NEWS *and Notes*

Henry Norris Russell, retired research professor of astronomy and director, Princeton University Observatory, has been appointed research associate of the Harvard College Observatory.

Linus Pauling, chairman, Chemistry and Chemical Engineering Division, California Institute of Technology, has recently returned from England, where he received honorary D. Sc. degrees from Cambridge University and the University of London, and participated in the International Congress of Pure and Applied Chemistry. Dr. Pauling will return to England in December as Eastman professor at Oxford University. The Eastman professorship is awarded periodically to outstanding American scholars and scientists.

William S. Wilson, head, Department of Physical Sciences, Georgetown College, Georgetown, Kentucky, has been appointed professor of chemistry and head, Department of Chemistry, University of Alaska, College, Alaska.

Barry G. King, formerly assistant professor of physiology, College of Physicians and Surgeons, Columbia University, and during the war, head, Aviation Facility, Naval Medical Research Institute, has been appointed chief, Division of Aeromedical Design and Materiel, Medical Service, Civil Aeronautics Administration.

William H. W. Komp, sanitary engineer director, U. S. Public Health Service, and consultant in malariology to the Division of Health and Sanitation, Institute of Inter-American Affairs, is being transferred from the Panama Canal Zone to the new Division of Tropical Diseases, National Institute of Health, Bethesda, Maryland.

George E. Large, Department of Civil Engineering, Ohio State University, has been appointed chairman of that Department, effective October 1, succeeding **Clyde T. Morris,** who retires this summer after 41 years of service at Ohio State.

George Hugh Berryman, formerly director, Medical Nutrition Laboratory, Office of the Surgeon General, has been appointed chief, Nutrition Branch, Quartermaster Food and Container Institute for the Armed Forces, Chicago.

Frederick S. Nowlan, of the University of British Columbia, Vancouver, has been named visiting professor of mathematics in the Chicago Undergraduate Division of the University of Illinois on Navy Pier.

Harry F. Herbrandson, fellow, Harvard University, has been appointed assistant professor of chemistry, Union College, Schenectady, New York.

Harvey L. Lantz, president of the Iowa State Horticultural Society and on the pomology staff of Iowa State College since 1918, has been appointed head of the pomology subsection of the Iowa Agricultural Experiment Station.

Ira D. Cardiff, Washington Dehydrated Food Company, Yakima, Washington, received the honorary D. Sc. degree from Knox College at its recent commencement.

W. Storrs Cole, professor of geology, Cornell University, has been appointed chairman, Department of Geology.

Charles A. Fowler, Jr., assistant professor of physics, University of California, Berkeley, has been named associate professor of physics on the Seeley W. Mudd Foundation and head, Department of Physics, Pomona College.

Albert F. Blakeslee, Smith College Genetics Experiment Station, who has been a corresponding member of the French Academy of Sciences since 1935, has received notice of a decree of the French Republic signed by Premier Paul Ramadier approving his election as an "Associé étrange" of the Académie des Sciences and the Institut de France. Dr. Blakeslee is the representative of botany among the foreign associates, whose number is limited to 12. He takes the place of the late Simon Flexner, who was director, Rockefeller Institute for Medical Research.

William Hovanitz, Laboratory of Vertebrate Biology, University of Michigan, has returned to Ann Arbor after spending six weeks on a population study of arctic butterflies in Northern Alberta and the Northwest Territories under the sponsorship of the Arctic Institute of North America.

Sidney Kaye, toxicologist, St. Louis Police Department, Missouri, has been appointed toxicologist to the Chief Medical Examiner for the Commonwealth of Virginia, Richmond.

Grote Reber, radio engineer on military radar and communication equipment, Stewart-Warner and Belmont Radio Corporations, has been appointed to the staff, National Bureau of Standards, to investigate cosmic and solar radio noise and to supervise the erection of a German Giant Wurzburg, an extremely large and powerful radar device, to be used to detect solar and cosmic radiation penetrating the earth's atmosphere.

Harold E. Finley, chairman, Department of Biology, Morehouse College, Atlanta, Georgia, has been appointed professor of zoology and head, Department of Zoology, Howard University, Washington, D. C.

H. P. Robertson, Princeton University, will be located at the Norman Bridge Laboratory of Physics, California Institute of Technology, as professor of mathematical physics as of September 15.

Grants and Awards

The Laurentian Hormone Conference has received from the Roche-Organon Company of Nutley, New Jersey, a gift of $15,000 to establish three awards in endocrinology. These will be assigned for 1947 at the Conference at Ste. Adele, Quebec, September 8–13. One award of $5,000 will be made for outstanding recent research in each of the fields of endocrine interest: animal experimentation, hormone chemistry, and clinical endocrinology.

The Committee on Awards consists of Edwin B. Astwood, Thomas F. Gallagher, Roy G. Hoskins, Allan T. Kenyon, Robert L. Noble, and Abraham White.

The Agricultural and Mechanical College of Texas has received a grant of $6,000 from the Research Corporation for the purchase of the Tiselius Adsorption Apparatus and the support of work on lipids by Ralph T. Holman, Department of Biochemistry and Nutrition.

Sidney P. Colowick, Public Health Research Institute of the City of New

York, will receive the $1,000 Eli Lilly and Company Award in Biological Chemistry at the 112th national meeting of the American Chemical Society, to be held in New York City September 15–19, in recognition of his contributions to the knowledge of enzymes. Presentation of the award will be made at a general assembly of the Society Monday evening, September 15. Dr. Colowick's award address on "Hexokinase and Phosphofructokinase" will be delivered at a symposium on "Studies on Enzymes," to be conducted by the Society's Division of Biological Chemistry, September 17.

Colleges and Universities

Harvard University's 11-inch Draper refractor telescope will be shipped to Sun Yatsen University Observatory, Canton, China, on a long-term loan, according to an announcement by Harlow Shapley, director of the Harvard College Observatory. The Chinese residents of Greater Boston have provided the funds for dismantling and shipment to the Chinese observatory, probably the only Chinese institution offering courses in astronomy at this time. Used in the discovery of the first spectroscopic binaries, the Draper telescope is equipped with a correcting lens, has a focal length of 153 inches, and gives photographs having a scale of 53 seconds/millimeter. Built originally for the Lisbon Observatory, Portugal, the telescope was acquired in 1880 by Dr. Henry Draper, who made the first photograph of the Orion nebula while it was in his observatory at Hastings-on-Hudson, New York. In 1886, his widow donated it to Harvard University, where it has been in continuous service ever since.

The University of Cincinnati Observatory has been designated by the International Astronomical Union as the international clearinghouse and publishing center for data pertaining to asteroids. The work will be under the direction of Paul Herget, director of the Observatory and professor of astronomy. Dirk Brouwer, director, Yale University Observatory, and chairman, I.A.U. Commission for Minor Planets, has invited Dr. Herget to take over the editing and publication of the Union's "Minor Planet Circulars." Astronomers in all parts of the world have been invited to send their asteroid observations to Dr. Herget, whose new duties cover work formerly carried on in Berlin.

The Ohio State University is assembling a classification system for more than 11,000 welding patents now in the Davis Welding Library. **W. H. Simon,** University of Toronto, is in charge of the project, which is being financed by the A. F. David Welding Engineering Scholarship and Library Fund. The new classification will enable industries, students, and research workers to obtain more readily information on all patents granted in their specific lines.

The Department of Physics, Rutgers University, has installed a helium liquefier capable of producing temperatures as low as −458°F. The liquefier, a Collins Helium Cryostat, designed by Samuel C. Collins, professor of mechanical engineering, Massachusetts Institute of Technology, and erected at a cost of approximately $20,000, will be used in fundamental studies of the structure of matter, a Rutgers research project sponsored by the U. S. Navy, the Research Corporation of New York, and the Rutgers Research Council. Frank G. Dunnington, head, Department of Physics, is in charge of the project.

Meetings

A three-day clinical conference on diagnosis and treatment of poliomyelitis will be held at Warm Springs, Georgia, September 15–17. The conference, which marks the 20th anniversary of the founding of Georgia Warm Springs, will be led by about 20 authorities in the fields of neurology, pathology, pediatrics, orthopedics, and physical and internal medicine. The papers and discussions will constitute a book on diagnosis and treatment of the disease, to be published next year. Demonstrations of modern methods of treatment will be given by the medical staff of the Warm Springs Foundation. Physicians interested in attending the conference should communicate with the Georgia Warm Springs Foundation, 120 Broadway, New York 5, New York.

The 21st Regional Meeting of the American Geophysical Union will be held as a general meeting of the Union on September 17–20. On September 17 at Wesleyan University, Middletown, Connecticut, there will be a conference on Major Problems in the Tectonophysics of the New England Area, under the chairmanship of Joe Webb Peoples, Department of Geology; at Woods Hole Oceanographic Institution on September 18 Columbus O'D. Iselin, director, will lead a conference on Earth Sciences From the Oceanographic Point of View; and on September 18–20, at the Institute of Geographic Exploration, Harvard University, there will be a conference on Meteorology, Hydrology, and Cosmic Phenomena, under the co-chairmanship of C. F. Brooks, director, Blue Hill Observatory; Harlan T. Stetson, director, Cosmic Terrestrial Research Laboratory, M. I. T.; H. G. Houghton, head, Department of Meteorology, M. I. T.; and H. B. Kinnison, district engineer, U. S. Geological Survey, Boston. Further details may be obtained from conference chairmen or from Richard M. Field, general chairman, South Duxbury, Massachusetts.

The New York Academy of Medicine will hold its 20th Graduate Fortnight October 6–17 at 2 East 103rd Street, New York City. The program, devoted to Disorders of Metabolism and the Endocrine Glands, will be composed of morning panel discussions, afternoon clinics, evening lectures, scientific exhibits, and demonstrations. The lectures will include: October 6, "The Diseases of Adaptation, With Main Emphasis Upon Hypertension," Hans Selye, University of Montreal, and "Adaptation Syndrome in Man," John S. L. Browne, McGill University Clinic, Royal Victoria Hospital, Montreal; October 7, "Energy Metabolism in Obese Persons," Louis H. Newburgh, University of Michigan Medical School, and "Psychological Aspects of Obesity," Hilde Bruch, College of Physicians and Surgeons, Columbia University; October 8, "Relation of the Adrenals to Immunity," Abraham White, Yale University, and "Clinical and Experimental Studies on Adrenal Cortical Hyperfunction," Louis J. Soffer, Mount Sinai Hospital; October 9, "Metabolic Consequences of Immobilization," John E. Deitrick, Cornell University Medical College, and "Use of Androgens in Women," Ephraim Shorr, Cornell University Medical College; October 10, "Studies in Intermediary Metabolism Conducted With the Aid of Isotopic Tracers," DeWitt Stetten, Jr., Harvard University Medical School, and "The Excretion of Urinary Steroids in Health and in Disease," Kon-

rad Dobriner, Sloan-Kettering Institute for Cancer Research; October 13, "Disturbances in Electrolyte Metabolism in Man and Their Management," Daniel C. Darrow, Yale University School of Medicine, and "Role of Amino Acids in Nutrition," William C. Rose, University of Illinois; October 14, "Metabolic Functions in Old Age," Nathan Shock, U. S. Public Health Service, Baltimore City Hospital, and "General Aspects of Cushing's Syndrome," E. C. Reifenstein, Jr., Sloan-Kettering Institute for Cancer Research; October 15, "Hormonal and Chemical Factors Regulating Thyroid Function," Rulon W. Rawson, Harvard University Medical School, and "Some Clinical Experiments With Antithyroid Compounds," Edwin B. Astwood, Joseph H. Pratt Diagnostic Hospital, Boston; October 16, "Testicular Dysfunction, Some Clinical Aspects," E. Perry McCullagh, Cleveland Clinic, and "Use of Androgens in Men," Carl G. Heller, University of Oregon Medical School; October 17, "Why Do Women Abort?", Arthur T. Hertig, Harvard University Medical School, and "Morphological Basis for Menstrual Bleeding," Joseph E. Markee, Duke University. The registration fee is $5.00. Additional information may be secured from Dr. Mahlon Ashford, 2 East 103rd Street, New York 29, New York.

The Fourth International Congresses on Tropical Medicine and Malaria will be held in Washington, D. C., May 10–18, 1948, under the sponsorship of the Department of State, with the cooperation of 5 other government agencies and 15 scientific societies. Over 60 governments have been invited by the Department of State to send official delegations. As one of the sponsoring societies, the AAAS is represented on the Organizing Committee by Ernest Carroll Faust.

The 12 sections of the scientific program, with their conveners, will be: Research and Teaching Institutes (W. A. Sawyer); Tropical Climatology and Physiology (D. B. Dill); Bacterial and Spirochetal Diseases (T. B. Turner); Virus and Rickettsial Diseases (J. R. Paul); Malaria (M. F. Boyd); Helminthic Diseases (W. W. Cort); Protozoan Diseases (E. C. Faust); Nutritional Diseases of the Tropics (T. T. Mackie). Tropical Dermatology and Mycology (F. D. Weidman); Tropical Veterinary Medicine (R. A. Kelser); Public Health (H. E; Meleney); Medical and Veterinary Entomology (F. C. Bishopp). Officers for the Congresses will be elected at the opening sessions of the plenary and sectional meetings.

There will be scientific and commercial exhibits related to tropical medicine and also motion pictures. Visits will be made to the laboratories of the Department of Agriculture in Beltsville, to the National Institute of Health in Bethesda, and to other institutions in and around Washington.

Two special evening sessions will be held in the Departmental Auditorium in recognition of triumphs of medical science in the tropical field. The first will commemorate the demonstration of the mosquito transmission of yellow fever by Walter Reed and celebrate his admission to the Hall of Fame. The second will commemorate the 50th anniversary of the discovery by Ronald Ross of the method of malaria transmission.

Physicians, scientists, and other professional persons with suitable qualifications and interest in tropical medicine will be enrolled. Those contemplating attendance should write to the Executive Secretary, Fourth International Congresses on Tropical Medicine and Malaria, Department of State, Washington 25, D. C., for the preliminary announcement and the form for advance registration and hotel reservations.

MRC News

The Committee on Growth, acting for the American Cancer Society, is entertaining applications for grants and fellowships. Applications for extension of existing Grants in Cancer Research will be received until October 1; applications for new grants, until November 2. Applications for Fellowships and Senior Fellowships in Cancer Research may be submitted until December 1.

Final decision on applications submitted during this period will be made, in most cases, soon after February 1. Grants approved at this time ordinarily will become effective July 1, 1948. Fellowships may begin at any time determined by the Committee, although these will also usually take effect on July 1.

During the past two years the American Cancer Society, acting upon the recommendation of the Committee on Growth, has awarded 176 grants and 47 fellowships, representing a total expenditure of some $2,700,000. The Committee will continue to recommend support of biological and clinical research dealing broadly with phenomena relating to growth, typical or neoplastic. In the formulation of this program the Committee will be guided, as in the past, by the advice of some 120 scientists, grouped in 20 panels comprising its Sections on Biology, Chemistry, Physics, Chemotherapy, Clinical Investigations, and Fellowships.

Communications regarding grants or fellowships should be addressed to: Executive Secretary, Committee on Growth, National Research Council, 2101 Constitution Avenue, N. W., Washington 25, D. C.

A comprehensive survey of food and nutrition research currently active in the United States is being undertaken by the Food and Nutrition Board with the support of the Quartermaster Food and Container Institute for the Armed Forces. This is a unique effort to compile a detailed record of research in progress in a special field which cuts across so many divergent interests. A register of the type proposed will not only facilitate the coordination of peacetime research in relation to national security and public welfare but will also serve as a basis for quick mobilization of food research resources in event of national emergency. The survey will cover all phases of food and nutrition research, including chemical, physiological, microbiological, technological, psychological, and basic economic studies. Correlation of such studies with regard to health, acceptability, stability, utility, and economy of food will be made.

Subject listings of research in progress pertaining to foods and nutrition are being obtained from directors of research in industry, universities, government, and other agencies. As a supplementary source of information, food and nutrition projects receiving financial support from foundations, public trusts, industry, and other funds are being recorded. The information received will be so classified and coded that any phase of research in progress can be readily extracted and correlated with other phases.

A roster of personnel engaged in food and nutrition research is also being developed in collaboration with the Office of Scientific Personnel.

C. G. King, scientific director, Nutrition Foundation, is chairman of the Committee on Survey of Food and Nutrition Research which will supervise the project

and collaborate in the preparation of periodic reviews and reports. Mildred Ragan, technical secretary for the Committee, and LeRoy Voris, executive secretary, Food and Nutrition Board, are handling the operational details for the National Research Council.

Recent Deaths

William W. Watts, 87, emeritus professor of geology, Imperial College of Science and Technology, died in London on July 30.

George H. Hallett, 76, professor emeritus of mathematics at the University of Pennsylvania, died August 13 in West Chester, Pennsylvania.

Terence Thomas Quirke, 61, professor of geology, University of Illinois, died August 19 of a heart attack. Dr. Quirke is the author of a comment appearing in this issue.

Boyd Coe Dennison, 66, professor of electrical engineering at the Carnegie Institute of Technology, died August 19 in Pittsburgh, Pennsylvania.

Comet Wirtanen, a new comet named for its discoverer, C. A. Wirtanen, was seen for the first time in California on July 18. Two observations have since been reported to the Harvard College Observatory from Lick Observatory, Mount Hamilton, California, according to announcement by Science Service. The comet, which can be seen only with a powerful telescope, is traveling slowly north and west near the celestial equator between the constellations Aquarius and Aquila and is of the 12th magnitude.

The National Government of China has announced a revised set of organic laws for the Academia Sinica, the National Academy of China. The revision has to do mainly with election of academicians from among Chinese scholars of distinction. The Academy, founded in 1926 as the highest academy of learning in China, is directly under the National Government, from which it receives financial support. Its first president was Tsai Yuen-Pei, who served until his death in 1940, after which Chu Chi-Hua, educator, was appointed acting president.

Aside from coordinating and promoting research in all branches of organized knowledge, the Academy's laws provide for the establishment of some 23 research institutes. At present only 13 are organized, each with its own director, research staff, technicians, and clerks: Mathematics, Astronomy, Physics, Chemistry, Geology, Zoology, Botany, Meteorology, History and Philology (divided into sections on History, Philology, Archaeology, and Ethnology), Social Sciences, Medicine, Engineering, and Psychology. The institutes are administered by a secretariat headed by a secretary general and a number of staff members appointed by the president. A. Pen-tung Sah is the present secretary general with a main office at Chi Ming Ssu, Nanking, and a branch at Shanghai (320 Yoyang Road).

The new provision for election of Academy members is in line with that of academies in other nations. Following election of an initial group of 80–100 members from nominees of various organizations and institutions in China, a maximum of 15 may be elected each year. There will also be a representative Council, members of which will serve for three years.

In addition to monographs published by the various institutes, the Academia Sinica publishes two journals: *Science Record,* containing brief original scientific articles in English, French, or German, which has been issued twice since 1941 under the chief editorship of Y. H. Woo, physicist; and *Shyue Shuh Hueh Kan,* published in Chinese, also issued only twice since 1941, which contains review articles, biographies of scholars, and abstracts of research work.

The U. S. Atomic Energy Commission has appointed an advisory Scientific Personnel Committee to study employment conditions and problems of scientific and technical personnel in the research institutions which are working on the Atomic Energy Commission program. Its report will include detailed recommendations and supporting data based on practices in government, industry, and educational institutions, taking into account the unique mission of the Atomic Energy Commission. This report, which the Committee will submit to the Commission, will recommend personnel policies for the Commission research program to enable the Commission to obtain the services of qualified research personnel without adverse effect upon academic and industrial employers. The Committee, which will be a continuing group, includes the following members: F. Wheeler Loomis, professor of physics, University of Illinois, chairman; Morris P. Carpenter, executive director, Whiting Laboratories, Standard Oil Company of Indiana, Whiting, Indiana; Farrington Daniels, chairman, Board of Governors, Argonne National Laboratory, and professor of chemistry, University of Wisconsin; W. A. Hamor, associate director, Mellon Institute; William B. Harrell, business manager, University of Chicago; and Lawton D. Geiger, Iowa Area Manager, U. S. Atomic Energy Commission, Ames, Iowa, executive secretary.

The National Registry of Rare Chemicals, 35 West 33rd Street, Chicago 16, Illinois, lists the following wanted chemicals: dodecamethylene chloride; 2,7-diaminofluorene; brazilin; desoxyguanosine; trimellitic acid; phloretin; perthiocyanicacid; carbonyl sulfide; deuteroammonia; diborane; lithium deuteride; furazan; 1,3,4-oxadiazole; 3-phenylcyclopentene; benzochrysene; benzoperylene; benzofluorene; jojoba oil; ferrous glycinate; and vinyl dimethylamine.

The 10th Annual Louis Gross Memorial Lecture will be delivered at the Jewish General Hospital, Montreal, under the auspices of the Montreal Clinical Society, October 29, at 8:30 P.M., by I. Arthur Mirsky, director, May Institute for Medical Research, and associate professor of experimental medicine in psychiatry, University of Cincinnati. Dr. Mirsky's topic will be: "Biology of Metabolic Disease in Man."

The Department of Biology, U. S. National Museum, was reorganized on July 31 to form two separate Departments, Zoology and Botany. The Department of Zoology for the present will include the Divisions of Mammals, Birds, Reptiles and Amphibians, Fishes, Insects, Mollusks, Marine Invertebrates, and Echinoderms, **Waldo L. Schmitt,** head curator of Biology, becoming head of Zoology. The Divisional staffs remain unchanged. The newly-established Department of Botany, with **E. P. Killip** as head curator, comprises the Divisions of Phanerogams, Grasses, and Cryptogams. **Jason R. Swallen** is curator of the Division of Grasses. Mr. Killip will for the

present act also as curator of the other divisions. Associate curators **E. C. Leonard, C. V. Morton,** and **E. H. Walker** are assigned to the Division of Phanerogams, and **Paul Conger,** in charge of the Section of Diatoms, is assigned with his collections to the Division of Cryptogams. It is expected that this reorganization will enable the staff working with the collections designated as the U. S. National Herbarium to give them better care and to respond more promptly to the many requests for information received from all parts of the world.

The National Bureau of Standards, in cooperation with the Office of Naval Research, has just published in loose-leaf form the first tables in a new and comprehensive compilation of "Tables of Selected Values of Chemical Thermodynamic Properties," which bring together for the first time all available published data of chemical thermodynamic properties. One set of these tables, which are published in three parts, is being furnished to each university Department of Physics, Chemistry, or Engineering. U. S. Government laboratories, research institutions, and industrial laboratories may obtain one set each on request to the Bureau.

Make Plans for—

American Roentgen Ray Society, September 14–19, Atlantic City, New Jersey.

American Chemical Society, September 15–19, New York City.

Illuminating Engineering Society, September 15–19, New Orleans, Louisiana.

American Institute of Electrical Engineers, Middle Eastern District Meeting, September 23–25, Dayton, Ohio.

American Public Health Association, October 6–10, Atlantic City, New Jersey.

American Academy of Ophthalmology and Otolaryngology, October 12–17, Chicago.

American Association for the Advancement of Science, 114th Meeting, December 26–31, Chicago, Illinois.

COMMENTS *by Readers*

In solar radiation work the unit called the gram calorie per square centimeter per minute is very frequently used; for longer time intervals, such as an hour or day, for example, the gm cal/cm²/hr or gm cal/cm²/day is used, when appropriate. These units are somewhat cumbersome to write and even more awkward to say.

A more convenient unit is therefore needed. According to F. Linke (*Handb. Geophys.*, 1942, **8,** 30) the "langley" has been proposed to designate the gm cal/cm²/min, in honor of Samuel P. Langley, who, as the first director of the Astrophysical Observatory of the Smithsonian Institution, contributed greatly to the study of solar radiation and its depletion by various gases in the earth's atmosphere.

However, in view of the need of considering longer time intervals than a minute, it is herewith proposed that the "langley" be defined as the gm cal/cm², where "gm cal" denotes the 15°C gm cal. It is also proposed that the written abbreviation of "langley" be "ly"; to shorten the word in other ways might tend to confuse it with other units.

Having adopted the new unit we may now speak of the langley per minute, the langley per hour (and so forth), which will be written as ly/min and ly/hour. (L. B. ALDRICH, *Smithsonian Institution, Washington, D. C.*; H. WEXLER and S. FRITZ, *U. S. Weather Bureau, Washington, D.C.*; I. F. HAND, *U. S. Weather Bureau, Boston*; A. COURT, *Office of the Quartermaster General*, and MAJOR W. P. MELLEN, *Air Corps, Washington, D. C.*)

A remarkable set of rainbows was seen from 8:00 until about 8:15 P.M. (C.D.T.) on July 20, 1947, at Urbana, Illinois. The main primary rainbow showed a continuous band of clear color. The most unusual part of this bow was the brilliance of the violet band, which at times exceeded in intensity that of the blue and green bands. From top to bottom the colors in a primary rainbow run: red, orange yellow, green, blue, indigo, violet. Usually the indigo and violet bands are quite faint, whereas in this case they were unusually bright.

A secondary rainbow was very plain, above and outside the arc of the primary bow. In this, as is usual, the order of colors was reversed, with red at the bottom and green above. It is uncommon for the blue, indigo, and violet bands to show above the green in the secondary rainbow, and this was no exception. However, the width of the secondary bow, even without the blues, was about equal to that of the whole primary bow. Between the primary and secondary bows the sky appeared to be lacking in light. It was dark, leaden gray in color.

Beneath and within the curve of the primary rainbow were the so-called supernumerary rainbows, very brilliantly exhibited. Although these are referred to as "familiar" phenomena by W. J. Humphreys in his *Physics of the air* (1920, pp. 456–482), they have never before been seen by the writer or by many other mature persons. In this case the position of the sun, due to the time of day, was almost ideal for rainbow phenomena. The whole band of rainbows appeared to lie within a vertical angle of about 20°, from about 60–40° above the horizon, with the zenith of the bows in a direction about 10° S.E. from the observer. Two supernumerary bands of color beneath the unusually brilliant violet of the primary bow were visible to this observer, and Lt. Col. J. S. Shaplund, C.E., U. S. Army, told the writer that he was able to distinguish still another inner band from his place of observation. The only colors distinguishable in these supernumerary bows were green and red-violet. The bands of green and violet were very narrow, their width being about that of green and blue only