CONTENTS AND INDEX

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THE NAMES OF CONTRIBUTORS ARE PRINTED IN SMALL CAPITALS

Abbreviations for Scientific Terms, E. H. McClelland, 203
Abdominal Window, W. L. Mendenhall, 245
Absorption Devices and Methods, J. W. Williams, 340
Academy of Science, Texas, H. B. Parks, 97; N. H., G. W. White, 98; N. C., H. R. Topper, 153; Virginia, E. C. L. Miller, 154; of Sciences, National, 571, 604, Award of Gold Medals to Dr. Annie J. Cannon and Professor Henry B. Bigelow, 644, Othaniel Charles Marsh, 647
Acid, Archidilie, Do Peanut Fed Hogs Yield Lards Containing, A. H. Gill and G. T. Vaala, 548
ADAMS, R., Samuel Wilson Part, 8
Adenoseine, The Ring Structure of, P. A. LEVENE and R. S. TIPSON, 521
Aeronautics, National Advisory Committee for, 451
Agricultural Experiment Stations, 479
ALEXANDER, M. L. J., National Parks in Africa, 584
Albert National Park in the Congo, 63
Alexander, L. J., and H. C. Young, Powdery Mildew, 514
Alfalfa, Inbreeding in, G. Stewart, 341
Allen, E. T., Dr. Hillebrand as I Knew him, 60
Allen, R. F., Heterothallism in Puccinia triticica, 462
Allergy, Psychic Analogues of, H. Sewall, 37
ALVAREZ, W. C., Copying Kymographic Records, 634
Amblystoma, X-Radiation and Regeneration in, E. G. BUTLER, 100
AMEEL, D. J., The Lung Fluke in North America, 493
American Association for the Advancement of Science, Address of the President, 124; General Meeting, General Features, 103; Attendance, Sessions and Papers, 104; Local Committee and Representatives of Sections, 104; Officers, 1931, 105; Excursions, 106; Council Meeting, 106; Scientific Exhibition, 107; General Sessions, 108; Press Service, 109; Scientific Sessions, A—110; B—110; C—113; D—113; E—114; F—115; G—117; F and G—117; H—117; I—118; K—119; L—120; M—121; N—121; O—122; Q—122; Summer Meeting in 1933, J. S. Sewall, 201; New Orleans Meeting, C. F. Roos, 415, 516; Section F (Zoology), G. T. Harig, 416; Section E (Geology and Geography), K. F. Mathies, 417; Preliminary Announcement, 525; Notices for Those Planning to Attend, 527; Press Service, 527; Prize, 528; Scientific Sessions of Sections and Societies, 528; General Officers, 1931, 536; Mayan Symposia and Exhibits, 570; Research Exhibits, 590
Angiopar sums, Age of, G. R. Wieland, 219
ANTHONY, H. E., Control of Predatory Mammals, 288
Antiurease, J. B. SUMNER and J. S. KIRK, 102
Apgar, C. S., Box Camera in Photomicrography, 487
Apple Measles, A. Bux, 485
Arboretum, National, 362
Arts and Sciences, Amer. Acad. of, Grants of, 407
Asia, Central, Psychological Expedition to, 383
Atomic Structure and Valence Variation, M. Gomberg, 553
Babcock, Dr. Stephen Moulton, H. L. Russell, 86; G. Frank, 87
Bacteria, Filterable, 127, 196; A. I. Kendall, 129; J. M. SHERMAN and C. E. Safford, 602
Bailey, Professor Solon L., H. Shapley, 29; History and Work of Harvard Observatory, E. E. BRASCH, 598
Baldwin, H. L., and W. E. Fergiv, Polyembryony in Red Spruce, 203
Basil-Metabolic Rates of Vegetarians, G. Wakeham and L. A.ハンセン, 70
BASCOM, F., Geomorphic Nomenclature, 172
Baskerville, Dr., The Work of, N. Van Patten, 657
BEAMS, J. W., and A. J. Weed, An Ultra-Centrifuge, 44
BEAVER DAMS, Position of Wood in, C. MacNAMARA, 630
BEEBE, W., A Submerged Beach off Bermuda, 659
Beit Memorial Fellowships for Medical Research, 262
BERG, A., Apple Measles, 485
Bermuda, Fresh-water System, 478; A Submerged Beach off, W. Beebe, 629
BERRY, E. W., Plant Life, A. C. Seward, 72
BEVAN, A., Virginia Geological Survey, 630
BILLINGS, M., Geological Excursion, 658
BING, P. C., Contribution to Nutrition by Magerdie, 456
BINGHAM, E. C., Edward Hart, 1854—1931, 123
BINKLEY, A. M., Correction on Paylild-Youlls, 72
Biochemical Research, T. B. JOHNSON, 376
Biochemists, Revolt of the, P. A. LEVENE, 23
Bio kinetics, A Study in, C. D. Snyder, 443
Biological, Cycles, Matamek Conference on, 1931, H. HUNTINGTON, 229; Abstracts, P. D. LAMSON, 486; Photographic Association, 506
BIRCH, C. L. F., Hemophilia, 16
Bird Sanctuaries, New, 623
Birds, Bilateral Gynandromorphism in, F. R. Lillie, 387
BISCHOFF, F., L. C. MAXWELL and H. J. ULMANN, Hormones in Cancer, 16
BLAKE, F. G., Clinical Investigation, 27
BLAKE, S. F., A Flora of Mexico, 468
BOAS, F., Race and Progress, 1
BODEINE, E. W., Culturing Tilletia levis, 341
BOKSA, N. J., A Trematode Requiring Four Hosts, 521
BOWMAN, P. W., and M. N. LINCH, Preparation of Animal Tissues for Staining, 440
BRADBURY, O. C., Histological Technique, 225
BRANSON, C. L., Age of the Metamorphic Series of Northeastern Washington, 70
BRASCH, F. E., History and Work of Harvard Observatory, S. I. Bailey, 598
BRESTED, G. H., The Rise of Man, 639
BREEDS, C., Device for Holding Ultrafiltration Membranes, 655
BRESSMAN, E. N., Developing New Varieties of Hops, 202
BRINKLEY, F. J., and C. W. GEESER, Eggs of Fresh-water Fishes for Physiological Research, 296
British, National, Physical Laboratory, 30, Collection of Type Cultures, 126; Soc. of Chem. Industry, Jubilee Meeting, 144; Medical Research Council, Therapeutic Trials Committee of, 239; Industrial Health Research Board, 307; British Association for the Advancement of Science, 236; Address of President, 297
BRITTON, W. H., Variations in Evening Primrose, 463
BRITTON, S. W., and H. SILVETTE, Cortico-adrenal Extract, by Mouth, 440
BRITTON, W. E., Edward Hopkins Jenkins, 537
BROWN, F. C., Samuel Wesley Stratton, 498
BROWN, J. H., Crown Sealed Milk Bottles, 391
BULK, D., H. LINNEWEATHER, C. K. HONNER and F. E. ALLISON, Nutrition and Stimulation of Plant Growth, 592
Burrfieldroad, M. D., Sex in the Louisiana Oyster, 71
Burt, F. A., Glauconite and Foraminiferal Shells, 457
BUTLER, E. G., X-Radiation and Regeneration in Amblystoma, 100
BYERLY, T. C., Embryo Size in the Fowl and the Rabbit, 546
CABLE, R. M., and H. W. STUNKARD, A Trematode from the Claws of the Gull, 438
Caldwell, M. L., L. E. BOOHER and H. C. SHERMAN, Crystalline Amylase, 37
Calendar and Meteorology, Conferences on, 405
California, Univ. of, Museum of Anthropology, 283
Camp, E. R., Humicin and Its Uses, 661
Campbell, L., Edward Skinner King, 380
Canal Zone Experiment Gardens, 362
Canavan, W. P., N., Reaction of the Contents of Trichinella spiralis Cyst, 71
Cancer, Hormones in, F. Bischoff, L. C. MAXWELL and H. J. ULLMANN, 16; Research, E. McDONALD, 55
Caries, Dental, Production of, in Rats, C. A. Hopfer, P. A. Webster and T. L. CANNIFF, 77; Immunity and Susceptibility in the Rat, H. Klein and E. V. McCollum, 662
Carmichael, E. B., The South’s Contribution to Science, 421
Carriege Institution of Washington, Appointments, 408
Carpenter, D. C., and B. R. Nebel, Ruthenium Tetroxide as a Fixative in Cytology, 154
Carpenter, K. E., Variations in Holopodium Species, 550
Carr, A., Physiological Time, 618
Cat, Midbrain of the, Action Currents in the Auditory Tract of the, H. DAVIS and L. J. Saul, 205
Caulkley, M., Genetics and Evolution, 254
Caylors, H. D., and T. E. Caylort, Light Source for a Portable Microscope, 73
Cellophane, Reconstruction Work by the Use of, E. R. VAN DER JACT, 601
Chamberlin, Thomas Chrowder Science Library, 592
Chemical Soc., Amer., Buffalo Meeting, 64; Symposium, 211
Chemistry, Body, G. J. Rich, 21; Paper, Inst. of, 382; Pure and Applied, Ninth International Congress, 432
Chicago Centennial Exposition, 1933, Basic Sciences at, J. S. Sewall, 94
Cheek, Rhododendron and Embryos, M. M. Keith, 268; Embryos, E. W. Goodpaster, A. M. Woodruff and G. J. Buddingh, 371
Chicken Tumor, Causative Agent of a, J. B. Murphy and E. P. Strain, 169
China, Flora of, E. D. Merrill, 95
Chittenden, R. H., Plant Sciences in the Sheffield Scientific School, 273
Chromosomes of Petunia, A. M. Ottesen, 175; In Entire Insect Eggs, M. L. Schmulch and C. W. Metz, 600
Churck, M. B., The Sugar Tolerance of Yeasts, 492
Citrus Fruit Laboratory in Texas, 431
Clarke, R. W., Protective Coatings for Mineral and Rock Specimen, 439
Clarke, Frank Wigglesworth, L. M. Dennis, 212
Clay, Varved, in Holmes County, Ohio, G. W. White, 441
Clinical Investigation, F. G. Blake, 27; Congress of the Corn State Med. Soc., 306
Coal, Bituminous, International Conference on, 290
Cobs, N. A., Live Nemas in Zoological Courses, 489
Cox, W. R., Sexual Rhythm in Oyster, 247
Cole, W. R., A Singing Tube, 461
Cole, W. A. Noyes, 96
Columbia Univ., Post-Graduate Medical School, 31
Colwell, R. C., and L. Fuller, Microphone Amplifier, 204
Compton, A. H., Uncertainty Principle, 172
Connecticut Valley, Terraces in, R. F. Flint, 368
Coral Reefs, Gardiner on, R. A. Daly, 566
Corey, E. L., and S. W. Britton, Effects on the Gonads of Cortico-Adrenal Extract, 101
Cortico-adrenal Extract, E. L. Corey and S. W. Britton, 101; S. W. Barton and H. Silvestre, 446
Creaser, E. P., North American Phylodons, 267
Creatine “Taste Deficiency,” R. J. Williams, 597
Crystalline Amylase, M. L. CALDWELL, L. E. Booher and H. C. Sherman, 37
Cyclone and Anticyclone, A. M. CADE, 595
Cysteine, Autoxidation of, C. A. ELVEHJEM, 508
Dadourian, H. M., Science in Soviet Russia, 15
Daly, R. A., Gardiner on Coral Reefs, 566
Davis, H., and L. J. Saul, Action Currents in the Auditory Tracts of the Midbrain of the Cat, 205
Deinath, L. M., Frank Wigglesworth Clarke, 212
Desc, C. H., Pure and Applied Science, 495
Dictionary, Improvement of, N. W. Taylor, 367
Discharge Tube, Triple-Spectrum, R. W. Shaw and G. B. Sarbe, 179
"Discovery," Return of the, 197
Disease, Eml, New, C. M., 437; Transmissions by Arthropods, C. G. HUFF, 456
Distilled Water, Testing Reaction of, E. Tevo, 633
Divining Rod and Fakers, W. K. Moorehead, 42
Doctorates Conferred in the Sciences by American Universities, 1930-31, C. J. West and C. Hull, 659
Dorchester, C. S., and L. W. Butler, Atmospheric Electricity, 155
Double-slit, Adjustable, P. Kirpatrick, 179
Dresdin, A., The School Days of Lorents, 457
Drop Recorder, Improved, O. S. Gibbs, 549
Dreyden, A. L., Jr., Fossil Foraminiferal Shells, 17
Drying Solutions, Apparatus for, W. W. Ewing, 74
Earthworm as an Economic Problem, C. T. Hurst, 656
Edison, Thomas Alva, 404; Medal, Award to Dr. Edwin W. Rice, Jr., 624
Eggs of Fresh-water Fishes for Physiological Research, F. J. BRINLEY and C. W. Chesse, 395
Einstein, What Does He Mean?, J. Frenkel, 609
Electrical, Engineers, Amer. Inst. of, Officers, 9; Appointments, 331; Drop Counter, S. E. Owen, 19
Electricity, Atmospheric, C. S. Dorchester and L. W. Butler, 155
Electrochemical Soc., International Convention, 237
Electrochemistry, The Metals in, L. Kahlenberg, 79
Electromagnetic and Gravitational Fields, 438
Element 87, C. F. Graham, 665
Elvehjem, C. A., Autoxidation of Cysteine, 568
Embryo, Sac, Is It a Megaspor!?, R. B. Thomson, 544; Size in the Fowl and the Rabbit, T. C. Byerly, 546
Emerson, P., Purity of Limestone in the Field, 418
Emig, W. H., Meganematophyte of Pinus, 337
Enamel, Mottled, Cause of, M. C. Smith, E. M. Lantz and H. V. Smith, 244
Encephalomyelitis of Horses, Epizootic, Etymology of, K. F. Meyer, C. M. Haring and B. Howitt, 297
Endamoeba Histolytica, J. H. St. John, 519
Engineering, Foundation, Dr. Swesey’s Gift to, 32; Chemical, Teachers of, 126; Education, D. C. Jackson, 183; Graduates, Employment for, 214
Evermann, B. W., David Starr Jordan, 327
Evolution, E. B. Poultont, 345; H. F. Osborn, 557
Ewing, W. W., Apparatus for Drying Solutions, 74
Exponents and Footnotes, F. B. Simms, 95
Fahreheit, Daniel Gabriel, 588
Faraday, Celebration, 187; Michael and Joseph Henry, 282
Fertilizer Requirements of Plants and Leaf Diagnosis, A. E. Murnek and E. J. Gilderhaus, 59
Field Museum of Natural History, Paintings, 260
Film Lantern Slides, O. Glasser, 549
Fine, Henry Burchard, Hall of Mathematics, 432, 213
“Fire-stopper, The,” F. W. Haasis, 222
Fisheries Commission, 166
Fitzpatrick, H. M., Visit of Dr. Jakob E. Lange, 43
Plexner, S., Poliomyelitis, 251; Accelerated Infection in, 520; Simultaneity in the Onset of, 601
Flint, R. F., Terraces in the Connecticut Valley, 568
Footstuds, Dynamic Action of, A. E. Kosterlitz, 78
Forbes, W. T. M., The Great Glacial Cycle, 294
Fossils, Vertebrate, Lithographic Plates, H. F. Osborn, 43; from the Sierra Nevada, E. B. Mayo, 514
Frank, G., Stephen Moulton Babcock, Address, 87
Franz, G. S., Hydropathy, 438
Freeman, John R., In honor of, 65
Frenkel, J., What Does Einstein Mean?, 609

Gager, C. S., "At the Top is Magic," 569
Galactic Explorations, H. Shaapley, 297
Gambusia in Foreign Lands, E. T. Hildebrand, 655
Gas, Pressure, Positive, in Poplar, F. C. Gates, 153; Effect of the Application of a Field of Attraction to, R. D. Kleeman, 291
Gasterostomes, Grinder
Growth, Graham, Greulich
Glacial Cycle, Greent, W. T. M. Forbes, 294
Glasses, R. W., The "Rickettsiae" and the Intracellular "Symbionts," 243
Glasser, O., Film Lantern Slides, 549
Goetz, A., and A. B. Focke, Diamagnetism in Metal Crystals, 553
Gomberg, M., Valence Variation and Atomic Structure, 553
Goodpasture, E. W., A. M. Woodruff and G. J. Buddingh, Cultivation of Vaccine in Chick Embryos, 371
Graham, C. F., Element 87, 665
Gredlich, W. W., Sex Ratio of Human Stillbirths, 53
Grinder, for Soft Tissues, C. T. Brodie, 96
Growth, Rates, E. M. Harvey, 46; Curves, W. A. Hendricks, 290; of Lemna minor and Manganese, E. F. Hopkins, 551
Guyer, M. F., Internal Secretions and Human Well-being, 159

Haasis, P. W., The "Fire-stopper," 222; Expulsion of Gas and Liquids from Tree Trunks, 311
Hand, L. H. D., A Chart of Radioactive Elements, 490
Haematoyxylin, Solutions, Ripening, E. J. Kohl and C. M. James, 247; and its Uses, W. H. Camp, 661
Hailstones, Conical, A. T. Jones, 656
Halliday, X., Anemia and the Pellagra-like Symptoms in Rats, 312
Hargitt, G. T., Section F (Zoology) Amer. Assoc. at New Orleans Meeting, 416
Harris, R. G., and D. M. Newman, Test for Potency of Extract of Corpora Lutea, 182
Hart, Edward, 1864–1951, E. C. Bingham, 123
Hartman, C. G., Relative Sterility of the Adolescent Organism, 236
Harvard, Univ., Dept. of Physics, 10; Summer Work of Botanists, 90; New Observatory, 480
Harveian Society of London, Centenary, 32
Harvey, E. M., Growth Rates, 436
Harvey, E. N., and G. L. Lavin, Reduction of Oxyluciferin by Atomic Hydrogen, 150
Hastings, E. G., Glassware in the Laboratory, 662
Hawk, F. B., and E. L. Oser, Modification of the Osborne-Mendel Salt Mixture, 369

Health, Service, U. S. Public, Expenditures, 89; and U. S. Army Medical Department, E. E. Humé, 465; Department, Counties, 261
Hemophilia, C. L. F. Birch, 16
Hendricks, W. A., Growth Curves, 290
Herbicides, Chlorates as, W. E. Loomis, R. Bessey and E. V. Smith, 485
Herpetological Fauna of Kansas, J. E. Hill, 547
Herrman, C., Newton's Saying, 175
Heterotaxialism in Puccinia triticina, R. F. Allen, 462
Hildebrand, S. T., Gambusia in Foreign Lands, 655
Hill, J. E., Herpetological Fauna of Kansas, 547
Hillebrand, Dr., as I Knew him, E. T. Allen, 69
Hilton, W. A., Pauroplasia in Alaska, 338
Himalayan Flora at the Roerich Museum, 649
Histological Technique, O. C. Bradbury, 225
Holland, M., Industrial Science, 279
Holopiedium Species, Variations, K. E. Carpenter, 550
Honorary Degrees for Scientific Men, 11
Hopkins, E. F., Growth of Lema minor, 551
Hopper, C. A., P. A. Weber and T. L. Canniff, Production of Dental Caries in Rats, 77
Hops, Developing New Varieties of, E. N. Bressman, 202
Howell, A. B., Poisoning Rodents, 632
Hudson, J. I., and H. W. Johnson, Phagocytosis of Brucella, an Undulant Fever, 315
Huff, C. G., Disease Transmissions by Arthropods, 456
Hume, E. E., U. S. Army Medical Department, 465
Huntington, E., Conference of Biological Cycles, 299
Hurst, C. T., A Curious Fish Story, 518; Common Earthworm as an Economic Problem, 656
Hydrogen, Atomic, Reduction of Oxyluciferin by, E. N. Harvey and G. I. Lavin, 150
Hygienic Exposition in Dresden, 63
Illinois State Geological Survey, Research, 63
Illumination Congress, International, 330
Immunology, Post-Ehrlich, W. H. Manwaring, 324
Inoculators, Heating, Humidifying Device for, G. Wishart and A. B. Baird, 269
Industrial Science, M. Holland, 279
Inman, O. L., and P. Rottemburg, Phylloloythrin in the Digestive System of Herbivorous Animals, 221
Internal Secretions and Well-being, M. P. Guter, 159
Isle Royale National Park, 9
Jackson, D. C., Engineering Education, 183
Jackson, R. W., and R. J. Block, Metabolism of Cystine and Methionine, 414
Jacot, A. P., Tree Twist, 567
Jenkins, Edward Hopkins, W. E. Britton, 537
Johs Hopkins University, Dohme Foundation, 451
Johnson, E. H., History of Physics, 433
Johnson, T. B., Biochemical Research, 276
Jones, A. T., Conical Hailstones, 656
Jordan, David Starr, B. W. Eyermann, 327
Josephson, E. M., Vision and the Vascularity of the Eye, 339

Kahleberg, L., The Metals in Electrochemistry, 79
Kahn, A. L., and G. H. Hanley, Photographing Animals, 530
Kaufman, Calvin Henry, E. B. Mains, 235
Keith, M. M., Chick Blastodiscs and Embryos, 268
Kellogg, F., Grants of the National Research Council, 96
Kelvin's, Lord, "Mortal Spring," E. Thomas, 173
Kendall, A. L., Filterability of Bacteria, 129
Kendall, A. L., Geophysical Survey, 382; Univ. of, Observatory, 129, Agricultural Engineering Building, 332
Kille, F. R., Induced Autotomy in Thyine, 396
King, Edward Skinner, L. Campbell, 380
Kirkpatrick, F., Adjustable Double-split, 179
Kitsuto, Shibasaburo, M. Mitelman, 124
Ottley, A. M., Chromosomes of Petunia, 175
Ovo-testis in the Yellow Perch, C. L. Turner, 370
Owen, S. E., An Electrical Drop Counter, 19
Oxygen Consumption in Sarceina lutea, B. B. Ruesenberg, 419
Oyster, Louisiana, Sex in, M. D. Burkenroad, 71
Pan-American Scientific Congress, 507
Paramecium aurelia, Division Rate, A. Phelps, 395
Parkes, R. C., Human Serum, Age and Multiplication of Homologous Fibro-blasts, 181
Parks, H. B., Texas Academy of Science, 97
Parks, National, in Africa, M. L. J. Akeley, 584
Parr, Samuel Wilson, R. Adams, 8
Pauropoda in Alaska, W. A. Hilton, 338
Paw, Beds, in the Apostle Islands, F. B. Taylor, 265;
Under a Delaware Beach, L. M. Snow, 458
Pelagra-like Symptoms in Rats and Anemias, N. Halliday, 312
Pencharz, R. L., and J. A. Long, Effect of Hypophysectomy on Gestation in the Rat, 206
Pensa, Richard Alexander Fullerton, Jr., J. Stanley Brown, 476
Peroxis in Chickens, H. W. Titus and W. M. Ginn, 249
Perry, L. M., Catfish Feeding on the Eggs of the Horse-shoe Crab, 312
Phagoeytosis of Brucella, Index of Immunity to Undulant Fever, I. F. Huddleston and H. W. Johnson, 315
Pharmacoeopia, The United States, 560
Phipps, A., Division Rate of Paramecium aurelia, 395
Physical Soc. of Washington, Joseph Henry Lectureship, 168
Philpot, C. H., Use of Protozoa in Measuring the Neutralizing Value of Coba Anti-Serum, 137
Photomicrography, Box Camera in, C. S. Apog, 487;
Ultra-Violet, of Living Cells, W. G. Wyckoff and A. L. Ter Low, 664
Phylloerythrin in Digestive System of Herbivorous Animals, O. L. Inman and P. Rothemund, 221
Phylloponds, North American, E. P. Creaser, 267
Physical Soc. Amer., Section A, Meeting, 127
Physics, Research in, J. J. Thomson, 317;
History of, Courses on, E. H. Johnson, 435;
Amer. Inst. of, 508;
Teachers, Amer. Assoc. of, 561
Physiological, Congres Fund Fellowships, International, H. B. Lewis, 223;
Time, A. Carmel, 618
Physiology, International Congress of, 650
Pius, Megametabotype of, W. H. Emig, 357
Sciences in the Sheffield Scientific School, R. H. Chittenden, 273
Poisoning, Rodents, A. B. Howell, 632; by Poison Ivy, M. M. Mercal, 632
Polyomyclitis, S. Flekén, 251, 520, 601
Polyembryony in Red Spruce, H. I. Baldwin and W. E. Percival, 203
Post, Aerial, Early, Relic of, S. R. Williams, 244
Poulton, E. B., A Hundred Years of Evolution, 345
Protein, The Term; A Correction, P. A. Levine, 658
Protoplast, Amehan, A. A. Schaeffer, 47
Protozoa, Apparatus for Washing, J. P. Turner, 99;
Use of, in Measuring the Neutralizing Value of Coba Anti-Serum, C. H. Philpot, 157
Psychiatric Education, 431
Psyllie-Yellow, Correction on, A. M. Binkley, 72
Pythium, Classification of, C. P. Siders, 596
Quirk, A. J., Colony Types, 461
Race and Progress, F. Boas, 1
Radioactive Elements, Chart of, I. W. D. Hackh, 490
Rades, M. A., Dilatometer for Measuring the Swelling of Seeds, 395
Rat, Gestation in, Effect of Hypophysectomy on, R. I.
Pencharz and J. A. Long, 206
Rations, Cattle, Natural Copper Deficiency in, W. M.
Neal, R. B. Bricker and A. L. Shalal, 418
Reflex-Hyperlipaemia, Y. D. Koskopp and J. G. Dusser de Barenne, 550
Reid, P. E., Preparing Lantern Slides, 418
Reimann, H. A., Decreased Suspension Stability of the Blood, 513
Research, Council, National, Grants-in-aid of, V. Kellogg, 96;
Farm, Surgical, Buckton Browne, 121; Industrial, 361;
Patents, Univ. of Wisconsin, 506;
Corporation, Award of Prizes, 10, 237
Rich, J. G., Intelligence and Body Chemistry, 21
"Rickettsiae" and the Intracellular "Symbionts," R. W. Glaser, 413
Riesman, D., The Art of Medicine, 373
Rietz, H. L., Mathematical Statistics, 82
Robbins, S. D., Naming Disorders of Speech, 515
Robert, E., New Mutation in the House Mouse, 569
Roos, C. F., American Association, New Orleans Meeting, 415, 516, 525
Rotien, A., A Source of Monochromatic Light for the Polariscpe, 204
Rous, P., Alfred Scott Warthin, 142
Royal Botanic Society, 88, 213
Ruesenberg, B. B., Rate of Oxygen Consumption in
Sarceina lutea, 419
Russell, H. L., Dr. Stephen Moulton Babcock, 86
Russell, R. J., Geomorphological Evidence of a Climatic Boundary, 484
Russell, W. C., and D. F. Chichester, The Gall Bladders of Chicks in a Vitamin D Deficient Condition, 457
Russia, Soviet, Science in, H. M. Dadourian, 15
Ruthenium Tetroxide as a Fixative in Cytology, D. C.
Carpenter and B. R. Nebel, 154
Sachs, Julius, in Honor of, 505
St. John, J. H., Method of Supplying Students with Natural Endoema Histology from Cultures, 519
Sanders, J. P., and F. K. Cameron, Old Manuscripts, 488
Sanford, E., Difference in Wave-lengths of the Spectral Line of a Given Element, 412
Sax, K., Mechanism of Crossing-over, 41
Schaeffer, A. A., Ameban Protoplasm, 47
Schardinger, J. H., Stomach, 502
Schmuck, M. L., and C. W. Metz, Study of Chromosomes in Entire Insect Eggs, 600
Schoenheimer, R., Sterol Metabolism, 579
Scientific, World-Picture of To-day, J. C. Smuts, 297;
Congress, American, 624
Seeds, Measuring Swelling of, M. A. Raines, 392
Sewall, H., Psychic Analogues of Allergy, 37
Seward, A. C., Plant Life, E. W. Berry, 72
Sewell, J. S., Summer Meeting of the Amer. Assoc. at
Chicago Centennial Exposition, 941
Sexual Rhythm in the Oyster, W. R. Cole, 247
Shapley, H., Professor Solon I. Bailey, 29; Galactic Explorations, 207
Shaw, R. W., and G. B. Sabine, Triple-Spectrum Discharge Tube, 179
Shells, Fossil Foraminifera, A. L. Daymond, Jr., 17
Shepard, J. M., and C. E. Safford, Primitive or Filterable Forms of Bacteria, 602
Sideris, C. P., Classification of Pythium, 596
Sigma Pi Sigma Convention, 500
Singing Tube, W. R. Cole, 461
Smith, D. E., International Congress of the History of Science and Technology, 175
Smith, M. C., E. M. Lantz and H. V. Smith, The Cause of Mottled Enamel, 244
Smith, T., Action of Agar on Bacteria, 21
Smuts, J. C., The Scientific World-Picture, 297
Snow, L. M., Peat Under a Delaware Beach, 458
Snowflakes, Conical, W. W. Wagenes, 414
Snydes, C. D., A Study in Biokinetics, 443
Snydes, L. H., Inherited Taste Deficiency, 151
Solar System, Riddle of, C. V. Van Andra, 187
Sound Absorption Coefficients, J. F. Mackell, 224
Speech, Naming Disorders of, S. D. Robbins, 515
Sprague, R., Columbia Basin Footrot of Wheat, 51
Stain for E. coli, D. H. M. Wallace, 369
Stanley-Brown, J., Richard Alexander Fullerton Penrose, Jr., 476
Sterility of Adolescent Organism, C. G. Hartman, 226
Stewart, G., Inbreeding in Alfalfas, 341
Stewart, O. J., A Motor Found in Nature, 548
Stiles, Dr. Charles Wardell, Retirement of, 540
Stillbirths, Sex Ratio among, W. W. Greulich, 53
Stokes, J. H., Schaudins, 505
Stout, S. and Wesley, F. C. Brown, 428
Sumner, F. B., Exponents and Footnotes, 102
Sumner, J. B., and J. S. Kirk, Antiturese, 102
Surgeons, American College of, 406
Sydney, Univ. of, Marine Lab. of, T. W. Vaughan, 202
Taste Deficiency, Inherited, L. H. Snydes, 151
Taylor, F. B., Submerged Pest Beds, 265
Taylor, N. W., Improvement of the Dictionary, 367
Temperature, Effect of, on the Number of Scales in Trout, C. McC. Mottley, 316
Temperatures, Bottom, in Deep Lakes, S. Wright, 413
Ten-Brink, C., Grinder for Soft Tissues, 98
Texas, Academy of Science, H. B. Parks, 97
Tharaldsen, C. E., Light Filter for Microscopes, 313
Thermoelectromotive Forces, S. R. Williams, 75
Thompson, Elizabeth, Science Fund, Grants from, 560
Thomson, J. R., Research in Physics, 317
Thomson, R. B., Is the Embryo Sac a Megaspore?, 544
Thyone, Induced Autotomy in, F. R. Kille, 396
Tilletia levis, Culturing, E. W. Hodnet, 341
Tissues, Animal, for Staining, P. W. Bowman and M. N. Linch, 440
Titus, H. W., and W. M. Ginn, Rice Bran, a Preventive of Pericarditis in Chickens, 249
Totten, H. E., N. C. Academy of Science, 153
Trees, Trunks, Expulsion of Gas and Liquids from, F. W. Haasis, 311; Twist, A. F. Jacot, 567
Trematode, from the Claws of the Gull, R. M. Cable and H. W. Stunkard, 438; Requiring Four Hosts, N. J. Bosma, 521
Trichinella spiralis Cysts, W. P. N. Canavan, 71
Trinity Beds, Land Types of, G. R. Wieland, 393
Truck, E., Reaction of Distilled Water, 633
Tubercle Bacilli, Non-Acid, Fast, F. R. Miller, 343
Turner, C. L., Ovo-testis in the Yellow Perch, 370
Turner, J. F., Apparatus for Washing Protozoa, 99
Tyson, S. L., Oestrus, 512
Ultra-Centrifuge, J. W. Beams and A. J. Weed, 44
Ultrafiltration Membranes, Holding, C. Breedis, 635
Uncertainty Principle, and Free Will, A. H. Compton, 172; W. A. Noyes, 595; H. Margenau, 596
Van Anda, C. V., Riddle of the Solar System, 187
Van Der Jagt, E. R., Reconstruction Work by the Use of Cellophane, 601
Van Patten, N., The Work of Dr. Baskerville, 657
Variations in Evening Primrose, W. H. Brittingham, 463
Varshelman, F. A., Curling of Microtome Sections, 20
Vaughan, T. W., Marine Lab., Univ. of Sydney, 202
Vinall, H. N., Russell A. Oakley, 195
Virginia Academy of Science, E. C. L. Miller, 154
Vision and the Vascularity of the Eye, E. M. Josephson, 339
Vitamin, A in Vitro, Transformation of Carotene to, H. S. Ollott and D. C. McCann, 414; D, Deficient Condition, Gall Bladders of Chicks in a, W. C. Russell and D. F. Chichester, 437
Wagenen, W. W., Conical Snowflakes, 414
Wakeham, G., and L. A. Hansen, Basal-Metabolic Rates of Vegetarians, 70
Walker, S. A., and W. Nissen, Lignin as a Nutrient for the Mushroom, (Agaricus Campestris), 271
Wieland, G. R., Why the Angiosperms are Old, 219; Land Types of the Trinity Beds, 393
Wild Life, in National Forests, 331; Problem of National Park System, 540
Williams, J. W., Absorption Devices and Methods, 340
Williams, R. J., “Taste Deficiency” for Creatine, 597
Williams, S. R., Thermoelectromotive Forces, 75; Early Aerial Post, 244; Work and Fatigue, 545
Wilson, E. D., Marine Tertiary in Arizona, 567
Wisconsin, Univ. of, Research Foundation, 89; New Engineering Building, 361
Wishart, G., and A. B. Baird, Heating-Humidifying Device for Incubators, 269
Woodhead, A. E., Redia of Gasterostomes, 463
Words, Hybrid, G. S. Fraps, 438
Work and Bodily Fatigue, S. R. Williams, 545
Wright, S., Bottom Temperatures in Deep Lakes, 413
Wyckoff, R. W. G., and A. L. Ter Louw, Ultra-Violet Photomicrography of Living Cells, 664
Yale Univ., Surgical Building for, 238
Years, The Next Twenty, H. Zinsser, 397
Yeasts, Sugar Tolerance of, M. B. Church, 492
Yellow Fever, Gold Medals for Work in, 407
Zebrowski, G., Nema for Type Study, 390
Zinsser, H., The Next Twenty Years, 397
Zoological Courses, Live Nematos in, N. A. Corp, 489
Zozaya, J., Combination of Bacterial Polysaccharides and Colloidion Particles as Antigens, 270
Institute for Juvenile Research, being limited only by the technician's ability to obtain from the patient a sufficiently large sample of blood. They included intelligence levels ranging from the imbecile to the superior. Calcium of the blood was determined by the Clark-Collip modification of the Kramer-Tisdale method; inorganic phosphorus by the Fiske-Subarrow method, and total and lipoid phosphorus by similar procedure following digestion and alcohol-ether extraction, respectively. The intelligence quotient was obtained in each case by an individual mental test.

The coefficients of correlation obtained between the I.Q.'s and the chemical determinations are given below, together with the number of cases upon which each is based (in parenthesis).

<table>
<thead>
<tr>
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<th>Correlation with I.Q.</th>
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<tbody>
<tr>
<td>Calcium</td>
<td>+.06 (69)</td>
</tr>
<tr>
<td>Inorganic Phosphorus</td>
<td>+.07 (845)</td>
</tr>
<tr>
<td>Lipoid Phosphorus</td>
<td>-.04 (77)</td>
</tr>
<tr>
<td>Total Phosphorus</td>
<td>+.06 (118)</td>
</tr>
<tr>
<td>Lipoid P + Total P</td>
<td>+.19 (68)</td>
</tr>
</tbody>
</table>

Our results agree with those of Powers with respect to the calcium of the blood. There is no evidence that it bears any relation to the individual's intelligence.

With respect to the inorganic phosphorus of the blood, on the other hand, we differ markedly from Powers. The data obtained from 245 subjects show no relationship between intelligence, as measured by the I.Q., and the phosphorus content of the blood. There is, of course, a difference in method. We worked with persons ranging from subnormal to superior intelligence, instead of extreme groups, and did not include cases of idiocy. If, however, the difference obtained in such extreme groups is valid outside of the very lowest ranges of intelligence, a correlation will necessarily be apparent when a wide range of intelligence is considered. Although our subjects were children, age does not appear to be a factor, for we have found that it correlates with the inorganic phosphorus content of the blood only to the extent of -.14. Moreover, the determinations of lipoid and of total phosphorus show no higher relationships to intelligence than do those for inorganic phosphorus. The ratio of lipoid phosphorus to total phosphorus does, indeed, correlate more highly with intelligence, but, as this relation is vitiated by a correlation of -.30 between this ratio and chronological age, further work with controlled age groups is essential for its interpretation.

The relationship of phosphorus metabolism to mental phenomena is a problem which is as yet far from solution. We have noted elsewhere\(^8\) a correlation of -.51 between intelligence and the excretion of phosphorus per unit of body weight. As the significance of this figure is lessened by the fact that it was obtained from only 28 subjects, it was suggested that verification was most desirable. This definitely positive result from a study of urinary excretion, the negative results mentioned above, and Powers' positive findings, taken together, suggest a complexity of relationship that urgently calls for further work. Our interest has been primarily in connection with certain non-intellectual traits, with which both the calcium and the various types of phosphorus in the blood likewise failed to show any significant correlations.

In his first paragraph, Powers makes reference to the lack of previous work on the relationships of body chemistry to mental phenomena, and characterizes the work that has been done as "vague." This broad statement can not be allowed to pass unchallenged. For example, the literature contains a group of studies, too numerous to mention in detail here, on the differential chemistry of the psychoses and neuroses.\(^4\) In general, the procedures have been similar to that of Powers, save that psychotics or neurotics, instead of idiots, were compared to normals. Many of these studies have yielded negative results and they have often contradicted one another, but they have hardly been "vague." Such work as that of Starr\(^5\) and Stratton\(^6\) on stammerers likewise reached definite conclusions, and the writer\(^7\) has published correlational values. One fears that Powers has been somewhat overhasty in drawing his indictment, for he has himself published nothing more definite than can be found elsewhere.

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