions of life.

Soon after the city of Pompeii was buried, the survivors came back and began to dig out the objects of value belonging either to themselves or their friends which they knew to be in the houses. As the upper parts of many of the houses still stood above the pumice stone and ashes, they were able to locate them in many instances with convenient accuracy, and as a result there remained in Pompeii, when the searchers had finished work, but few houses which had not been partly or wholly explored. Anything like a systematic search, however, was never made, and the excavators worked most in the places which seemed to promise the best results. Among others, the builders' labourers

covered, and general interest in the work was at last awakened. Between 1806 and 1815, under Joseph Napoleon and Murat, the Herculaneum Gate and Forum were excavated; and between 1825 and 1848, a large number of beautiful houses were cleared out and made accessible to

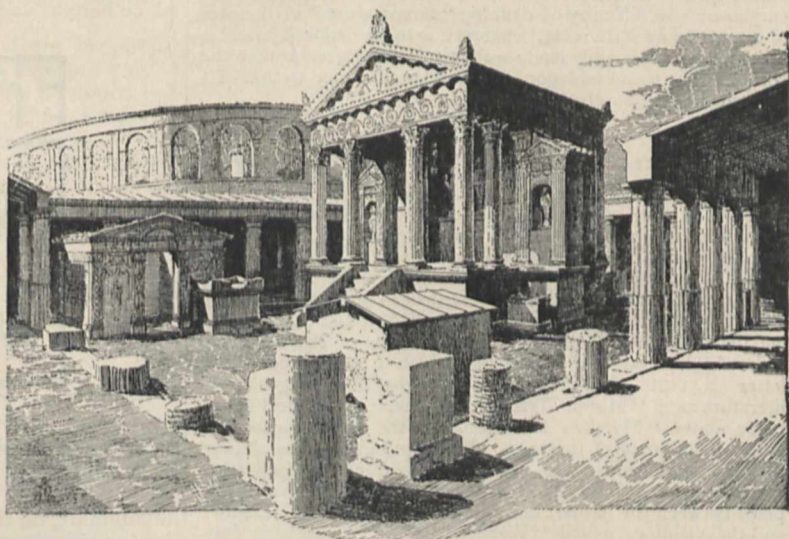


FIG. 3.—The Temple of Isis restored.

the curious and the learned. Up to this period, the work of excavation, though carried on with skill and zeal, was exceedingly unscientific; indeed, judged by the canons of the excavator of to-day, it would be pronounced to possess no system at all. In 1860, however, explorations and

excavations on the site of Pompeii were entrusted to the hands of G. Fiorelli, and most of the excellent results which have attended the excavations made during the last forty years are due to the plan inaugurated by him. At the present time, about one-half of the site of Pompeii has been excavated, and, according to the calculations which he made as far back as 1872, the work of clearing the undisturbed parts in the western half of the ancient city, and the whole of the eastern half, will not be completed much before the year 2000. The above facts will enable the reader to grasp the magnitude of the undertaking, and to appreciate the help which is forthcoming from Prof. Mau's exhaustive work, of which we must now speak briefly.

It is well known that Prof. Mau has for more than a score of years devoted all his winters to the study of the antiquities of Pompeii, and there is little doubt that he is *facile princeps* among the experts in this special branch of Roman archaeology. His articles and papers in the scientific periodicals have secured for him a high position among savants, even in his own country, and his "Mittheilungen" are at once the product of good scholarship and enthusiasm. The volume before us is not a mere translation of one previously issued, but is to all intents and purposes a new work, now published for the first time in English. Mr. Kelsey, who is responsible for the English work bearing Prof. Mau's name, is more than the translator, for he has abridged the German manuscript which he had to work from in many places, and a number of additions to the text are due to him. He has done his part of the work faithfully, and the English visitor to Pompeii has now available in his own tongue a volume in which lucidity of treatment goes hand in hand with erudition and scholarship. The English text is accompanied by twelve plates, six plans, and two hundred and sixty-three cuts, which are inserted as near as possible to the subject-matter illustrated by them. We have only one fault to find with the book—it is a little heavy to carry about. Thus having said our worst, we proceed to describe very briefly its contents. The six first chapters really form the introduction, which they are actually called, and they treat of the early history and general situation of Pompeii, the overwhelming of the city, and the excavations undertaken during the last hundred and fifty years. The last chapter of the section on building materials and architectural periods is particularly instructive, and will be read by more than the tourist. Part i. contains twenty-five chapters, which deal exhaustively with the public buildings and places of Pompeii, including the Forum, the Basilica, the Comitium, the theatres, the temples of Jupiter, Apollo, Zeus Milichius, and, strangest of all, the temple of the Egyptian goddess Isis. It will be remembered that the Ptolemies, by the help of Manetho, an Egyptian priest, and of Timotheus, a man who had peculiarly perfect knowledge of the Eleusinian Mysteries, associated certain Egyptian religious ceremonies with those of the Mysteries, in the hope of binding his Greek and Egyptian slaves together in the bonds of a common form of worship. The new cult, though it was abominated by the philosophers, was very

popular, and it spread from Alexandria by way of the Delta into Syria, and from the same centre to Rome. As a result, we find that a college of priests of Isis, or Pastophori, was founded at Rome in the time of Sulla, about B.C. 80. The Romans objected to the introduction of the Egyptian gods, and three times in the space of eleven years was their temple destroyed. Oddly enough, a temple in honour of Osiris and Isis was built in Rome about B.C. 44, and before the end of the century their festival was recognised by the public calendar. But other cities of Italy were more tolerant than Rome, for a temple in honour of Serapis was standing at Puteoli B.C. 105, and not long after this date the temple to Isis was built at Pompeii. In the earthquake which took place A.D. 63 this temple suffered greatly, but it was rebuilt by Numerius Popidius Celsinus at his own expense "from the foundation." From the view given by Prof. Mau on p. 166, we see enough to show us



FIG. 4.—The adoration of the holy water of the Nile during the worship of Isis.

that although the building bore slight resemblance to an Egyptian temple, there was, notwithstanding, a wish on the part of the architect to produce an unwonted effect on the mind of the beholder. The deities Osiris, Isis, Anubis and Harpocrates were represented by statues, and as they have never been found, it is probable they were carried off by the faithful on that awful day in August, A.D. 79. We know little of the ceremonies connected with the initiation into the Mysteries, but two skulls, a marble hand, two small boxes, a gold cup, a small glass vessel, and a statuette of the god nearly one inch in height seem to have played a prominent part in them. We have not space to follow Prof. Mau through his description of all the various parts of this interesting temple, but we may note that the existence of the hieroglyphic sepulchral inscription, set up for the scribe Hat on a pillar to the right of the altar, indicates the adoption in Pompeii of a widespread Egyptian custom. The

that although the building bore slight resemblance to an Egyptian temple, there was, notwithstanding, a wish on the part of the architect to produce an unwonted effect on the mind of the beholder. The deities Osiris, Isis, Anubis and Harpocrates were represented by statues, and as they have never been found, it is probable they were carried off by the faithful on that awful day in August, A.D. 79. We know little of the ceremonies connected with the initiation into the Mysteries, but two skulls, a marble hand, two small boxes, a gold cup, a small glass vessel, and a statuette of the god nearly one inch in height seem to have played a prominent part in them. We have not space to follow Prof. Mau through his description of all the various parts of this interesting temple, but we may note that the existence of the hieroglyphic sepulchral inscription, set up for the scribe Hat on a pillar to the right of the altar, indicates the adoption in Pompeii of a widespread Egyptian custom. The

worship of Isis attracted large numbers to her temple, and the principal services took place before daybreak. The curtains were drawn aside and the statue of the goddess was presented to her worshippers, who straightway prayed to her; an hour after sunrise a hymn was sung to the rising sun, typified by Harpocrates, and the service was over. The second service of the day was held two hours after noon, and it seems to have consisted in the adoration of water in a vessel which was supposed to have been taken from the Nile. Whatever the details may have been, the services certainly had reference to scenes connected with the finding of the dead body of Osiris by his wife Isis, and they were intended to urge the beholder to renounce the present life and to prepare for a second birth into a purified and beatified state of existence in a new world. The temple of Isis at Pompeii is a remarkable relic of the adoption of a remarkable religion by the Romans, and we hope that Prof. Mau will add any new facts which he may glean from subsequent researches to the future editions of his work. The second part of Prof. Mau's volume deals with the houses of Pompeii, and it seems to us to be the best in the book, for it recalls the scenes and occurrences in the daily household life of the Pompeians in a most realistic fashion. The mind's eye has so many facts supplied to it with such lucid explanations that a street of houses appears before it without fatigue, and as the result of but little effort. Parts iii.-vi. deal with trades and occupations, the tombs, Pompeian art and inscriptions; the chapters of these sections are written in the same easy style, but at the same time the reader feels that he is being led along an interesting path by the hand of a master of his craft.

#### THE UNVEILING OF THE HUXLEY MEMORIAL STATUE.

THE statue, by Mr. Onslow Ford, R.A., of the late Right Hon. Thomas Henry Huxley, now placed in the first right-hand recess of the Great Hall of the Natural History Museum, was unveiled by H.R.H. the Prince of Wales on Saturday last, April 28, the ceremony being performed, by his Royal Highness's desire, immediately after the meeting of the Trustees appointed for that day.

Seating accommodation had been provided for the Huxley family, the Trustees of the British Museum, the members of the Memorial Committee, and other distinguished guests and chief subscribers to the Memorial Fund, in front of the statue; and a still greater number of persons, most of whom were subscribers also, assembled in the corridors overlooking the Great Hall, and on the staircases.

There were from 700 to 800 persons present, adequately representative of all branches of science, art, law, music, and politics, and of several foreign nations. The following is a classified list of the persons more directly concerned in the ceremony:—

#### Trustees of the British Museum.

H.R.H. the Prince of Wales.	Dr. W. S. Church, President
Earl of Elgin, K.G.	of the Royal College of
Earl of Hopetoun.	Physicians.
Viscount Cross.	The Rev. F. H. Annesley.
The Bishop of Winchester.	Mr. Cavendish-Bentinck.
The Lord Walsingham.	The Duke of Devonshire, K.G.
The Right Hon. Sir George	Lord Russell of Killowen.
Trevelyan, Bart.	Lord Avebury.
The Right Hon. John Morley,	Viscount Peel.
M.P.	Viscount Dillon.
Sir Nathaniel Lindley, Master	Sir John Evans, K.C.B.
of the Rolls.	Sir Richard Webster.

#### Executive Committee of the Memorial Fund and others.

Lord Shand (Chairman).	Dr. P. L. Sclater, F.R.S.
Sir Joseph Fayrer, Bart.,	Prof. G. B. Howes, F.R.S.
K.C.S.I., F.R.S.	(Hon. Secretary).
Sir Henry Thompson, Bart.	Mrs. Huxley and members of
Sir Joseph Hooker, G.C.S.I.,	the Huxley family, to the
C.B., F.R.S.	number of thirty-two.
Sir John Donnelly, K.C.B.	Sir E. Maunde Thompson and
Sir Norman Lockyer, K.C.B.,	Officers of the British
F.R.S.	Museum, Bloomsbury.
Sir Michael Foster, K.C.B.,	Prof. E. Ray Lankester, the
M.P., F.R.S.	Director, and the Officers of
Sir Spencer Walpole, K.C.B.	the British Museum (Natural
Sir A. Geikie, F.R.S.	History).
Mr. Briton Riviere, R.A.	

Among other persons who were seated in the central enclosure were the following:—

Sir F. Abel, Bart., F.R.S.	Lord Hobhouse, K.C.S.I.,
Prof. T. Clifford Allbutt,	C.I.E.
M.D., F.R.S.	Prof. Victor Horsley, F.R.S.
Sir L. Alma-Tadema, R.A.	Prof. J. W. Judd, C.B., F.R.S.
Sir Edwin Arnold, K.C.I.E.,	Right Hon. W. E. H. Lecky,
C.S.I.	M.P.
The Attorney-General.	Sir Hugh Low, G.C.M.G.
Mr. Alfred Austin.	Dr. P. Manson.
Sir Squire Bancroft.	Dr. Ludwig Mond, F.R.S.
Hon. Edmund Barton, Q.C.	Prof. R. Meldola, F.R.S.
Prof. Bastian, F.R.S.	Sir Francis Mowatt, K.C.B.
Sir Lowthian Bell, Bart., F.R.S.	Sir Andrew Noble, K.C.B.,
Mr. Horace Brown, F.R.S.	F.R.S.
Sir T. Lauder Brunton, M.D.,	Admiral Sir Erasmus Omman-
F.R.S.	ney, Bart., C.B., F.R.S.
Rt. Hon. L. Courtney, M.P.	Prof. J. Perry, F.R.S.
Sir Wm. Crookes, K.C.B.,	Sir F. C. Roberts-Austen,
F.R.S.	K.C.B., F.R.S.
Mr. Francis Darwin, F.R.S.	Sir Henry Roscoe, F.R.S.
The Earl of Ducie, F.R.S.	Prof. A. W. Rücker, F.R.S.
Sir W. Thimelton Dyer,	Sir J. S. Burdon-Sanderson,
K.C.M.G., F.R.S.	Bart., F.R.S.
Mr. R. Etheridge, F.R.S.	Dr. D. H. Scott, F.R.S.
Prof. J. B. Farmer, M.A.	Sir G. G. Stokes, Bart., F.R.S.
Lady Flower.	Prof. G. Johnstone Stoney,
Prof. Le Neve Foster, F.R.S.	F.R.S.
Dr. R. Garnett, C.B.	Mr. J. J. H. Teall, F.R.S.
Dr. J. H. Gladstone, F.R.S.	Prof. T. E. Thorpe, F.R.S.
Lieut.-Col. Godwin-Austen,	Prof. W. A. Tilden, F.R.S.
F.R.S.	Rev. Canon Tristram, F.R.S.
Dr. A. Günther, F.R.S.	Sir William Turner, F.R.S.
Mr. G. Henschel.	Prof. W. F. R. Weldon, F.R.S.

Foreign nationalities were represented by:—

Dr. F. P. Moreno (of the	Prof. G. Paladino (of Naples).
Argentine Republic).	Prof. G. Gilson (of Louvain).
Major Dr. von Wissmann	Señor Don Pedro Jovar y Tovar
(Germany).	(Spain).
Mons. L. Geoffray (France).	Count Bottaro Costa (Italy).
Mons. F. Fuchs (Congo Free	Plenipotentiaries at the Inter-
State).	national Conference for the
Prof. Batalha Reis (Portugal).	preservation of wild animals
	in Africa.

Punctually at the time appointed (1.15 p.m.), his Royal Highness took up a position to the spectators' left of the statue, supported by the Standing Committee of the Trustees of the Museum, with Sir Maunde Thompson and Prof. Ray Lankester; while Sir Joseph Hooker, similarly supported by the members of the Executive of the Memorial Committee, stood on the right; and the sculptor, Mr. Onslow Ford, being in proximity to the statue.

The proceedings were opened by Prof. Ray Lankester, with the following introductory statement:—

YOUR ROYAL HIGHNESS, MY LORDS, LADIES AND GENTLEMEN,—The duty of briefly explaining the nature of the present proceedings has devolved upon me. I feel it to be a great privilege to discharge this duty on the occasion designed to do honour to my venerated master, Prof. Huxley. This

celebration would have been no less dear to Huxley's fellow-worker and friend, the late director of this museum, Sir William Flower, who unhappily is no longer with us to witness the completion of the memorial statue which he, especially, desired to see placed in this hall.

A few months after Prof. Huxley's death in 1895, a committee was formed for the purpose of establishing a memorial of the great naturalist and teacher. At a meeting of that committee, held on November 27, 1895, at which 250 members were present, and at which his Grace the Duke of Devonshire presided, the following resolution was carried:—

"That the memorial do take the form of a statue, to be placed in the Museum of Natural History, and a medal in connection with the Royal College of Science; and that the surplus be devoted to the furtherance of biological science in some manner to be hereafter determined by the committee, dependent upon the amount collected."

From all parts of the world, besides our own country, from every State of Europe, from India and the remotest Colonies, and from the United States of America, subscriptions have been received for the Huxley memorial, amounting in all to more than 3380*l*.

Three years ago the committee commissioned and obtained the execution of a medal bearing the portrait of Huxley, and has established its presentation as a distinguished reward in the Royal College of Science. The re-publication of the complete series of Huxley's scientific memoirs, which was proposed as one of the memorials to be carried out by the committee, has been undertaken by Messrs. Macmillan, without assistance from the committee. I am glad to be able to state that two large volumes of these richly illustrated contributions to science have been already published.

Whilst these other memorials were in progress under the auspices of the executive committee, they secured the services of Mr. Onslow Ford, R.A., to execute the statue which it had been decided by the general committee to regard as the chief object of the subscriptions entrusted to them. On the completion of the statue, the trustees of the British Museum agreed to receive it and to place it in the great hall where we are now assembled.

On behalf of the vast body of subscribers to the memorial, Sir Joseph Hooker, Huxley's oldest and closest friend, himself the survivor of that distinguished group of naturalists, including Charles Lyell, Richard Owen and Charles Darwin, who shed so much lustre on English science in the Victorian age, will hand over the statue of Huxley to the trustees of the British Museum. Your Royal Highness has been graciously pleased, as one of the trustees, to represent them on the present occasion, and to receive the statue on their behalf. The memorial statue of Huxley is the expression of the admiration, not only of the English people, but of the whole civilised world, for one who as discoverer, teacher, writer and man, must be reckoned among the greatest figures in the records of our age.

Sir Joseph Hooker then stepped forward from among the committee, and presented the statue in the following words:—

MAY IT PLEASE YOUR ROYAL HIGHNESS,—I have the honour of being deputed, by the subscribers to the statue of my friend the late Prof. Huxley, to offer it to your Royal Highness, on behalf of the trustees of the British Museum, with the intent that it should be retained in this noble hall as a companion to the statues of Prof. Huxley's distinguished predecessors, Sir Joseph Banks, Mr. Darwin and Sir Richard Owen. It would be a work of supererogation, even were I competent to do so, to dwell upon Prof. Huxley's claims to so great an honour, whether as a profound scientific investigator of the first rank, as a teacher, or as a public servant; but I may be allowed to indicate a parallelism between his career and those of two of the eminent naturalists to whom I have alluded, which appears to me to afford an additional argument in favour of retaining his statue in proximity to theirs. Sir Joseph Banks, Mr. Darwin and Prof. Huxley all entered upon their effective scientific careers by embarking on voyages of circumnavigation for the purpose of discovery and research under the flag of the Royal Navy. Sir Joseph Banks and Prof. Huxley were both Presidents of the Royal Society, were both trustees of the British Museum; and, what is more notable by far, so highly were their scientific services estimated by the Crown and their country, that they both attained to the rare honour of being called to seats in the Privy Councils of their respective Sovereigns.

With these few words I would ask your Royal Highness graciously to accede to the prayer of the subscribers to this statue, and receive it on behalf of the trustees of the British Museum.

He was followed by Sir Michael Foster, who pronounced the following *éloge* on Huxley's work and influence:—

MAY IT PLEASE YOUR ROYAL HIGHNESS,—Before you unveil this statue it is my duty and privilege to add a few words to those which have just been spoken by the beloved Nestor of biological science. Sir Joseph D. Hooker, born before Huxley was born, a sworn comrade of his in the battle of science, standing by him and helping him like a brother all through his strenuous life, may perhaps be allowed to shrink from saying what he thinks of the great work which Huxley did.

We of the younger generations, Huxley's children in science, who know full well that anything we may have been able to do springs from what he did for us, cannot on this great occasion be wholly silent.

Some of us have at times thought that Huxley gave up for mankind much which was meant for the narrower sphere of science; but if science may seem to have been thereby the loser, mankind was certainly the gainer; and indeed it was a gain to science itself to be taught that her interests were not hers alone, and that not by one tie or by two, but by many was her welfare bound up with the common good of all.

To many perhaps the great man whose memory we are here met to honour was known chiefly as the brilliant expositor of the far-reaching views of that other great man who through his statue is now looking down upon us. Your Royal Highness is doubtless at this moment thinking of that interesting occasion, fifteen years ago, when you unveiled that statue of Darwin, and you are calling to mind the weighty words then spoken by him whose own statue brings us here to-day.

Huxley it is true fought for Darwin, and indeed "he was ever a fighter." But he fought not that Darwin might prevail; he fought for this alone—that the views which Darwin had brought forward might be examined solely by the clear light of truth, untroubled by the passion of party or by the prejudice of preconceived opinion. As he never claimed for those views the infallibility of a new gospel, so he always demanded that they should not be peremptorily set aside as already proved to be wrong.

Huxley worked for his fellow men in many ways other than the way of quiet scientific research. Had we not known this we should have thought that his whole life had been given up to original scientific investigation, so much has the progress of biologic science, since he put his hand to it, been due to his labours. On the sands of many a track of biologic inquiry he has left his footprint, and his footprint has ever been to those coming after him a token to press on with courage and with hope. The truths with which he enriched science are made known in his written works; but that is a part only of what he did for science. No younger man, coming to him for help and guidance, ever went empty away; and we all—anatomists, zoologists, geologists, physiologists, botanists, and anthropologists—came to him. The biologists of to-day, all of us, not of this country alone, but of the whole world of science, forming, as it were, a scattered fleeting monument of this great man, are proud at the unveiling of this visible lasting statue here.

In conclusion, Sir M. Foster, facing the Prince, added the words:—May I crave your Royal Highness's permission to seize this opportunity to assure you incidentally, but none the less from the bottom of our hearts, on the part of men of science that we, in common with all Her Majesty's subjects, are rejoicing that you escaped the dreadful peril to which a few days back you were exposed, and to express to you our continued esteem and respect?

On Sir M. Foster's return to his seat among the committee, the Duke of Devonshire, speaking from in front of the veiled statue, said he had the honour nearly five years ago of presiding over the committee formed for the purpose of establishing a memorial to Prof. Huxley. He had now to report to his Royal Highness that the labours of that committee had terminated, and to say that the committee desired to present the statue to his Royal Highness on behalf of the trustees of the British Museum. They felt, however, that the real memorial to the deceased man of science was to be found in the writings which had already been referred to, and still more in the scientific work he accomplished or helped to promote, and in the influence he exercised and was still exercising upon the

minds of younger men, many of whom they trusted might at some future time emulate his distinguished example. On behalf of the committee he begged to tender his Royal Highness their thanks for having come to give a final sanction to their proceedings, and for having undertaken the duty of unveiling the statue that day.

The Prince of Wales then withdrew the covering from the statue, and brought the proceedings to a close with the following words:—

MY LORDS, LADIES AND GENTLEMEN,—I consider it a very high compliment to have been asked by the Huxley Memorial Committee to unveil and receive this statue, and to do so in the name of the trustees of the British Museum, of whom I have the honour to be one. I have not forgotten that fifteen years ago I performed a similar duty in connection with the fine statue of the celebrated Charles Darwin, which is at the top of the stairs, when it was similarly handed over to the British Museum. We have heard to-day most eloquent and interesting speeches with reference to that illustrious man of science and the great thinker, the late Prof. Huxley. It would, therefore, be both superfluous of me, I may even say unbecoming in me, to sound his praises here in the presence of so many men of science, who know more about all his work than I do. I can only, on my own behalf, endorse everything that has fallen from the lips of those gentlemen who have spoken, and I beg to repeat the expression of the great pleasure it has given me for the second time to have performed the interesting ceremony of taking over the statue of another great and illustrious man of science.

The statue is a colossal seated one of white marble, the figure being represented in a doctor's gown, with the right hand clasping one arm of the chair, and the left lying across the other with the fist clenched. The pedestal is of Verona marble on a black base, and bears upon its face the name and dates of birth and death in simple bronze letters.

The statue is a thoroughly successful work of art, and stands out in bold relief to the dim mystery of the recess in which it is placed. Though the expression of the face is perhaps a little severe, the features are true to nature; and when it is considered that the artist was never privileged with a sitting in life, and that the only material available to him were the death mask and an assemblage of none too favourable photographs, it must be admitted he has done well. Great praise must be given to the modelling of the hands, in which those who knew the great philosopher intimately will recognise a faithful portrayal of well-defined characteristics.

The first and main object of the Memorial has thus been successfully achieved. As for those which remain, the award at the Royal College of Science is to be known as the "Huxley Gold Medal," for the "promotion of science in the directions in which Huxley was distinguished," and especially for research to be carried on in the laboratory which bears his name. It has been further arranged that the use of the obverse die shall be granted to the Anthropological Institute (of which Huxley was practically the founder), in connection with the establishment by that body of a Huxley Lecture-ship, and a medal, for which they will furnish the reverse. Huxley's labours as an anthropologist are among the most important of his scientific career, and it may be questioned whether his "Man's Place in Nature," published against the advice of some of his friends, who feared his "ruin" did it appear, does not now rank among the best and most enduring of his works. His influence as an anthropologist was great, and devotees to that branch of science will hail with satisfaction this decision to perpetuate his memory.

#### PRELIMINARY NOTES ON THE RESULTS OF THE MOUNT KENYA EXPEDITION, 1899.

THE Mount Kenya Expedition left Nairobi, the then head of the Uganda Railway, on July 26, 1899, and returned to Naivasha, a station on the Uganda Road, on September 29. Considerable difficulties were experienced in the matter of commissariat, on account of the drought

and famine prevalent throughout East Africa. For this reason a longer sojourn on the mountain would have been impracticable, even if other circumstances had permitted of it.

Previous accurate knowledge of Mount Kenya rested chiefly on the work of Captain G. E. Smith, R.E., who had fixed the position of the peak, by triangulation along the Uganda Road, and of Dr. J. W. Gregory, who, in 1893, ascended the south-western slope to a height which appears to have been nearly 16,000 feet. An account of the 1899 journey is given in the May number of the *Geographical Journal*.

Mount Kenya is a vast flattened dome, seered with radiating valleys. It rises from a plateau, the level of which is 5000 to 7000 feet above the sea. Upon the crown of the dome is a precipitous pyramid, the cleft peak of which has an altitude of 17,200 feet. The entire *massif* measures about fifty miles from east to west and forty miles from north to south. Its northern slopes are crossed by the equator.

We made a plane table survey of the central portion of the mountain, and connected it by route surveys with Nairobi and Naivasha. The altitude of the central peak was determined by boiling point and theodolite, combined in four different ways, with an average result practically the same as that obtained by Captain Smith at a distance of ninety miles.

The central pyramid is the core of the denuded and dissected volcano, a fact first suggested by the late Joseph Thomson, who saw the mountain from the Laikipian plateau. Although not yet examined in section, the holocrystalline rock on the summit may probably be identified with the nepheline syenite obtained by Gregory at a lower level. The core must, therefore, have risen considerably above the present peak, and if allowance be made for still loftier crater-walls, the original height of Kenya may have equalled that of the still complete Kibo summit of Kilimanjaro.

The most significant point in the structure of the mountain is the fact that, while the major axis of the peak strikes west-north-westward and throws the glaciers down northern and southern slopes, the chief water-parting runs in a direction at right angles to this, past the eastern foot of the central peak, with the effect that the valleys are thrown off eastward and westward, and that all the existing glaciers belong to the westward drainage. From a series of rock specimens obtained at widely separated spots on the summit of the craggy ridge constituting the divide, it appears that the lie of the water-parting has been determined by a system of great dykes, which must almost have split the mountain in two.

There are fifteen existing glaciers, of which two are a mile in length, and the remainder are small. Their lower ends descend to about 14,800 feet. Everywhere and at all hours at the time of our visit the surfaces were dry and crisp. Comparatively little water flowed from them, and the stream banks below gave small indication of floods. The ice was intensely hard, and fed by fine hail rather than snow. These facts may be explained by the meteorological conditions. Although the air-temperatures were not very low at night, there was then great radiation into the cloudless sky. In the afternoon, on the other hand, a cloud cap regularly warded off the sunshine. The air was usually dry, the relative humidity falling on more than one occasion to 54 per cent.

Evidence of past glaciation was frequent down to 12,000 feet both in the eastern and western valleys, and there were occasional traces down to about 9000 feet. The whole of the central part of the mountain, with the exception of the peak and the dividing ridge, must have been buried under a sheet of glacier, more than comparable to that of Kilimanjaro, at a time later than the erosion of the existing valleys.



Snow was absent from the summit, and several species of brilliantly coloured lichen were collected there. Everlasting flowers grew in the rock chinks up to 16,500 feet. In the upper Alpine zone were two distinct species of giant groundsel and two of giant lobelia, seeds of which have been brought home. The greater part of our dried plants was lost, but the mosses and lichens were saved. A series of photographs of the Alpine vegetation in various stages of growth was taken by my colleague, Mr. C. B. Hausburg.

Mr. Oldfield Thomas has described, before the Zoological Society, the skulls and skins of the mammals collected by us. The most interesting is a new species of Rock Dassie (*Procavia Mackinderi*), whose nearest relative has recently been sent home from the Eldoma Ravine by Mr. F. J. Jackson (*P. Jacksoni*). Apart from these two species, no Rock Dassies have been found in any part of East Africa, nor are they known further south. *P. Mackinderi* appears to be isolated above the forest-zone (7000-10,000 feet) on Mount Kenya. A new Forest Dassie was obtained from a lower level.

This mountain block and the Rift Valley may be the necessary complements of one another.

Only a small collection of insects was obtained, chiefly in Kikuyu, but Prof. Poulton informs me that it includes new species of Coleoptera, Forficulidæ and Hymenoptera.

H. J. MACKINDER.

#### THE DUKE OF ARGYLL.

AMONG the losses which science is from time to time called upon to deplore, not the least serious arise from the death of men of prominent public position who have taken an active personal interest in the advance of natural knowledge, and have done their best to promote it. The late Duke of Argyll was an eminent example of this type of man. Heir of a long line of illustrious ancestors, who for many generations have played a leading part in the stormy annals of their native country, called early in life to the legislature where he mingled conspicuously in the political conflicts of his time, full of



Kenya Peak, from the south-west.

The collection of birds has been described by Dr. Bowdler Sharpe. It includes a new eagle owl, as large as the European species, which feeds on the rats of the Alpine zone of Kenya, and there are three other new species. Generally the birds are similar to those of Mount Elgon, and in a lesser degree to those of Kilimanjaro. This is strikingly indicated by the fact that if Mr. Jackson had not explored Mount Elgon in 1890, nearly every bird we obtained would have been new.

The few human inhabitants of Kenya are Wandorobo, elephant hunters, who live in the forest up to its higher limit. On one occasion a party of them was seen at over 12,000 feet.

To west of Mount Kenya is the so-called Aberdare Range, traversed for the first time by the members of our expedition. It consists of two much denuded volcanic stumps, Nandarua and Sattima, rising to 12,900 and 13,200 feet respectively, and of a raised block, 9000 feet high, defined by parallel fault scarps, which strike in the same direction as the scarps of the Great Rift Valley.

wide and generous sympathies which prompted him to speak or to write on most of the great questions that agitated the public mind during his long and brilliant career, the Duke yet found time to read much and widely in science, and to keep himself acquainted with the progress of scientific discussion and achievement. He was happily gifted with a marvellous versatility, so that he could turn rapidly from one sphere of thought and activity to another far removed. Hence, amid the cares of State and of the administration of a great domain, as well as in the sorrow of domestic bereavement, he was often to be found immersed in the perusal of some recent treatise, or carrying on a research of his own in those parts of the scientific field which more specially interested him. Whether as an acute critic of the labours of others, or as an observer of nature himself, his devotion to these pursuits remained a characteristic feature of his life from the beginning to the end. It is difficult at present to define with precision the extent and value of the services of such a man in the progress of the science of his time. His

own original contributions may be little in amount or importance, but his example and his enthusiasm, together with his political activity and his social rank, combine to make him a force in the land, which powerfully aids any good cause which he espouses. The death of the Duke of Argyll is thus an event which must be chronicled with sincere regret in the pages of a scientific journal.

It was through geology that the Duke first came practically in touch with science, and it was in geological pursuits and criticisms that he found the most congenial employment of his leisure moments. It is just half a century since, on a visit to his property in the Island of Mull, he found that one of his tenants had gathered a number of fossil leaves and plants from the rocks of the neighbourhood. At once appreciating the geological significance of these remains, he investigated their mode of occurrence, and recognised their association with sheets of lava and volcanic ashes. The plants were pronounced by Edward Forbes to be probably of Miocene age, and thus was securely laid the first stone of the edifice that has since been reared in illustration of the volcanic history of the Inner Hebrides. It is matter for regret that the Duke never followed up this important discovery.

Other geological fields attracted him, where he found ampler material for the exercise of that critical acuteness and the display of that forensic style of argument which made his writings so lively and so pungent. He had imbibed his earliest ideas of geological causation in the school of the cataclysmists, and to these ideas he adhered to the last. When the earlier views of Hutton and Playfair with regard to the denudation and sculpture of the land were revived and began to spread among the younger men, the Duke raised his protest against them, and poured on them the contempt and ridicule which they seemed to him to deserve. As they grew in acceptance, both in this and other countries, and as their advocates increased in number and in confidence, his vehemence of declamation seemed to augment in proportion.

Nor was this the only line along which the modern tendency in geological speculation seemed to the Duke to be running in an entirely wrong direction. When he began to interest himself in these questions, Agassiz' doctrine, that not only Britain but a large part of Europe was once buried under land-ice, had not been generally accepted. The geologists of this country preferred to account for the phenomena by supposing that the land had been submerged in a sea across which floating ice drifted. The Duke of Argyll was never able to accept the modern doctrine, except in a limited degree. He admitted the former existence of local valley-glaciers, but could not recognise the force of the evidence adduced to show that not only the valleys, but the surrounding hills had once been over-ridden by a vast sheet of ice.

The rise of the modern school of evolution afforded the Duke full scope for the exercise of his acute reasoning power and keen critical faculty. In article after article, address after address, and volume after volume, he subjected the doctrines of that school to the closest scrutiny. It may be freely admitted that he detected here and there a fallacy, and pointed out a conclusion different from, but not less probable than, that which his opponents had drawn. But perhaps his most valuable service lay in that border-land of philosophy and science in which he specially loved to exercise his thoughts and his pen. Even when men of science differed widely from his conclusions, they could not but admit that in his "Reign of Law" and his "Unity of Nature," he showed the wide range of his reading, the clearness and vigour of his reasoning powers, the force and eloquence of

his style, the grasp he had of some of the more difficult scientific problems of his day, the strong bent of his nature towards metaphysics, and, above all, the lofty tone of his sentiments in regard to the moral nature and destiny of man.

The Duke of Argyll was essentially a man of action, to whom the stir of conflict and the stimulus of controversy were not uncongenial. Even in his scientific discussions he could not always quite forego the style in which he vilipended the opposite party in the House of Lords or in the public prints. He seemed sometimes hardly to realise the full extent and meaning of the evidence which he was criticising. In conversation, indeed, he might appear for a time to be impressed by the force of this evidence, and be willing to admit that the truth might, perhaps, lie somewhere between his own views and those to which he was opposed. But the force of early conviction or prepossession would, in the end, be too strong for him, and possibly the next morning his opposition would be found to be as complete and confident as ever. Unflinching and resourceful as an antagonist, enforcing with almost passionate enthusiasm what he held to be the truth, independent and self-reliant alike in his opinions and his actions, dignified and courteous after the manner of an older time, he formed altogether a striking and picturesque personality.

But the energy of the doughty debater was combined with much personal kindness even towards those from whom he most seriously differed. Above all the other features of his character there shone out an intense love of nature and an eager desire to know more of her processes and laws. Year after year the Duke would spend weeks at a time in his yacht among the Western Isles, which he loved with all the enthusiastic devotion of one who was born and spent his youth among them. He was familiar with that western coast from one end to the other, under every change of sunlight and shadow. He had sketched every peak and crag and island, and he delighted to recall from his sketch-books the charm with which these scenes had fascinated him. To all their obvious attractions for the ordinary visitor his geological knowledge enabled him to join the fresh interest which is given to them by an acquaintance with the history of their remote past. In this way he kept himself in touch with some of the aspects of nature that most vividly appealed to his imagination. His poetic temperament found refreshment in these frequently renewed sojourns amid the varied scenery of the West of Scotland. As shown by his published writings, his wide acquaintance with modern English poetry furnished him with many an apt quotation and allusion. Tennyson's poetry seemed to be particularly familiar to him, inasmuch that a casual citation of a line or expression from that poet by one of the company would sometimes lead the Duke to quote from memory the whole passage.

As the head of a great historic clan, the Duke of Argyll was a true Scot, who had studied his country's history both geological and political, and had made himself personally acquainted with a large part of its surface. The geological problems that more particularly engaged his attention were largely those which his own Highland hills and glens had suggested to his mind. Now and then, in the midst of an eager conversation, a Scottish word or expression would come most readily to his lips as conveying the meaning he wished to express. Of his general services to the country at large this is not the place to speak. But we may confidently anticipate that when some future historian shall review the various forces which have furthered the advance of science in this country during the Victorian age, a well-marked place will be assigned to the services rendered by the Duke of Argyll.

A. G.

PROF. A. MILNE-EDWARDS.

IT is with sincere regret that we have to record the death, at the age of sixty-four, of Prof. Alphonse Milne-Edwards, the Director of the Paris Museum of Natural History, which took place at Paris on Saturday, April 21, after a brief illness. The late professor was of English descent, being the grandson of Mr. Bryan Edwards, M.P., a West Indian planter who settled at Bruges; and, with this ancestry, it is curious to note how extremely imperfect was his colloquial knowledge of the English language. His father, Prof. Henri Milne-Edwards, was the well-known eminent zoologist of Paris, who died in 1885; and father and son were for many years associated in zoological work.

Born in Paris in 1835, Alphonse Milne-Edwards took his medical degree in 1859, and was nominated Professor at the School of Pharmacy in 1865. In 1876 he acted as deputy for his father as Professor of Zoology at the Jardin des Plantes; in the following year he succeeded the late Prof. P. Gervais as a member of the Institute of the Paris Academy of Sciences; and in 1885 he entered the Academy of Medicine. In 1891, being already Professor of Zoology, he was appointed Director of the Paris Museum of Natural History and of the Menagerie in the Jardin des Plantes; his official title as regards the latter post being *Administrateur chargé de la Direction de la Ménagerie au Musée d'Histoire naturelle*.

Having published, in 1864, an important memoir on the anatomy and affinities of the Chevrotains, and a second, in 1866, on the osteology of the Dodo, in 1867 Milne-Edwards issued the first fasciculus of his magnificent work, entitled "Recherches Anatomiques et Paléontologiques pour servir à l'Histoire des Oiseaux Fossiles de la France," which was completed in four volumes (two of text and two of plates) in 1872. As mentioned by Prof. A. Newton, this monumental work marked an epoch in ornithology, for it showed the possibility of forming a classification of birds by means of their "long bones." Much interest was excited by the identification in this work of remains of peculiar existing African and Malagasy genera of birds in the French Tertiaries. While this work was in progress, Alphonse Milne-Edwards was associated with his father in bringing out the "Recherches pour servir à l'Histoire naturelle des Mammifères," which was commenced in 1868 and completed in 1874. A large proportion of the latter was devoted to the description of new types of mammals from Central Asia, among them being the many strange forms, like *Aeluropus*, then recently obtained by Père David in the Moupin district of Eastern Tibet. The period from 1866 to 1874 also saw the issue of "Recherches sur la Faune ornithologique éteinte des Îles Mascareignes et de Madagascar." And the late professor's interest in the Malagasy fauna was likewise shown in a paper on the embryology of the Lemurs, published in 1871, and in his contributions to Grandidier's "History of Madagascar," still in course of publication.

But it would be a mistake to suppose that the researches of Prof. Milne-Edwards were by any means restricted to mammals and birds. From an early period in his career his attention had been directed to the study of zoophytes and crustaceans; and later on he had attentively studied the animals adherent to submarine cables, which had been raised after a sojourn at the bottom of the sea. With this latter subject the study of the ocean floor was intimately connected. And in 1880 he brought before his Government the advisability of fitting out an expedition for submarine surveying, with the result that in the following year a party of savants, under his own direction, embarked on the *Travailleur* to survey the Gulf of Gascony. The results obtained were so important that the same vessel was again put at the disposal

of the professor, who completed the survey of the Gulf of Gascony, and explored the sea-bottom of the Strait of Gibraltar and of a considerable portion of the Mediterranean. In 1882 the *Travailleur* undertook a surveying voyage of the Atlantic as far as the Canaries. The year following the *Talisman* took the place of the *Travailleur*, and carried Prof. Milne-Edwards and his associates to the coasts of Portugal, Morocco, and the Canary and Cape Verde Islands, and then on to the Sargasso Sea, whence it returned by way of the Azores. The results of these dredging expeditions were published under the title of "Expéditions scientifiques du *Travailleur* et du *Talisman* pendant les années 1881, 1882 et 1883."

For these deep-sea explorations, Milne-Edwards was awarded the gold medal of the Royal Geographical Society. In 1876 he was elected a Foreign Member of the Zoological Society of London, and in 1882 a Foreign Correspondent of the Geological Society. He paid several visits to England, the last on the occasion of the Zoological Congress at Cambridge in 1898. R. L.

#### NOTES.

THE funeral of the Duke of Argyll will take place at the family burial ground, Kilmun, on the Holy Loch, on Tuesday next, May 8.

THE annual conversazione of the Institution of Electrical Engineers will be held at the Natural History Museum, South Kensington, on Tuesday, June 26.

THE Duke of Cambridge, president of the Sanitary Institute, will occupy the chair at the Institute dinner on Friday, May 11.

THE University of Göttingen has awarded the Volbrecht prize for scientific research to Dr. Gegenbauer, professor of anatomy at Heidelberg. The prize is of the value of 12,000 marks (600*l.*)

To commemorate the foundation of the k. k. geologischen Reichsanstalt of Vienna, in 1849, a jubilee meeting will be held in the great hall of the Institute on June 9, and representatives of science or of scientific institutions are invited to be present.

THE *Botanical Gazette* records the death by drowning, in September last, of Prof. Kyokichi Yatabe, the founder of the Botanical Society of Japan.

THE annual meeting of the American Association for the Advancement of Science will be held at Columbia University, New York, from June 25 to June 30.

WE learn, from the *American Naturalist*, that the herbarium and the principal part of the botanical library of Columbia University have been transferred to the New York Botanic Garden, and that, in future, the advanced work in botany of the University will be carried on in the laboratory of the Garden.

THE *British Medical Journal* states that the tenth award of the Riberi prize of 20,000 lire (800*l.*) will be made by the Royal Academy of Medicine of Turin on December 31, 1901, for the best printed or manuscript work, or the most important discovery, during the quinquennium 1897-1901, in the domain of experimental pathology, hygiene, or forensic medicine.

THE Franklin Institute has awarded John Scott medals and premiums to Mr. A. V. Groupe for his improved braiding machine, to Messrs. C. A. Bell and S. Tainter for their invention of the graphophone, and to Mr. A. M. Hopkins for his pneumatic system for preventing the bursting of water-pipes by freezing. Elliott Cresson medals have been awarded to Mr.

L. E. Levy for his acid-blast method of etching metal plates; and to Prof. W. O. Atwater and Mr. E. B. Rosa for their respiration calorimeter.

THE *Daily News* states that Lieut. R. E. Peary has forwarded some interesting relics to the Royal Naval College, Greenwich. These consist of the sextant left behind in Repulse Harbour by Lieut. Beaumont in 1876, and subsequently recovered by Lieut. Peary, and the original record deposited in a cache by Sir George Nares on Norman Lockyer's Island in 1875. The great meteorite which Lieut. Peary brought back from his last Arctic expedition still remains on the Cob Dock of the Brooklyn Navy Yard. The meteorite weighs 200,000 pounds, and Lieut. Peary wishes to obtain 15,000*l.* for it.

THE Trinity House steam vessel *Irene*, with the deputy master, Captain G. R. Vyvyan, on board, accompanied by a committee of the Elder Brethren and their scientific adviser, Lord Rayleigh, has proceeded to the Bristol and English Channels in order that special surveys in connection with new lighthouse works, and observations on both English and French lights from seaward, may be made.

THE death is announced of Mr. G. V. Ellis, who succeeded Prof. Quain as professor of anatomy in University College, London, in 1850, an appointment which he held for twenty-seven years, resigning in 1877, when he was appointed Emeritus Professor. Mr. Ellis was co-editor with the late Dr. William Sharpey of the sixth edition of "Quain's Elements of Anatomy," published in 1856, and the author of several works for students of anatomy.

AMONG the items included in the Prussian Budget is a sum of 7,300,000 marks, for the purchase of lands in Berlin, on which is to be erected a building for the Academy of Sciences and the Royal Library. The value of the land is estimated at more than 11,000,000 marks, but about 3,000,000 marks is obtained by the exchange of other property, and 1,000,000 marks is to be voted next year.

A SUMMER meeting of the Anatomical Society of Great Britain and Ireland will be held at the Owens College, Manchester, on Thursday and Friday, June 21 and 22. Opportunities will be afforded to members of seeing things of local interest during their visit to Manchester. An excursion to the Lake District will be arranged, and members who desire to join the party are requested to inform the local secretary, Dr. Peter Thompson, the Owens College, Manchester.

A COMMITTEE composed of many eminent men of science in France has been formed for the purpose of obtaining funds for the erection of a modest monument at Langres in honour of Auguste Laurent, the renowned chemist. Laurent was born at La Folie, near Langres, in 1808, and in 1831 became assistant to Dumas, under whom he acquired a special knowledge of organic chemistry, and carried on his original researches on naphthalene and carbolic acid, together with their derivatives. After filling various posts, the last of which was a chemical professorship at Bordeaux, Laurent became Warden of the Mint at Paris, where he remained in intimate connection with Gerhardt until his death in 1853. Subscriptions for the proposed monument should be sent to the treasurer of the Committee, M. Caublot, 45 rue de Belleville, Paris.

MR. JAMES MANSERGH has been elected president of the Institution of Civil Engineers, in succession to Sir Douglas Fox. Sir William White, K.C.B., F.R.S., Mr Charles Hawksley, Mr. J. C. Hawkshaw, and Mr. F. W. Webb have been elected vice-presidents. The following awards have been made for papers read and discussed before the Institution during the past session:—A George Stephenson medal and a Telford premium

to Sir Lowthian Bell, Bart., F.R.S.; Telford medals and premiums to Messrs. H. H. Dalrymple-Hay, B. M. Jenkin, F. W. Bidder and F. D. Fox; a Watt medal and a Telford premium to Mr. J. Dewrance; a Crampton Prize to Sir Charles Hartley; and Telford premiums to Messrs. C. N. Russell and R. A. Tatton. The presentation of these awards, together with those for papers which have not been subject to discussion, and will be announced later, will take place at the inaugural meeting of next session.

AMERICAN ethnology has been deprived of a prominent worker by the death of Mr. Frank H. Cushing. Mr. Cushing, says the *Scientific American*, was born in 1857, at Northeast, Pa., and when he was only eighteen years of age his work was brought to the attention of the late Mr. Spencer F. Baird, who was then Secretary of the Smithsonian Institution, and in 1875 he went to Washington as an assistant in that institution. He had charge of the ethnological exhibit at the Centennial Exposition of 1876, and in 1879 he accompanied an expedition from the Smithsonian Institution to investigate the Pueblos of New Mexico, and at his request was left at the Pueblo of Zuni, where he lived almost continuously for six years. He returned to Washington in 1884 and began to work up his voluminous notes. Two years later he was made Director of the Hemenway South-western Archaeological Expedition. Extensive excavations were made in South Arizona and New Mexico, and the large collection of objects of prehistoric art which he gathered is in the Peabody Museum at Cambridge, Mass. This work took up two and one-half years of his time, and then Mr. Cushing returned to the United States Bureau of Ethnology to supervise a memoir on the Zuni myths printed by the Bureau. Three years later he became director of the expedition fitted out by Mrs. Phoebe A. Hearst and the late Dr. William Pepper, conducted under the auspices of the National Museum, the Bureau of Ethnology and the University of Pennsylvania.

THE motion for the second reading of the Sea Fisheries Bill in the House of Commons, on Monday, resulted in a lively discussion. The Bill prohibits the sale of flatfish below a specified size, and its rejection was moved on the grounds that it would not have the effect of preventing the destruction of immature fish, or of increasing the supply of fish. In the course of the discussion, an honourable member said that the whole of the trouble arose from the institution of a number of committees composed of farmers, lawyers, and captains of the horse, foot, and artillery, who knew little of fishing, and who ventilated strange theories and supported them with portentous and irrelevant statistics. This remark was used as an argument against the Bill, but it may also be taken to mean that if fishery matters were controlled by scientific men familiar with the natural history of the sea, and questions concerning fisheries were referred to marine biologists, recommendations would be made upon which reasonable regulations might be based. Board of Trade statistics prove that there is a large destruction of immature fish, and that the quantity of fish landed has decreased during recent years. The Government, wishing to preserve a great national industry, have put forward the present Bill, which is really the Undersized Fish Bill of last year, and has appeared under various other titles in previous years. The discussion upon the Bill was not completed when the House adjourned on Monday.

THE report presented at the anniversary meeting of the Zoological Society, held on Monday, stated that the number of Fellows of the Society at the end of last year was 3246. The total income of the Society during the past year was 28,880*l.* The average annual receipts of the Society for the previous ten years have been 26,370*l.*, so that the receipts for 1899 exceeded that average by 2509*l.* The number of visitors to the Society's

Gardens in 1899 was 696,707. The number of animals now living in the Gardens is 2753, of which 821 are mammals, 1471 birds, and 461 reptiles and batrachians. Amongst the additions made during the past year, thirteen were specially commented upon as being of remarkable interest, and in most cases new to the Society's collection. Of these, by far the most noticeable objects exhibited for the first time were the pair of Grévy's zebras placed under the care of the Society by Her Majesty the Queen. These animals, which had been presented to Her Majesty by the Emperor Menelik of Abyssinia, were brought down to Zeila, on the coast of Somaliland, under the care of Captain J. L. Harrington, the British Political Agent. At Zeila they were handed over to the Society's assistant superintendent, Mr. Arthur Thomson, who had been sent there by the Council at the request of the Foreign Office on purpose to receive them, and by him they were landed safely in London on August 14 last year. The Council also called special attention to the young male giraffe, acquired in April 1899, by purchase, for the sum of 800*l.* It is believed that this animal, together with the female purchased in 1895, form the only pair of young giraffes now to be found in any of the zoological gardens in Europe. The works in connection with the new bore at the well and the new machinery for pumping were completed last year. The new water supply has been further improved by the construction of a second and larger reservoir, so that an excellent supply of water will henceforth always be available in every part of the Gardens.

MR. F. W. HASEL GROVE sends us a photograph of a robin's nest in a water-can, with the bird sitting upon its eggs, now to be seen at Finchley Cemetery. Robins are well known to build



their nests frequently in curious places, one of the most remarkable instances on record being that of a nest in a battered beer-can between the rails over which trucks were continually passing at Worthing railway station. Flower-pots and water-cans appear to be favourite nesting-places of the birds.

THERE are reasons for believing that the Scandinavians discovered America and settled in Massachusetts in pre-Columbian days. The evidence consists in the occurrence of certain ruins which correspond closely with ruins of the Saga-time in Iceland, but which differ from native dwellings and early European

ruins on the coast; and also in the correspondence in the physical features of the Massachusetts coast with the description of the country called Vinland in Icelandic literature. This evidence has recently been brought together in an illustrated article by Miss Cornelia Horsford in *Appleton's Popular Science Monthly*.

THE recent Norwegian earthquakes are studied by Mr. J. Rekstad in a paper published in the *Bergens Museums Aarbog* (1899, No. iv.). During the four years 1895-1898, the number of recorded earthquakes is 77, the corresponding number for Great Britain being 24, and for Greece, 1652.

A SLIGHT earth-shake occurred near Manchester at about 1.17 a.m. on April 7. It was felt at Pendleton, Pendlebury, Seedley, Salford and other places in the immediate neighbourhood of the Irwell Valley fault. The small disturbed area and the rather marked intensity of the shock point to a local origin, probably connected either directly or indirectly with the extensive coal-workings of the district. On February 27, 1899, a similar earth-shake was felt at the same places (see *NATURE*, vol. lxi. p. 546).

WE have received a reprint of a paper, published in the *Bulletin* of the Geographical Society of Philadelphia, "On the Nicaragua Canal in its Geographical and Geological Relations," by Prof. Hugelo Heilprin. The paper, which is illustrated by maps and photographs, discusses (1) the volcanic phenomena of the region of the proposed canal; (2) an assumed inconstancy in the level of Lake Nicaragua; and (3) the deformation of the Nicaragua coast-line. After pointing out the marked deficiency of trustworthy information concerning the region, especially with regard to lake and river topography and hydrography and dynamical geology, the author concludes that "the facts that are known render doubtful, or at least open to question, the advisability of constructing, or even the practicability, of a canal such as is contemplated." . . . "It may, perhaps, be properly questioned whether, if the canal had been constructed a hundred years ago, along the site that is now being contemplated, it would be in existence to-day."

THE current number of *La Geographie* contains a suggestive paper on the variation of the limits of the Mediterranean region, by M. Gaston Bonnier. It is pointed out that attempts to define the boundary from geological considerations have proved unsatisfactory, and that the region is more clearly distinguished by its climate. This may be traced in the flora, the Mediterranean region being roughly taken in France as the region of the olive. M. Bonnier contends that it can be more closely followed, especially in certain regions, by reference to other plants, and discusses a number of interesting observations with regard to exposure and elevation.

AT the close of an address recently delivered as president of the Anthropological Society of Washington, Mr. W. J. McGee enunciated the cardinal principles of science as follows:—"The indestructibility of matter, the contribution chiefly of chemistry; the persistence of motion, the gift mainly of physics; the development of species, the offering of the biotic sciences; the uniformity of nature, the gerund of geology and the older sciences; and the responsivity of mind, the joint gift of several sciences, though put in final form by anthropology." These principles are comprehensive enough, but they will not satisfy all students of epistemology, so much depends upon the point of view occupied.

THE manufacture of silk cord from spiders' web seems likely to attain commercial importance, for we learn through the *Board of Trade Journal* that one of the most novel exhibits in the Paris Exposition will be a complete set of bed-hangings

manufactured in Madagascar from the silk obtained from the halabe, an enormous spider that is found in great numbers in certain districts of the island. The matter has been taken up by M. Nogue, the head of the Antananarivo Technical School. The results he has already achieved show that the production of spider silk should quickly become a highly important industry. Each spider yields from three to four hundred yards of silk. After the thread has been taken from the spiders they are set free, and ten days afterwards they are again ready to undergo the operation. The silk of these spiders, which is of the most extraordinary brilliant golden colour, is finer than that of the silkworm, but its tenacity is remarkable, and it can be woven without the least difficulty.

We have received from the Agricultural Department of the Economical Society of Youriev (Dorpat) a report upon the results of rainfall and temperature observations made in the Baltic Provinces of Livonia and Esthonia during 1898. This is the thirteenth year of publication; the report contains a large amount of very useful statistics, including monthly and yearly means and the number of rainy days at no less than 203 stations. The same information is also shown very clearly in a graphical manner, together with a comparison of the year's results with a ten years' average. We note that the publication of the results for the year 1899 may be expected very shortly.

THE Weather Bureau of the United States has published a valuable discussion of the climate of San Francisco (*Bulletin* No. 28), by Messrs. A. G. McAdie and G. H. Willson. The work is based upon observations collected during the last thirty years, and the results are given in considerable detail on account of the important position of the town and the peculiarity of its climate. The authors state that if a native of San Francisco were asked which was the coldest month of the year, he might be unable to answer, and if asked which was the warmest, he might say November. This arises from the comparative small range of temperature; the mean annual temperature is about 56.2°. May and November have practically the same temperature; the warmest month is September, 60.9°, and the coldest January, 50.1°. The highest temperature recorded was 100°, in June, 1891, and the lowest 29°, in January, 1888. The mean of the three consecutive warmest days has never exceeded 76.3°, and the mean of the three coldest days was 40.7°. The annual rainfall is 23 inches. July and August are practically without rain, while December and January together have nearly 10 inches.

A SERIES of Lower Silurian fossils from Baffin Land, in the region between Hudson Bay and Davis Strait, has been described and figured by Mr. Charles Schuchert (*Proc. U.S. Nat. Museum*, vol. xxii. 1900). The fossils belong to the Trenton group, and the strata rest unconformably on old crystalline rocks. The author notes the early introduction in the Baffin fauna of Upper Silurian genera of corals, such as *Halysites*. He also remarks that the corals, brachiopods, gasteropods and trilobites have a wide distribution, and are less sensitive to differing habitats than the cephalopods or lamellibranchs.

IN an article on the Dwyka Coal-measures (*Trans. S. African Phil. Soc.* vol. xi.), Mr. E. J. Dunn points out that the Dwyka conglomerate, which occurs at the base of the coal-bearing series, is a most valuable horizon, and that its length of outcrop exceeds 2000 miles. This is shown on an accompanying map. Within this outcrop coal may be present at varying depths over an immense area, extending from the southern part of the Transvaal to Kimberley and near East London. Borings alone can decide if profitable seams occur, and if so, at what depths.

It is well known that the blood of animals that have been poisoned with carbonic oxide loses its power of absorbing oxygen. Dr. Adolfo Moutuori, writing in the *Rendiconto* of

the Naples Academy, describes experiments tending to explain the fact that dogs are capable of surviving the injection into their veins of a quantity of carbonic oxide far greater than would poison them if inhaled. It is found that the poisoned blood reacquires its power of absorbing oxygen when it is brought into contact with the pulmonary tissues, but not otherwise.

THE statics and dynamics of pseudospherical space in three dimensions form the subject of a memoir by Prof. D. de Francesco in the *Rendiconto* of the Naples Academy. Defining the co-ordinates of a point as the hyperbolic sines of the perpendiculars on three principal orthogonal planes of reference, the author introduces the conception of the moment of a force with regard to a point, analogous to the moment in ordinary statics, and, in addition, the new notion of the co-moment, of which an analytic expression is given. By representing forces by the hyperbolic sines of segments measured on their lines of action the equation of virtual work is established, and by applying this equation to a rigid system the author determines the six characteristics, the central axis, and the invariants. Starting from the conception of the co-moment, the problem of dynamics is treated by the method of Poinso. Two invariants are found, and the conditions for their vanishing lead to remarkable geometrical properties, which do not exist in ordinary mechanics. The same author discusses in the *Atti dei Lincei* the kindred problem of integration of the differential equations of free motion of a rigid body in space of constant curvature.

MR. J. E. GRIFFITH, of Bangor, author of the "Flora of Carnarvonshire and Anglesey," proposes to publish a series of photographic reproductions of the cromlechs of these two counties of Wales. The series will contain forty-three photographs of thirty-six different cromlechs.

A RUMOURED project of reclaiming Wicken Fen in Cambridge-shire, forming the subject of a recent leader in the *Standard*, once more raises the question as to the desirability of acquiring by public subscription this last remaining habitat of the old fauna and flora of the Fen district, and thus saving them from extinction. Such a project was suggested some time ago by Mr. Carrington, the editor of *Science Gossip*, and it is much to be hoped that a movement may be set on foot for the purpose before it is too late.

We have received No. 3 (vol. i.), for April, of *Climate*, "a Quarterly Journal of Health and Travel," edited by Dr. C. F. Harford-Battersby. The periodical is the organ of the Travellers' Health Bureau, the object of which is to supply to inquirers information of every kind connected with the health and comfort of travellers and of residents in unhealthy climates. Among the original articles in the number before us is a very interesting one on "Gardening in West Africa," by Miss Kingsley, and a *résumé* of the facts at present ascertained connecting malarial fever with the parasite of the mosquito. A short paper on "European Children in Tropical Climates," by Dr. G. D. McReddie, will be read with interest by many.

A "FLORA OF BOURNEMOUTH" is announced for early publication by the Rev. E. F. Linton, of Bournemouth (subscription price, 7s. 6d.). The area taken is a radius of twelve miles, and includes portions of the counties of Hants and Dorset, with the Isle of Wight. The total number of flowering plants and Pteridophytes is stated as 1137.

IN the *Naturwissenschaftliche Wochenschrift* for April 15, Prof. M. Möbius gives an interesting account of pigments in the vegetable kingdom. Commencing with the colouring matters of fungi and lichens, he proceeds to those in the various groups of Algae, and then to the pigments of Muscineæ, Pteridophytes, and Phanerogams, contained in the stem, root, leaves, flowers,

and fruits. He regards chlorophyll and hæmoglobin as antagonistic substances, the one characteristic of the vegetable, the other of the animal kingdom.

To the *Sitzungsberichte* of the Berlin Academy for March 15, Dr. K. von Möbius, the director of the Zoological Museum, communicates a suggestive paper on our perception of the æsthetic proportions of various mammals.

THE April number of the *Journal of Anatomy and Physiology* contains the full text of the paper read by Dr. Albert Gray at the last meeting of the British Association on Helmholtz's theory of hearing. The author proposes a modification of the theory of the German investigator, according to which a remarkable analogy between the senses of hearing and touch is shown to exist.

IN the last issue of the *Transactions* of the South African Philosophical Society, Dr. R. Marloth gives the results of his investigations as to the mode of growth of the barnacle infesting the Southern Bight Whale. Were it not for some special provision, the growth of the epidermis beneath, coupled with the wearing away of the outer layer, would soon cause the parasite to be shed, and, as a matter of fact, this actually takes place with the dead shells. The living barnacle cannot, however, be discarded in this manner, since it dissolves the part of the epidermis with which its skin is in contact at the same rate at which fresh epidermal tissue is formed below. Consequently the layer of epidermis between the barnacle and the true skin never varies in thickness, and the parasite accordingly retains its position, the shell disintegrating at the apex at the rate at which it grows at the base.

MM. GAUTHIER-VILLARS, Paris, have published the third revised edition of the "Traité élémentaire d'Electricité avec les principales Applications," by M. R. Colson.

MR. FELIX L. DAMES, Berlin, has issued a catalogue of books and papers on astronomy, geodesy, meteorology and related sciences, which he has acquired from the library of the late Dr. H. Romberg, and offers for sale.

THE seventh edition of the late Prof. Milnes Marshall's well-known and practical manual on "The Frog: an Introduction to Anatomy, Histology, and Embryology," edited by Dr. G. Herbert Fowler, has been published by Mr. David Nutt. The chief addition consists of a new series of woodcuts in illustration of the development and metamorphosis of the frog.

THE "Handbook of Jamaica," compiled by Mr. T. L. Roxburgh and Mr. J. C. Ford, and published by Mr. Edward Stanford, is filled with historical, statistical and general information concerning the island. We notice that the magnetic declination, which was 6° 30' E. at the end of last century, and has been steadily decreasing since then, is now only 1° 24' E., and in 1910 its value will be zero.

IN the course of a few weeks, Mr. Gustav Fischer, Jena, will commence the publication of "Aus den Tiefen des Weltmeeres," an elaborate work in which Prof. Carl Chun will describe and illustrate the German deep-sea expedition to Antarctic waters. The work will be published in twelve parts, the first of which will appear during this month and the last in November.

A SIXTH edition, revised and enlarged, of "A Text-book of Assaying," by C. and J. J. Beringer, has just been published by Messrs. Charles Griffin and Co. Mr. J. J. Beringer is responsible for the revision of this handy book for assayers; and he remarks in the preface: "The principal changes in this edition are additions to the articles on gold, cyanides and nickel, and a much enlarged index. The additional matter covers more than forty pages."

SCIENTIFIC students and investigators in Melbourne should be grateful to Mr. T. S. Hall for the "Catalogue of the Scientific and Technical Periodical Literature in the Libraries in Melbourne," which he has prepared. Besides periodicals, the list includes reports of scientific societies, as well as Government reports and Parliamentary papers of scientific import. The catalogue will be a very useful guide to scientific literature accessible in Melbourne and its suburbs.

THE sixteenth part of Mr. Oswin A. J. Lee's fine work, "Among British Birds in their Nesting Haunts, illustrated by the Camera," has just been published by Mr. David Douglas, Edinburgh. The birds illustrated and described are the black-cap, bullfinch, short-eared owl, yellow wagtail, stock dove, pintail, wryneck, and lesser whitethroat. The present part completes the fourth volume, and it is hoped that the whole work will be finished in the course of a few months.

AT the meeting of the Chemical Society on June 1, 1899, Prof. Sydney Young, F.R.S., described a series of tests made by him to determine the relative efficiency of various forms of still-heads for fractional distillation. The design of several new still-heads, superior in many respects to those in common use, was an outcome of the investigation; and chemists will be glad to know that Messrs. J. J. Griffin and Sons have now placed these improved forms upon the market.

THE additions to the Zoological Society's Gardens during the past week include a Mozambique Monkey (*Cercopithecus pygerythrus*, ♀) from Uganda, presented by Lady Ashburnham; two Leopards (*Felis pardus*, ♂ ♀) from India, presented by Mrs. C. Simpson; a Tawny Owl (*Syrnium aluco*) from Scotland, presented by Mrs. C. M. Blackwood; six Common Vipers (*Vipera berus*) from Dorsetshire, presented by Mr. A. Old; nine Natterjack Toads (*Bufo calamita*) from Norfolk, presented by Mr. J. B. Thornhill; a Sykes's Monkey (*Cercopithecus albigularis*, ♀), a Flap-necked Chameleon (*Chamaeleon dilepis*) from East Africa, a Cactus Conure (*Conurus cactorum*) from Bahia, deposited; two Gold Pheasants (*Thaumalea picta*, 2 ♀), two Silver Pheasants (*Euplocamus nyctemerus*, 2 ♀), two Cabot's Horned Tragopans (*Cerionis caboti*, ♂ ♀) from China, two Germain's Peacock Pheasants (*Polyplectron germaini*, ♂ ♀) from Cochin China, two Japanese Pheasants (*Phasianus versicolor*, ♂ ♀), two Scemmerring's Pheasants (*Phasianus soemmerringi*, ♂ ♀) from Japan, three White-backed Trumpeters (*Psophia leucoptera*) from the Upper Amazons, four Wonga-Wonga Pigeons (*Leucosarcia picata*) from New South Wales, a Musky Lorikeet (*Glossopsittacus concinnus*) from Australia, three Blue-crowned Hanging Parrakeets (*Loriculus galgulus*) from Malacca, an Ural Owl (*Syrnium uralense*), North-east European; a Great Wallaroo (*Macropus robustus*, ♂) from South Australia, a Barbary Wild Sheep (*Ovis tragelaphus*, ♂) from North Africa, purchased; a Yak (*Poephaqus grunniens*, ♂), born in the Gardens.

#### OUR ASTRONOMICAL COLUMN.

NEW VARIABLE IN TAURUS.—In the *Astronomische Nachrichten* (Bd. 152, No. 3635) M. W. Ceraski, of Moscow, announces the discovery of another new variable by Madame Ceraski during her examination of the plates taken by M. S. Blajko. The star's position is:—

R.A.		Decl.	
h.	m.	°	'
5	33 17.33	+26	18 58.3 (1900)
5	30 29.56	+26	17 7.9 (1855)

The star is not found in the B.D. At its maximum it is of 9.0-9.5 mag.; at minimum, about 12 mag. or less. On 1900 March 29, it was at the limit of visibility in a telescope of 4.5 inches aperture.

SEARCH EPHEMERIS FOR EROS.—In view of preparing for observations of this minor planet during the coming opposition, the following ephemeris has been prepared by J. B. Westhaver from the elements computed by H. N. Russell (*Astronomical Journal*, No. 479, vol. xx. p. 185).

*Ephemeris for 12h. Greenwich Mean Time.*

1900.	R.A.		Decl.	Mag.
	h. m.	s.		
May 3 ...	23	2 0'1	... -4 0 25	... 13'4
5 ...		5 46'7	... 3 28 2	...
7 ...		9 32'3	... 2 55 29	... 13'3
9 ...		13 16'9	... 2 22 45	...
11 ...		17 0'5	... 1 49 52	... 13'3
13 ...		20 43'1	... 1 16 48	...
15 ...		24 24'9	... 0 43 35	... 13'2
17 ...		28 5'8	... 0 10 11	...
19 ...		31 45'8	... +0 23 22	... 13'2
21 ...		35 25'0	... 0 57 4	...
23 ...		39 3'3	... 1 30 55	... 13'1
25 ...		42 40'8	... 2 4 55	...
27 ...		46 17'5	... 2 39 4	... 13'1
29 ...		49 53'3	... 3 13 22	...
31 ...	23	53 28'4	... +3 47 48	... 13'0

RELATION BETWEEN SOLAR ACTIVITY AND EARTH'S MOTION.—In the *Astronomische Nachrichten* (Bd. 152, No. 3635), Mr. W. G. Thackeray criticises the recent paper by Dr. J. Halm (*Astr. Nach.* Bd. 151, No. 3619, NATURE, March 8, p. 445), deducing certain relations between the sun-spot cycle, the changes in the obliquity of the ecliptic and the variations of the terrestrial latitude. Mr. Thackeray states first, that continuous observations of sun spots have only been made since 1825, so that the sixty years period lacks sufficient evidence; secondly, that Dr. Halm has ignored some of the systematic errors of observation, particularly those depending on the corrections for temperature in the transit circle reductions, although in some cases their amount affects the value of the obliquity by as great a quantity as the whole amplitude of Chandler's long period inequality of latitude variation. The paper includes a table showing the annual corrections to Leverrier's obliquity from 1836-1896, with corresponding yearly means of Wolf's spot numbers. These differ from the values adopted by Dr. Halm, and the resulting plotted curves show little or no resemblance.

DETERMINATION OF SOLAR PARALLAX FROM OPPOSITION OF EROS.—In the *Astronomical Journal* (No. 480, vol. xx. pp. 189-191), Prof. S. Newcomb directs attention to the favourable opportunity for determining the Solar Parallax which will be afforded by the coming opposition of the minor planet Eros, in December 1900, the conditions being conducive to more accurate direct measurements than have ever before been presented. As another such favourable opportunity will not occur for more than thirty years, several suggestions are made for determining the best combination of observations.

The period during which determinations may be made is remarkably long, as during the five months from 1900 October 15 to 1901 March 15, the distance of the planet will be less than 0'50 astronomical unit.

The high degree of precision attainable in late years by photography indicates this as the best method, an additional point in favour of this plan being that photographic telescopes are already in use at various stations, and need only devoting to this work. In arranging the programme of observations three objects should be kept in view:—

First, the station and hours of exposure should be so chosen as to secure the maximum of parallactic angles.

Secondly, endeavour should be made to secure simultaneous exposures at different stations, in order to lessen the uncertainties arising from differences of scale, changes in relative position of planet among stars, and in the reduction of the position of the planet from hour to hour. Series of independent determinations should also be made, each within an interval of twenty-four hours.

Thirdly, the relative displacement should, as nearly as possible, be in a direction at right angles to the motion of the planet among the stars.

Prof. Newcomb then describes four charts included in the paper, showing projections of the earth as seen from Eros at the Epochs (1) middle of October to end of November; (2) about December 16; (3) about January 10; (4) about February 1. On these are marked the sunset and sunrise lines, and parallels

of latitude corresponding to the principal observatories: Helsingfors, Pulkowa, 60° lat.; Greenwich, Paris, Potsdam, &c., 50° lat.; Jamaica, Madras, 15° lat.; Arequipa, -15° lat.; Cape of Good Hope, -35° lat. On these projections the direction of the planet's motion for different dates is indicated, so that observers may find by inspection the relative importance of observations at various stations and at various times of night.

Respecting the degree of precision it may be possible to attain in the final result, it is noticeable that the course of the planet throughout the entire period will lie along the borders of the Milky Way, ensuring more and nearer comparison-stars than would otherwise be available. An element of uncertainty is the probable error of measurement from the plates. From a consideration of Kapteyn's investigation of the Helsingfors parallax plates, and those at Potsdam, it is likely that the probable error of the solar parallax from a pair of simultaneous plates at Arequipa and Helsingfors would be  $\pm 0''\cdot 02$ , and even this might be reduced were it not for the uncertainty arising from the motion of the planet.

*WORKING SILICA IN THE OXY-GAS BLOWPIPE FLAME.*

THE plastic state of silica, and the elasticity of fine threads of vitreous silica, were first observed by M. Gaudin (*Comptes rendus*, viii. 678, 711) in 1839; but his observations seem to have attracted but little attention, and the valuable qualities of "quartz threads" remained unutilised till they were independently rediscovered and applied by Prof. C. V. Boys in 1887.

Similarly, M. A. Dufour succeeded, in 1869, in making very narrow tubes of silica, and showed such tubes in Paris in the year 1878, but he failed to make further progress, even with the aid of M. Moissan's electric furnace (*Comptes rendus*, cxxx. 816, March 26), and his early work was so completely forgotten, both in France and England, that the latest French worker on the subject, M. A. Dufour, was evidently unaware of its existence a few weeks ago (*Comptes rendus*, cxxx. 775, March 19).

But though it thus appears that Prof. Boys was not, as has been supposed, actually the first physicist to draw silica into threads, or work it into fine tubes, there can be no doubt but that his observations, methods of working and experiments have formed the basis of all that has been done since the publication of his first paper in 1887.

In June 1899, one of the authors of this article exhibited (in conjunction with W. T. Evans), at the Royal Society's soirée, a tube of vitreous silica, about 12 cm. in length and 1 cm. in diameter, and at the same time showed the process by which it had been made. Since that date we, the present writers, have made a good deal of further progress. We have succeeded in making longer tubes of various thicknesses, and in joining such tubes both end to end and at right angles. On February 22, we filled and sealed an ungraduated mercury thermometer made entirely of vitreous silica<sup>1</sup>; and what is equally important, we have entirely overcome the difficulty caused by the great tendency of quartz to splinter when suddenly thrust into the oxy-gas flame. We therefore now publish a short account of our methods in the hope that they may enable others to take advantage of the new material without undertaking a tedious preliminary investigation into its properties and the methods of working it. We may perhaps be permitted to add that we have already commenced experiments intended to test the suitability of silica for use in mercury and air thermometers, especially in regard to the fixity, or otherwise of their zero points, that M. A. Dufour is engaged on similar work, especially in relation to high temperature thermometers, and that we are also studying the fitness of silica apparatus for researches on the properties of pure gases.<sup>2</sup>

*To prepare Non-splintering Silica.*—The best form of silica for use before the blowpipe is rock crystal. This may be obtained in the form of chippings, or in masses which have proved unsuitable for optical work. We have experimented with the lighter particles of Kieselguhr, after well washing them with strong hydrochloric acid, and also with well-washed precipitated silica; but, though these can be worked before the blowpipe without much difficulty, they have not proved satisfactory in our hands, as they yield an opaque product which is only suitable for a few purposes.

<sup>1</sup> NATURE, April 5, p. 540.

<sup>2</sup> This will obviously involve a careful investigation into its power of condensing gases and vapours.



In order to prepare non-splintering silica from native masses of rock crystal, the latter must be heated in a Bunsen flame, unless they are already perfectly clean, until the outer impure layers can be removed easily by a blow from an iron pestle or hammer. The clean masses of silica must then be heated in a vessel containing boiling water for some time, and dropped whilst hot into clean cold water. This treatment will cause the masses to crack to such an extent that they may easily be broken into fragments of convenient dimensions by sharp blows from a clean hammer. When the material has thus been broken up, the fragments must be examined one by one, and all those which contain foreign matter must be rejected. Finally, the selected fragments must be heated to a yellow-red heat in a platinum dish, and then quickly thrown into deep cylinders containing cold distilled water. After the quartz has been treated in this manner twice, it will be found to be semi-opaque and very much like a white enamel in appearance. It may now be brought safely into the oxy-gas flame, or be pressed suddenly against masses of white-hot plastic silica without any preliminary heating, such as is necessary in the case of the natural quartz. These processes do not occupy much time, and the use of the prepared material saves a great deal of time and trouble at the subsequent stages. We have tried unprepared opal and natural cloudy quartz, but both these splinter badly.

*The Blowpipe.*—We have worked silica both in the flame of an ordinary "blow through" jet, and in the flame of a good "mixed gas" burner. We find the latter gives by far the more satisfactory results. The large "blow through" burners, such as may be used for welding and melting iron, or for melting platinum, do not give satisfactory results, from an economical point of view, with silica.

*Some necessary precautions.*—In working silica it is necessary to use very dark glasses to protect the eyes. The darkest glasses usually supplied by spectacle makers are not, in our experience, satisfactory. We use spectacles made specially from glass so strongly darkened, that it is difficult at first to work with them at all. We lay some stress on this matter, as we are satisfied that want of care in selecting the spectacles would be likely to result in injury to the sight of any one who should work silica before the blowpipe frequently, and for long spells.

*Relative difficulty of working Glass and Silica.*—The fashioning of apparatus from silica before the blowpipe is expensive, for the consumption of oxygen is large, and it demands some patience to build up large pieces of apparatus from shapeless masses of quartz. But owing to the remarkable fact that properly prepared silica, and also silica rendered vitreous by fusion, may be plunged directly into the hottest part of the oxy-gas flame, and afterwards be suddenly cooled, and reheated and recooled, apparently as frequently as one pleases, without any risk of its cracking, it is really very much easier to manipulate silica than any variety of glass. The most careless and most inexperienced worker runs no risk of breaking his apparatus through want of skill in managing the flame, or through the exigencies of his affairs compelling him to put aside half-finished work. It is important, however, to apply the flame to the opaque prepared silica, in the first instance, in such a way as to avoid the forming of air bubbles. Our practice is to heat first the lowest surface of each fresh mass of silica, and to take care that fusion proceeds regularly from below upwards. If this be done, a perfectly clear glass-like product is obtained.

Silica is very liable to exhibit a phenomenon resembling devitrification, especially at the earlier stages before the traces of sodium and lithium, which seem to be present in most quartz, have been expelled. In order to avoid permanent injury to the finished work from this cause, care must be taken to employ a quiet flame. If this be done, any devitrification that may appear will be removed easily by reheating the disfigured surfaces.

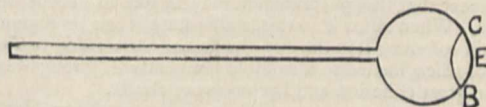
*To make Silica Tubes.*—Before one commences to construct apparatus of silica it is well to prepare a stock of the vitreous material in the form of rods about 1 mm. in diameter. These are made by holding a small lump of non-splintering silica in the flame, by means of forceps with platinum tips, so as to melt one corner of the mass, pressing a second fragment of the material against the heated spot till the two adhere, heating the second portion from below upwards until it assumes a clear vitreous appearance, then adding a third fragment of silica to the second, a fourth to the third, and so on, until an irregular rod has been formed. Finally, this irregular rod must be reheated in small sections at a time, and drawn out to the desired extent.

These rods are easily made by any one; a capable laboratory boy will produce about a score of rods 20 cm. long in an hour, after a few days' practice at the work; but his consumption of oxygen must be watched closely. The platinum tongs do not suffer much if one works in the manner described, for after the first start off they are only used to press cold fragments of silica against the fused ends of the growing rods. Our forceps have been used by four beginners, and are quite unharmed after several years.

When a supply of the rods of vitreous silica has been prepared, bind a few of them, at their ends, with fine platinum wire round a rod of platinum 1 to 1.5 mm. in diameter; heat the silica cautiously till the rods adhere to one another, and then withdraw the platinum core. If the tube is not perfect, add bits of silica at the defective places and reheat them. Close one end of the rough tube thus produced and blow a small bulb upon the closed end, proceeding in the manner employed for producing glass bulbs. Heat the bottom of the bulb, attach a rod of silica to it, reheat the whole bulb and then draw it out into a tube. Blow a fresh bulb at one end of the fine tube thus made, and draw this out in its turn until the tube is six or seven cm. in length. By the time this is accomplished the worker will have discovered that the hottest spot in his oxy-gas flame is just inside the tip of the inner cone, but not too near the orifice of the jet; and after this, if he can perform the simpler operations of glass working, he will, with a few weeks' practice, find it easy to make larger apparatus by following the simple instructions given below.

The chief difficulty met with when one wishes to make large bulbs, tubes, &c., is due to the fact that the only thoroughly satisfactory burners give comparatively small flames, and that it is only the hottest parts of these flames that give the desired results. There is no doubt, however, that suitable combinations of small burners could be contrived if they should be demanded, for the production of apparatus of really considerable dimensions.

In order to convert a small bulb of silica into a large tube, proceed as follows:—Heat one end of a fine rod of vitreous silica, and when it is in the plastic state apply it to the bulb at the point C. Then soften the adjacent parts of the rod and allow them to fall upon the bulb so as to form a ring C B, attached to the bulb. Heat the end of the bulb and C B till the silica softens, then blow out the end in the usual manner. If this process



is repeated the bulb will first become ovate and then form a short tube which can be lengthened, practically speaking, indefinitely. Tubes of 1.5 cm. diameter and of considerable length are easily made in this way by a patient person. It does not answer to add lumps of silica at E and then to blow them out; we had no success in working silica till we abandoned that method. The sides of a tube formed in that way are too thin, and blow-holes constantly form in them. The tubes are easily thickened, when necessary, by adding rings of silica, reheating these, and blowing them to spread the material as one would do when working glass. It is best to blow through a chamber containing potash. If this is connected to the end of the silica tube by india-rubber "valve" tube, one is able to move the silica tube with sufficient freedom. If a large tube is being made, it is best to blow out the softened material whilst it is still in the hottest part of the flame, but smaller objects may be transferred to the less hot parts of the flame with advantage at the moment of blowing. When a comparatively large object must be uniformly heated, it is convenient to place a sheet of silica in front of the flame a little beyond the object to be heated, in order that it may throw back the flames upon those parts of the material which are turned away from the chief source of heat. A suitable plate of silica is easily made by sticking together small, rounded masses of vitrified quartz.

We find that it is not difficult to produce tubes of various thicknesses and various internal diameters by heating and collapsing thin tubes made as described above, and that fine capillaries, "thick millimetre tubes," and tubes of two or three millimetres bore, of moderate thickness, can be produced in this way. Thermometer stems are best made by adding rings of silica to small bulbs, thickening them in the flame till their cavities are

very small, and then quickly drawing them out whilst soft. Finally, we may add that tubes of silica can as readily be sealed to one another as tubes of glass, and that T-pieces and side tubes generally may be formed by fixing rings of silica in the positions to be occupied by the side tubes and extending them by blowing as already described, or by attaching tubes of suitable dimensions, previously prepared, to short side tubes blown as just described. It is therefore possible to construct such apparatus as Geissler tubes, small distilling tubes, and thermometers with stems of the German type, &c. We feel sure that small flasks could easily be made also by means of suitable combinations of several oxy-gas burners, though doubtless they would be rather expensive.

Finally, solid rods of silica five or six millimetres in diameter can be made by putting together small masses of prepared silica, or better by pressing together in the flame the softened ends of the fine rods already described.

*Notes on some Properties of Vitreous Silica.*<sup>1</sup>—A good many of the properties of silica have already been described by Prof. Boys, but a knowledge of the following, some of which are, we think, now described for the first time, will be found useful:—

(1) Vitreous silica is a very poor conductor of heat; hence it is possible to hold a thick rod of silica very close to a strongly ignited zone.

(2) Our colleague, the Rev. H. Pentecost, finds that vitreous silica is less hard than chalcedony, but harder than felspar. Its surface appears to be about equally hard after it has been heated as strongly as possible and cooled suddenly, and after it has been heated and cooled in the air. Tubes of silica may be readily cut by means of a cutting diamond, and also with a good file of hardened steel.

(3) It has already been stated that cold vitreous silica can be plunged safely into the hottest part of an oxy-gas flame, and that the heating and cooling process can be repeated with impunity. Hot vitreous silica bears sudden cooling equally well. We have repeatedly plunged thick rods and large tubes of silica, heated till plastic, into cold water and even into fusible metal below 100°, without any injury to the material, for when afterwards cut with a diamond it did not fly.<sup>2</sup>

On the other hand, threads of silica become rotten when heated to the highest temperature of an ordinary blowpipe.<sup>3</sup> Large objects seem to be affected to a much less degree; and we suspect that this phenomenon may be due to surface devitrification. When silica is in this friable state it can be re-annealed by again softening it in the oxy-gas flame. According to Gaudin, wires of silica heated to a suitable temperature ("rouge-blanc") acquire great cohesion and become very elastic.

We have not yet succeeded in fixing platinum electrodes securely into silica tubes. But we have reason to hope that this may be found to be practicable by the use of kaolin, or some other natural silicate. Meanwhile, it seems possible that they might be soldered into the silica if necessary (see "Laboratory Arts," by R. Threlfall).

We may add that, according to M. Gaudin, emerald gives threads which are even more tenacious than those of silica.

Clifton College.

W. A. SHENSTONE.  
H. G. LACELL.

### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—The following is the Speech delivered, on April 26, by the Public Orator (Dr. Sandys) in presenting Mr. CHARLES HOSE for the degree of Doctor in Science, *honoris causa*.

Insulae Borneonem orbis terrarum inter insulas omnes prope maximam esse constat. Insulae autem illius insulis nostris fere duplo maioris in parte septentrionali patet regio quae unum e Britannis regem suum esse gloriatur. In eadem vero regione provincia quaedam, fluviorum ingentium infra confluentes, abhinc annos decem alumno nostro tradita est, qui barbarorum animos bellicosos pacis ad foedera vocavit, et armorum certamina saeva certaminis nautici in ludum mutavit. Idem non modo in foedere inter barbaros sanciendo victimarum caesarum haruspes sollertissimus, sed etiam avium in silvis volantium augur et

auspex admirabilis exstitit. Ergo alumni nostri auspiciis et Helvetiae et Bataviae et Germaniae et Galliae et Britanniae musea avium et animalium exemplis eximiis aucta et suppleta sunt, et insulae ipsius zoologia, anthropologia, geographia, novo lumine illustratae. Talia propter merita alumnus noster non modo inter nosmet ipsos a regia geographiae societate praemio singulari donatus est, sed etiam inter Europae gentes tum aliis honoribus ornatus est, tum praesertim inter Germanos falconis albi eques iure optimo nominatus est. Nostra denique zoologiae, anatomiae, archaeologiae musea iam plus quam decimum per annum alumni nostri liberalitatem loquuntur. Ergo nos quoque insulae tantae non modo avium et animalium venatore assiduam, sed etiam montium et fluminum exploratorem intrepidum, ob scientiarum fines etiam imperii Britannici prope terminos feliciter propagatos, laurea nostra hodie libenter coronamus.

Duco ad vos museorum nostrorum patronum liberalissimum, exploratorum nostrorum hospitem benignissimum, CAROLUM HOSE.

The General Board propose the establishment of a lectureship in ethnology, to which Dr. Haddon may be appointed; and a lectureship in bacteriology and preventive medicine for Dr. Nuttall. Both have unofficially given valuable instruction in their respective subjects, and the recognition now suggested will probably be readily accorded by the University. New lectureships in experimental physics and in agricultural chemistry are also proposed.

The Board of Agricultural Studies, at the close of their first financial year, make a highly satisfactory report. Their income is sufficient for the provision of a complete course of instruction, which has now been organised under the direction of Prof. Somerville. They now ask the University to establish a special examination in agricultural science (botany, chemistry, physics and geology) for the ordinary B.A. degree.

THE history of the University of London, from the time of Sir Thomas Gresham's bequest, in 1575, of his house and garden in Bishopsgate, for the purposes of education, down to the completion of the work of the commissioners appointed under the University of London Act, 1898, is traced in an interesting article in the current number of the *Quarterly Review*. The large part the University has taken in the renaissance of natural science, which will hereafter be regarded as the main characteristic of intellectual progress in the nineteenth century, is pointed out, as well as the fact that London degrees in science were the first conferred by British universities.

WE learn from *Science* that the University of Chicago has secured the 2,000,000 dollars needed to meet the requirements of Mr. Rockefeller's gift of an equal amount. At the recent convocation of the University, President Harper gave some details in regard to the gifts received since January 1st. They have come from more than 200 different persons, and 90 per cent. of them were unsolicited. The largest items appear to be the Gurley paleontological collection, 30,000 dollars from Mrs. Delia Gallup, and, given anonymously, 60,000 dollars for a commons, 50,000 dollars and 25,000 dollars for a students' club-house, 20,000 dollars towards a women's hall, and 30,000 dollars with specific use to be designated later. President Harper stated that the total assets of the University are now not far from 11,000,000 dollars.

THE Technical Education Board of the London County Council will proceed shortly to award five senior county scholarships, each of the value of 60*l.* a year for three years, with free tuition fees up to 30*l.* a year. These scholarships are intended to assist young men and women to pursue a course at some University or at a technical college of University rank. Some of the scholars who have been elected in previous years are holding their scholarships at Oxford and Cambridge, others are studying at technical colleges in different parts of England, while others are pursuing courses of study on the Continent. The scholarships are open only to candidates who are under twenty-two years of age, and whose parents are in receipt of not more than 400*l.* a year. In addition to the senior scholarships, the board has in past years made a certain number of grants of smaller value to assist students in pursuing advanced education, and the board has at its disposal a certain number of free places at University College, London, King's College, London, and Bedford College, London. The scholarships and grants are awarded, not on the result of a set examination, but on the consideration of the past achievements and promise of

<sup>1</sup> See also Gaudin, *loc. cit.*

<sup>2</sup> Gaudin obtained similar results with drops of liquid silica.

<sup>3</sup> Gaudin observed a similar phenomenon in the case of fine threads, and so also, we believe, did Boys.

the candidates. Application forms may be obtained from the secretary of the Technical Education Board, 116, St. Martin's Place, W.C., to whom they should be returned not later than May 14. The board is also offering scholarships for the encouragement of horticulture and gardening. Two of these, tenable at the Swanley Horticultural College, Kent, give free board and tuition for two years, and may be reckoned as of the value of 60*l.* a year. They are open to candidates between the ages of sixteen and twenty, and one will be awarded to a young man and the other to a young woman as the result of a competitive examination. No candidate is eligible whose parents are in receipt of more than 400*l.* a year.

## SOCIETIES AND ACADEMIES.

### LONDON.

**Physical Society.**—Ordinary meeting held by the invitation of Sir Norman Lockyer, F.R.S., in the Solar Physics Observatory, South Kensington, on April 27.—Mr. T. H. Blakesley, Vice-President, in the chair.—Sir Norman Lockyer gave a short account of the physical problems now being investigated at the Solar Physics Observatory, and their astronomical applications. The chief work carried on at the observatory is the comparison of stellar spectra with spectra obtained from lights emitted by laboratory sources. The light from a star (or the sun) and from an arc (or a spark) are focussed alternately upon the slit of a spectroscope, and the two spectra are photographed side by side upon the same plate. The number of lines in the arc spectrum depends upon which part of the arc is focussed on the slit. The image of the centre is rich in lines, the image of the edge gives a few single lines. Changes in spectra are also dealt with. The thickening and thinning of lines depends upon several things. In the first place, it depends upon the density of the substance, and thus the hydrogen lines in the spectrum of Sirius are much broader than those in  $\alpha$  Cygni, the hydrogen being denser in the former star. Changes may also be produced by variations in quantity. A reduction in the quantity of a substance generally simplifies its spectrum, the longest line disappearing last. The motion of a luminous body to or from the spectroscope alters the wave-length of the light emitted and produces a shift in the lines of the spectrum. The amount of deviation is a measure of the velocity in the line of sight. In the case of Nova Aurigæ, we have dark and bright lines of the same substance side by side. This shows that there are two bodies involved, moving with different velocities, the one giving a radiation and the other an absorption spectrum. Another change in the lines depends upon temperature. In general an increase in temperature produces a greater number of lines, a notable exception being sodium, which gives its full number of lines at the temperature of an ordinary Bunsen flame. The spectra of metals obtained from the arc, and by sparking, are often quite different. Those lines which make their appearance, or are intensified in passing from the arc to the higher temperature of the spark, are known as enhanced lines. The comparison of stellar spectra with laboratory spectra is often easy. For instance, the presence of iron in the sun and hydrogen in Sirius is easily seen. Several lines in the spectrum of Bellatrix have been shown to be due to helium, the position of the lines being exactly the same as those due to the gases from cleveite. In many cases it is possible to build up the spectrum of a star from the spectra of its constituents taken at the proper temperatures. For instance, the spectrum of  $\gamma$  Orionis can be closely imitated by means of oxygen, nitrogen, and carbon together with the well-marked lines of hydrogen and helium. We can roughly estimate by the character of the spectra of stars, the temperatures of those stars, and thus arrive at a stellar thermometry. Starting with a hot star like Bellatrix, and passing through  $\beta$  Persei,  $\gamma$  Lyre, Sirius, Castor, Procyon to Arcturus, a cold star, we have a gradual change in the character of the lines which appear in the spectrum of any constituent. The widening of the lines in the case of spectra of sun spots enables us to trace changes in temperature of the sun, and we can compare these temperature changes with a variety of terrestrial phenomena, such as variation in latitude. The extraordinary number of lines exhibited by many metals suggests that what we are accustomed to call chemical elements are really complex bodies which are made up of simpler ones. Attempts have been made to build up the spectra of metals by superimposing

simple sets of lines upon one another. In many cases a great number of series would be required to represent things completely. In the case of hydrogen it would be necessary to have at least twenty-seven series to give the structure spectrum only. Taking the atomic weight of hydrogen as unity, the atomic weight of the little masses which might give rise to any one of these series would be about '0019. This is of the order of magnitude of the small bodies, of which the existence has been suggested by Prof. J. J. Thomson from his work on ions.

### PARIS.

**Academy of Sciences.**—M. Maurice Lévy in the chair.—The President announced to the Academy the death of M. Alphonse Milne-Edwards, and gave an account of his work.—On linear partial differential equations of the second order, and on the generalisation of the problem of Dirichlet, by M. Émile Picard.—On the heats of combustion and formation of some iodine compounds, by M. Berthelot. A redetermination of the heats of combustion of fourteen typical iodine derivatives. In spite of preconceived notions to the contrary derived from the incomplete combustion of such compounds as iodoform in air, no difficulty was experienced in completely burning any of the substances in the calorimetric bomb.—On rifling in cannon, by M. Vallier. A discussion on the best form of curve for the rifling of cannon, and an extension of the work of M. Zaboudski upon the same subject.—On the upright trunks, stems and roots of Sigillaria, by M. Grand'Eury. A study of the Sigillaria existing in a quarry in the neighbourhood of St. Étienne. From the fact that the stems (*Syringodendron*) found in a vertical position are not distributed at random, but are usually found in groups near each other forming well marked colonies, and from other characters of their growth, the author concludes that the hypothesis of R. P. Schmitt that they have been transported by water and deposited in the position found, is untenable. The view of Dawson that they have grown upon unsubmerged soil is also held to be untenable, all the facts noted by the author pointing to the Sigillaria have grown in the place in which they are found in marshy soil; under water varying from 1 metre to 7 or 8 metres in exceptional cases.—Reply to a reclamation of priority of M. Curie, by M. Gustave le Bon.—Reply by M. Th. Tommasina to a reclamation of priority, by MM. Ducretet and Popof.—Note by M. L. M. Bullier replying to M. Geelmuysen on a question of priority.—On the complementary terms in the criterium of Tisserand, by M. Gruey.—On differential equations of any order whatever with fixed critical points, by M. Paul Painlevé.—On the generalisation of analytical prolongation, by M. Émile Borel.—The theoretical cycle of gas engines, by M. A. Witz. A discussion of the remarks and criticism of M. Marchis.—On the dielectric constant and the dispersion of ice for electromagnetic radiations, by M. C. Gutton. The value of the refractive index for electromagnetic waves was found to vary with the wave-length from 1.76 for a wave-length of 14 cm. to 1.50 for 2088 cm., ice thus presenting normal dispersion for electromagnetic waves.—Two applications of Govi's camera lucida, by M. A. Lafay.—On the maximum sensitiveness practically employed in coherers for wireless telegraphy, by MM. A. Blondel and G. Dobkévitch. The increase of sensibility observed by M. Tissot to occur when the coherer is placed in a magnetic field, is ascribed by the authors to purely mechanical causes, the increase of contact between the powder and the electrodes produced by their mutual attraction.—On the radiations of radium, by M. E. Dorn. The author draws attention to the fact that he published a note on the deviation of the rays emitted by radio-active barium bromide in an electric field on March 11, independently of M. Becquerel.—On a new thermo-calorimeter, by M. G. Massol. Two improvements on Regnault's thermo-calorimeter are suggested, the replacement of alcohol by sulphuric acid, giving a large increase in the range of the instrument, and the use of a reservoir at the upper end of the instrument as in Walferdin's maximum thermometer by which the sensitiveness of the thermo-calorimeter is increased without undue lengthening of the stem. The instrument thus modified has been of especial service in the study of superfluid liquids.—A new indicator in acidimetry, and its application to the estimation of boric acid, by M. Jules Wolff. The indicator proposed is a solution of ferric salicylate in sodium salicylate, which passes from violet to orange when the solutions become alkaline. Data are given showing the results obtainable with borates.—On the selenides and chloroselenides of lead, by M. Fonzes-Diacon.—Crystallised lead selenide, PbSe, is obtained by

reduction of a selenate by hydrogen or by carbon, by the action of hydrogen selenide upon the vapours of lead chloride, and by the direct fusion in the electric furnace of precipitated lead selenide.—On the alkaline selenio-antimonites, by M. Pouget. Selenio-antimonites can be obtained of analogous composition to the sulpho-antimonites already known; mixed sulphur and selenium compounds, thioantimonites in which the sulphur is only partially replaced by selenium have also been prepared.—Micro-chemical researches on yttrium, erbium and didymium, by MM. M. E. Pozzi-Escot and H. C. Couquet.—Mechanism of the senility and death of nerve cells, by M. G. Marinresco. As the result of a study of nerve cells from the brain and spinal column of individuals of ages ranging from 60 to 110, it was found that the modifications constituting the old age of the nerve cell do not only consist of the diminution, more or less marked, of this body, but include other more interesting changes, some of which, tangible to the microscope, are described.—Heteroplastism, by M. Nicolas-Alberto Barbieri.—A determination of the conditions under which tissue from one mammal can be grafted on to another, to replace similar tissue. The results of experiments are given on the grafting of muscular, vascular, and nervous tissue.

DIARY OF SOCIETIES.

THURSDAY, MAY 3.

ROYAL INSTITUTION, at 3.—A Century of Chemistry in the Royal Institution: Prof. J. Dewar, F.R.S.  
 LINNEAN SOCIETY, at 8.—Note on the Movements in Fishes: Prof. R. J. Anderson.—On New Species of *Haliuroida*, from Funafuti: Miss E. S. Barton.—On West Indian Fungi: Miss A. L. Smith.  
 CHEMICAL SOCIETY, at 8.—Brazilin, Part IV.: A. W. Gilbody, W. H. Perkin, jun., and J. Yates.—Hæmatoxylin, Part V.: W. H. Perkin, jun., and J. Yates.—The substituted Nitrogen Chlorides and Bromides derived from  $\alpha$ - and  $\beta$ -acet-toluide and their Relation to the Substitution of Halogens in Toluides and Toluidines: F. D. Chattaway and K. R. P. Orton.  
 RÖNTGEN SOCIETY, at 8.—Demonstration and Exhibition of New Methods and Results.  
 INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—If the discussion on Prof. Forbes's Paper, read on April 26, is concluded, the following Paper will be read:—The Calculations of Distributing Systems of Electric Traction under British Conditions: H. M. Sayers.

FRIDAY, MAY 4.

ROYAL INSTITUTION, at 9.—Pottery and Plumbism: Prof. T. E. Thorpe, F.R.S.  
 GEOLOGISTS' ASSOCIATION, at 8.—Some Features of the Recent Geology of Western Norway: Horace W. Monckton.  
 COLD STORAGE AND ICE ASSOCIATION (Examination Hall, Victoria Embankment), at 11.30.—Recent Researches in Refrigeration: G. Halliday.—Insulation and Insulators: W. D. A. Bost.—At 3.—Electric Lighting of Cold Stores: W. B. Esson.—The Design and Construction of Buildings for Ice Factories and Cold Storage: P. Gaskell.

SATURDAY, MAY 5.

ROYAL INSTITUTION, at 3.—Egypt in the Middle Ages: Prof. Stanley Lane-Poole.

MONDAY, MAY 7.

SOCIETY OF ARTS, at 8.—The Incandescent Gas Mantle and its Use: Prof. Vivian B. Lewes.  
 SOCIETY OF CHEMICAL INDUSTRY, at 8.—The Production of Nitrate of Soda in Chili: Dr. W. Newton.

TUESDAY, MAY 8.

ROYAL INSTITUTION, at 3.—A Corner of Sussex: Dr. H. R. Mill.  
 SOCIETY OF ARTS, at 8.—Art Metal Work: Nelson Dawson.  
 ZOOLOGICAL SOCIETY, at 8.30.—A List of the Batrachians and Reptiles of the Gaboon (French Congo), with Descriptions of New Genera and Species: G. A. Boulenger, F.R.S.—On the Birds of Hainan: W. R. Ogilvie Grant.—On the Rhopalocera collected by the late Mr. John Whitehead in the Interior of the Island of Hainan: Philip Crowley.  
 ROYAL PHOTOGRAPHIC SOCIETY, at 8.—The Effect of Colour on Gradation: Chapman Jones.

WEDNESDAY, MAY 9.

SOCIETY OF ARTS, at 8.—Improvement of our Roads: A. Moresby White.  
 GEOLOGICAL SOCIETY, at 8.—The Pliocene Deposits of the East of England. Part II. The Crag of Essex (Waltonian) and its Relation to that of Norfolk and Suffolk: F. W. Harmer. With a Report on the Inorganic Constituents of the Crag by Joseph Lomas.—The Salt Lake of Larnaca (Cyprus): C. V. Bellamy.  
 IRON AND STEEL INSTITUTE, at 10.30.—General Meeting.—On Blowing-Engines driven by Crude Blast-Furnace Gas: Adolphe Greiner.—The Solution Theory of Iron: Baron H. von Jüptner.—The Use of Fluid Metal in the Open-Hearth Furnace: James Riley.—Iron and Phosphorus: J. E. Stead.—The Continuous Working of the Open-Hearth Furnace: Benjamin Talbot.

THURSDAY, MAY 10.

ROYAL SOCIETY, at 4.30.—*Probable Papers*: On the Diffusion of Gold in Solid Lead at the Ordinary Temperature: Sir W. Roberts-Austen, F.R.S.—On Certain Properties of the Alloys of the Copper-Gold Series: Sir W. Roberts-Austen, F.R.S., and Dr. T. K. Rose.—Experiments on Supposed Vascular and Visceral Factors in the Genesis of Emotion: Prof. Sherrington, F.R.S.—On the Brightness of the Corona of April 16, 1893. Preliminary Note: Prof. H. H. Turner, F.R.S.  
 ROYAL INSTITUTION, at 3.—A Century of Chemistry in the Royal Institution: Prof. J. Dewar, F.R.S.  
 MATHEMATICAL SOCIETY, at 5.30.—Special Meeting.—The Differential Equation whose solution is the Ratio of Two Solutions of a Linear Differential Equation: M. W. J. Fry.—A Congruence Theorem relating to Eulerian Numbers and other Coefficients: Dr. Glaisher, F.R.S.  
 INSTITUTION OF ELECTRICAL ENGINEERS, at 8.—A Frictionless Motor Meter: S. Evershed.  
 IRON AND STEEL INSTITUTE, at 10.30.—Ingots for Gun Tubes and Propeller Shafts: F. J. R. Carrulla.—The Manufacture and Application of Water-Gas: Carl Dellwik.—The Equalisation of the Temperature of Hot Blast: Lawrence Gjers and Joseph H. Harrison.—The Manganese Ores of Brazil: H. Kilburn Scott.—The Utilisation of Blast-furnace Slag: Ritter Cecil von Schwarz (Liège).

FRIDAY, MAY 11.

ROYAL INSTITUTION, at 9.—Shakespeare and True Patriotism: Sidney Lee.  
 ROYAL ASTRONOMICAL SOCIETY, at 8.

SATURDAY, MAY 12.

ROYAL INSTITUTION, at 3.—South Africa; Past and Future: Dr. Alfred P. Hillier.

CONTENTS.

PAGE

Mount St. Elias. By G. W. L. . . . . 1  
 A Hydrodynamical Theory of Action at a Distance. By Prof. G. H. Bryan, F.R.S. . . . . 3  
 Photo-micrography . . . . . 4  
 George Kingsley's Life and Writings. By R. L. . . . 5  
 Our Book Shelf:—  
 King: "Irrigation and Drainage, Principles and Practice of, their Cultural Phases."—W. H. C. . . . 5  
 Davis: "The Refraction of the Eye, including a Complete Treatise on Ophthalmometry. A Clinical Text-book for Students and Practitioners."—E. E. . . . 6  
 Hall: "A Key to the Birds of Australia and Tasmania, with their Geographical Distribution in Australia."—R. L. . . . . 6  
 Rebière: "Pages Choieses des Savants Modernes" . . . 6  
 Kerville: "Les Vieux Arbres de La Normandie" . . . 7  
 Letters to the Editor:—  
 The Nature of the Solar Corona.—Prof. Geo. Fras. Fitzgerald, F.R.S. . . . . 7  
 Rock-structures in the Isle of Man and in South Tyrol.—Dr. Maria M. Ogilvie Gordon . . . . . 7  
 Pompeii and its Remains. (Illustrated.) . . . . 7  
 The Unveiling of the Huxley Memorial Statue . . . 10  
 Preliminary Notes on the Results of the Mount Kenya Expedition, 1899. (Illustrated.) By H. J. Mackinder . . . . . 12  
 The Duke of Argyll. By A. G. . . . . 13  
 Prof. A. Milne-Edwards. By R. L. . . . . 15  
 Notes. (Illustrated.) . . . . 15  
 Our Astronomical Column:—  
 New Variable in Taurus . . . . . 19  
 Search Ephemeris for Eros . . . . . 20  
 Relation between Solar Activity and Earth's Motion . . 20  
 Determination of Solar Parallax from Opposition of Eros . . . . . 20  
 Working Silica in the Oxy-gas Blowpipe Flame. (With Diagram.) By W. A. Shenstone, F.R.S., and H. G. Lacell . . . . . 20  
 University and Educational Intelligence . . . . . 22  
 Societies and Academies . . . . . 23  
 Diary of Societies . . . . . 24