News and Notes

Royal Society of Canada, Section III

SECTION III, Chemical, Mathematical and Physical Sciences, of the Royal Society of Canada, held its annual meeting at Laval University, Quebec, on June 2–4. G. Herzberg gave the presidential address on "Forbidden Transitions in Diatomic Molecules." This was one of three papers in a symposium on forbidden transitions. The others were "Forbidden Transitions in Atoms," by A. G. Shenstone, and "Forbidden Transitions in Nuclei," by L. G. Elliott. About 100 papers were presented before the subsections—Chemistry, Mathematics, Astrophysics and Spectroscopy, Nuclear Physics, Meteorology, and Other Branches of Physics.

Chemistry. The program of the chemistry subsection consisted of a series of papers in organic chemistry (P. E. Gagnon *et al.*) and several in physical chemistry. The photolysis of azomethane has been investigated over the temperature range 25°–190° C (M. H. Jones and E. W. R. Steacie). Experiments on the photolysis of deuterated methylamines have shown that both the C—H and N—H bonds are ruptured (J. S. Watson and B. deB. Darwent). Various forms of deuterated pentanone-3 have been synthesized (L. C. Leitch and A. T. Morse), and the assignments of certain infrared absorption bands between 1350 and 1475 cm^{-1} to the bending vibrations of the C—H bonds of methyl and methylene groups located at specific positions in the molecule have been confirmed in forms of deuterated pentanone-3 (B. Nolin).

Mathematics. Three papers were read in algebra and number theory, eight in analysis, and two in geometry. The significance of the work presented and the general interest and enthusiasm made this meeting the most outstanding of any yet held by the mathematics subsection. It was generally agreed that the upsurge of activity on the part of Canadian mathematicians is due to the stimulus of the biennial seminars of the Canadian Mathematical Congress and especially to the influence of the Summer Research Institute.

Astrophysics and Spectroscopy. The astronomical papers included the determination of the masses of eclipsing binaries, the study of interstellar matter, the investigation of the line profiles of Be-type stars, and the development of new techniques for the determination of time. The orbital elments of the exceptionally massive eclipsing system, H.D. 228854, have been deduced (J. A. Pearce). These stars are of spectral class O 7 with temperatures of 33,000° K. The orbital inclination is nearly 90°, and the relative orbital velocities are exceptionally large, 710 km/sec. The combined mass is 70 times the sun. A new catalogue of 1346 variable stars in globular clusters has been prepared (Helen S. Hogg). Investigation of the absorption lines of the eclipsing stars Zeta Aurigae when light of the hot star traverses the atmosphere of the larger and cooler companion has provided evidence of major prominence activity of irregular character (A. McKellar and R. M. Petrie). The intensities of interstellar sodium and calcium lines for 142 early type stars have been used to derive a relation between distance and intensity (C. S. Beals).

Relatively high dispersion spectra of the aurora have been obtained in the region 3300–8900 A (W. Petrie). The near-ultraviolet emission bands of the N_2^+ molecule support the value 9.75 ev for the dissociation energy (A. E. Douglas). The rates of change of polarizability with respect to internuclear distance have been found from the ratio of the intensities of Raman and Rayleigh scattering in gases (E. J. Stansbury, H. L. Welsh, and M. F. Crawford). Experimental and theoretical results on the splitting of nuclear magnetic resonance absorption lines in single crystals by the interaction of the nuclear electric quadruple moment with the electric field gradient within the crystal were reported (G. M. Volkoff).

Nuclear Physics. A varied program of nuclear physics papers on heavy cosmic primaries in photographic emulsions, photonuclear reactions, neutron physics, radioactive nuclides, and mass spectrometry was presented.

Several papers on neutron physics from the Chalk River Laboratory will be briefly reviewed. Work on the resonant scattering of slow neutrons by Sm, Gd, Eu, Dy, and Cd was reported. The scattering and total cross sections of Cd in the resonance region accurately obey the Breit-Wigner one-level formulas. The total cross section at resonance is 7900 barns (B. N. Brockhouse). The neutron capture γ-ray spectra from the even-charge nuclei Ti, Cr, Fe, Ni, and Zn, and from the odd-charge nuclei Sc, Mn, Co, and Cu, were shown and discussed in terms of nuclear shell theory (B. B. Kinsey and G. A. Bartholomew). The angular distributions of prompt fission neutrons with respect to the direction of motion of the light and heavy fragments from the thermal neutron fission of U^{233}, U^{235}, and Pu^{239} show that the neutron emission probability is 30% greater for the light fragment (J. S. Fraser and J. C. D. Milton). The neutron capture cross section for Co^{59} (n, γ) Co^{60m} (10.7 min) was reported as 19 barns (N. Moss and L. Yaffe). The nuclide Ra^{227}, produced by the Ra^{226} (n, γ) Ra^{227} reaction with a cross section of 22 barns, is a β-emitter with a half-life of 41.2 min, a maximum energy of 1.30 mev, and γ-rays of approximately 291 and 497 kev (J. P. Butler and J. S. Adam. A curious time behavior of positrons annihilated in liquids and solids was reported. In metals and several other materials, positrons are annihilated with a single mean lifetime of about 2×10^{-10} sec. In other materials (e.g., water, ice) two distinct lifetimes were observed—about 3×10^{-10} sec and 2×10^{-9} sec (R. E. Bell and R. L. Graham).

Papers on the radioactive properties of neutron-deficient nuclides, Cd^{105}, Cd^{104}, Ag^{104}, Xe^{123}, Xe^{122},

and Xe^{121}, produced by proton bombardment in the McGill University cyclotron, were read (J. S. Foster, F. A. Johnson, and D. E. Tilley). The x-rays from the 70 mev synchrotron at Queen's University have been used to study depth-dose relations in a Plexiglas phantom, the absorption of 17.5 mev x-rays in various absorbers with the aid of Cu^{63} (γ, n) Cu^{62} as detector, and the production and cross sections of photonuclear reactions such as the (γ, n) reactions in C^{12}, Cu^{63}, Ag^{107}, and Mo^{92}, and the reactions C^{12} (γ, 3α), and O^{16} (γ, 4α) (J. A. Gray *et al.*). The 25 mev betatron at the University of Saskatchewan can be held constant to 5 kev at a preselected energy. Photoactivation curves have been obtained that show a fine structure attributed to absorption by individual levels in the reacting nucleus. The ratios of the cross sections for the (γ, n) reactions leading to the ground and isomeric states in Br^{80} and Mo^{91} have been measured and related to the spins of the reacting particles (L. Katz, R. N. H. Haslam, *et al.*). Excellent agreement with experimental results on the capture of electrons by protons in hydrogen is obtained if both the ion-nucleus interaction and the electron-ion interaction are included as perturbations in a calculation using the Born approximation (J. D. Jackson and H. Schiff).

Other Branches of Physics. Papers in meteorology included a discussion of the conditions for the production of low-temperature fog (W. L. Godson), a correlation between snow crystal types and the temperature at the height of formation (L. W. Gold and B. A. Power), and evaluation of fluctuating radar weather echoes (J. S. Marshall and W. Hitschfeld). A method for measuring subsurface velocities in the Gulf Stream was described (E. E. Watson). A flowmeter, utilizing the cooling of a thermistor element, has been found suitable for measurement of small velocities in liquids (A. D. Misener).

Several papers were presented on the properties of dielectrics, theory of diffraction, sound sources, vibration of plates, infrared detection, and an absolute measurement of the ohm. The failure of the Clausius-Mosotti equation for certain artificial dielectrics was explained in terms of the random distribution and shape of the metallic particles (H. E. J. Neugebauer). Discrepancies between diffraction theories and measurements close to a circular aperture under the influence of a plane acoustic wave have been traced to rapid oscillations in field intensity within the aperture (G. Bekefi). An improved method of calculating the diffraction of electromagnetic waves by small apertures and scattering by small conducting bodies was reported (A. F. Stevenson). Calculations and observations have been made on the vibration patterns of thick barium titanate disks (R. R. Aggarwal and E. A. G. Shaw). The usefulness of physical theory in solving engineering problems was well demonstrated in a study of chopper-type sound sources for foghorns and air-raid sirens (G. L. Thiessen).

Three papers on low temperature and solid state physics were read (D. K. C. MacDonald). With suitable modification of a Collins helium liquefier, continuous measurements of electrical resistances of metals over a wide range of temperature have been made. The variation of characteristic temperature has been examined and carefully compared with the corresponding calorimetric data. The problems of anharmonicity in lattice vibrations and of melting are of particular interest, together with the adequacy or otherwise of the Debye model. The anomalous minimum of electrical resistance found at about 10° K in copper has been systematically investigated with specimens containing controlled small percentages of Sn, Ag, Ni, Pb, Bi, and C. Scattering cross sections can be deduced from the residual resistances.

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Scientists in the News

E. F. W. Alexanderson, chief engineer of Radio Corporation of America (1920–24), has rejoined the company in the capacity of consultant. He recently retired from General Electric Company following a long period of service.

Leslie R. Angus has been appointed director of psychiatric services and director of the Child Research Clinic at The Woods Schools, Langhorne, Pa.

Robert V. Bartz, of MIT, has been appointed executive director of the Industrial Associates of the California Institute of Technology. The Caltech Industrial Associates, initiated slightly over two years ago, now include 23 member-companies representing oil, aircraft, steel, chemical, and other industries. Each member-company supports the over-all research program of the institute and in return is kept informed on key developments and trends in areas of existing or potential importance to its business.

Nathan Beckenstein, director of Syracuse Psychopathic Hospital for the past two years, has just been transferred to Brooklyn State Hospital as director, succeeding the late **Clarence H. Bellinger.** Appointed to replace Dr. Beckenstein as director of Syracuse Psychopathic Hospital is **Richard F. Binzley,** associate director of Pilgrim State Hospital. Dr. Beckenstein joined the Brooklyn State Hospital staff in 1929, following his internship at Binghamton State Hospital and Jewish Hospital in Brooklyn. He was appointed acting medical inspector for the Department of Mental Hygiene in 1947 and in 1950 he became director at Syracuse Psychopathic Hospital, serving also as assistant commissioner in the department until early this year.

Robert S. Casey, director of research of the W. A. Shaeffer Pen Company, has been elected chairman of the American Chemical Society's Division of Chemical Literature for 1953. He succeeds **Julian F. Smith,** head of the Scientific Information Division, Office of Naval Research, Washington, D. C. **Byron A. Soule,** of the University of Michigan, was chosen chairman-

elect; **Lorna F. Lederman,** of the Monsanto Chemical Company, Dayton, was named secretary; and **Madeline M. Berry,** of MIT, was elected treasurer.

Philip Chasin, of New York, has been named executive director of the American Technion Society. At the same time it was announced that the society would start an international drive for $20,000,000 for the rebuilding of the Israel Institute of Technology in Haifa, to provide a minimum of 600 engineers, architects, and technicians for Israel's program of industrialization and agricultural expansion.

John Cockcroft, director of the Atomic Energy Research Establishment at Harwell, England, recently delivered two special physics lectures at the California Institute of Technology. He spoke on "Research at Harwell" and "Harwell Ideas on Nuclear Power."

C. Henry Kempe, assistant professor of pediatrics in the University of California School of Medicine, San Francisco, has been granted a leave during December and January to accept an invitation by the government of India and the World Health Organization. He will conduct studies on serum treatment of smallpox in connection with research being carried on in the School of Medicine at the King Institute.

H. D. Kerman has returned to his post as associate professor of radiology at the University of Louisville School of Medicine after a two-year leave of absence as radiologist with the Oak Ridge (Tenn.) Hospital and the Medical Division of the Oak Ridge Institute of Nuclear Studies.

Z. I. Kertesz, professor of chemistry, New York State Agricultural Experiment Station, Cornell University, Geneva, has been granted a leave of absence to accept a one-year appointment as director of food research for the United Nations' Food and Agricultural Organization Technical Assistance Program in Ceylon. Dr. Kertesz will coordinate the work of a team of FAO food experts and advise the Ceylon Food Research and Nutrition Council on the establishment of a Food Research Institute.

Anton Lang has joined the faculty of the University of California at Los Angeles as assistant professor of botany. He was formerly connected with the Kaiser Wilhelm Institute of Biology in Berlin and later with the Max Planck Institute in Tübingen. He came to the U. S. in 1949 and for the past two years has been a senior research fellow at California Institute of Technology.

Rachmiel Levine has been appointed to the newly established position of chairman of the Department of Medicine and director of the Educational Program at Michael Reese Hospital, Chicago. The hospital has taken this step in the further development of an integrated training program for internes and residents. Dr. Levine, who has been associated with Michael Reese Hospital since his graduation from McGill University in 1935, is at present the director of the Department of Metabolic and Endocrine Research at the hospital's Medical Research Institute, and also a professorial lecturer in physiology at the University of Chicago.

George H. Mangun has been appointed research director of the Warner Therapeutic Institute and Chilcott Research Division of Warner-Hudnut, Inc. For the past five years he has been head of the Department of Clinical Chemistry of the Henry Ford Hospital, Detroit, and professorial lecturer at Wayne University Graduate School.

The first David Sarnoff Fellowship established at the New York University College of Engineering by the Radio Corporation of America in honor of David Sarnoff, RCA board chairman, has been awarded **Oscar Oliver, Jr.** Mr. Oliver was selected from a class of 256 graduating engineers to receive the fellowship, which provides an annual grant of $2700 for predoctoral study. The award was established this year as part of a program to assist in the education of scientific personnel for leadership in the growing electronics industry.

Maurice L. Peterson, associate professor of agronomy, University of California College of Agriculture, has been named chairman of the Department of Agronomy, succeeding **Fred N. Briggs,** who was recently appointed dean of the College of Agriculture for the Davis campus. Dr. Peterson joined the staff of the university in 1948.

A team of Swedish oceanographers headed by **Hans Pettersson** and **W. Weibull** will continue their research on the sediments of the oceans. Their new expeditionary work will take them into the Mediterranean on board the French vessel *Elie Monnier,* placed at their disposal by the French Navy. The scientists will use the depth-charge echo-sounding methods developed by Dr. Weibull in determining the depth of the sediments resting on the igneous rock.

George H. Plumb, assistant entomologist at the Connecticut Agricultural Experiment Station, has resigned to accept the post of chief of the newly organized Division of Forest Insect and Disease Control of the Virginia Forest Service. His headquarters will be in Charlottesville. Dr. Plumb was with the Connecticut station 21 years.

William J. Simon, professor of dentistry at the University of Minnesota, has been named dean of the college of dentistry at the State University of Iowa. Dr. Simon, who has been on the staff of the Minnesota School of Dentistry since 1936, will take over his new duties at Iowa City on Jan. 1.

Charles E. Sloan, engineer of bridges for the Baltimore and Ohio Railroad since 1940, has been appointed engineer of bridges and buildings, succeeding **Leland P. Kimball,** engineer of buildings, who has retired. Other promotions in the B & O Engineering

Department include **Otis G. Wilbur** and **Abram Clark,** appointed assistant engineers of bridges and buildings, and **Gurney H. Dayett, Sr.,** appointed assistant to Mr. Sloan.

J. McLean Thompson has retired from the chair of botany in the University of Liverpool and has been succeeded by **N. A. Burgess,** of the University of Sydney. Professor Thompson went into botany in the heyday of comparative morphology and, since his appointment to the chair of botany at Liverpool in 1921, has continued morphological work with tropical and subtropical plants, devoting his attention more recently to the complex and enigmatic phenomenon of cauliflory. In these studies he has shown the extraordinary morphogenetic potentiality and diversity of the bud-forming regions of the trunks of various woody species.

Joseph F. van Ackeren has been appointed chief medical officer of the Coast Guard, succeeding **Paul M. Stewart,** who has reached the age of mandatory retirement. Dr. van Ackeren has been medical officer in charge of the U. S. Public Health Service Hospital, Seattle, since 1944.

Channing P. Van Camp, of the Pacific Region, USGS, has been designated assistant to the chief topographic engineer in Washington, D. C. Mr. Van Camp joined the Geological Survey in 1934, becoming assistant Pacific Region engineer in 1947.

U. S. von Euler, head of the Physiology Department at Karolinska Institutet, Stockholm, has been visiting the Army Medical Service Graduate School, Walter Reed Army Medical Center, Washington, D. C., where he consulted with the staff on problems of shock and circulatory hemostasis.

W. Barry Wood, Jr., professor of medicine at Washington University and physician in chief at Barnes Hospital, St. Louis, is traveling in Korea in his capacity as consultant to the Army Medical Service Graduate School, advising on the Army epidemic hemorrhagic fever research project there.

Education

The **University of California** and the **UCLA College of Engineering** are sponsoring a series of 19 lectures on "Modern Physics for the Engineer," to be given on consecutive Monday evenings. The series began on Oct. 20 with an address by L. I. Schiff, of Stanford. Others who will appear in the series include W. A. Fowler, R. V. Langmuir, W. K. H. Panofsky, W. D. Hershberger, C. Kittel, D. T. Griggs, J. L. Greenstein, F. Seitz, J. Bardeen, J. Kaplan and R. E. Holzer, H. P. Robertson, W. Bleakney, S. Ramo, L. N. Ridenour, R. Revelle, J. B. Weisner, R. Weller, and G. T. Seaborg.

The **Duke School of Forestry,** under contract with the Bureau of Ships, is beginning the study of tropical woods that might be used in manufacturing marine plywood. The project will begin with a study of angelique, a wood of French Guiana. Long-range aim of the research is to ensure a continuous supply of marine plywood in case of a mahogany shortage.

Florida State University has promoted Guenter Schwarz to full professor and chairman of the Physics Department, and George L. Rogosa to associate professor. Under a grant from the National Science Foundation, the two physicists will study the anomalous transmission of radiation through single crystals at the Bragg angle. Several graduate research assistantships are available under the grant. Avramy Melvin, formerly at Columbia University, has joined the department as professor of physics.

The **Medical College of Virginia** has appointed Herbert W. Park, III, professor of physical medicine and rehabilitation and director of the Baruch Center of Physical Medicine; promoted Henry G. Kupfert to professor of clinical pathology and chairman of the department; made Miles E. Hench assistant professor of clinical bacteriology; and promoted M. Josiah Hoover and Susanne Hirt to associate professors of orthopedic surgery and applied anatomy, respectively. Everett I. Evans, professor of surgery and director of the Surgical Research Laboratories, is giving the McArthur Lectures at the University of Edinburgh and the Hunterian Oration before the Royal Academy of Surgeons, London. He will also speak before the Swedish Surgical Society and conduct conferences on the treatment of burns in Paris, Liége, Amsterdam, Copenhagen, and Lund. Dr. Evans will return to the U. S. early in November.

Polytechnic Institute of Brooklyn began a series of ten lectures on "Recent Trends and Developments in Polymer Chemistry" on Oct. 18 with a lecture by B. H. Zimm. Subsequent lecturers will be U. P. Strauss (Nov. 1), F. R. Eirich (Nov. 15), H. Morawetz (Dec. 13), W. O. Baker (Jan. 10), M. Szwarc (Jan. 31), G. Oster (Feb. 28), W. H. Stockmayer (Mar. 14), E. J. Hehre (Apr. 18), and T. Alfrey, Jr. (May 9).

Stevens Institute of Technology has promoted Newell O. Mason to professor in the Department of Humanities, and George Johannus Yevick to associate professor of physics. The Stevens Laboratory of Psychological Studies was recently host to a party of six visiting French psychologists who are on a six-week inspection tour of American industries under MSA auspices. Paul Fraisse, Colette Benassy, Suzanne Pacaud, Jean Faverge, Pierre Rennes, and Jean Bonnaire are making the tour.

West Virginia University, through a gift of $7500 from the Hope Natural Gas Co., of Clarksburg, will construct a geology cottage near Alvon, in Greenbrier County. This will enable geology students at the university's Camp Wood to study geologic formations and structures that are the surface exposures of those actually productive of oil and gas from the subsurface elsewhere.

Grants and Fellowships

The **Institute for Advanced Study** School of Mathematics will allocate a small number of grants-in-aid to gifted young mathematicians and mathematical physicists for the academic year 1953–54. Application blanks, returnable by *Jan. 1,* may be obtained from the institute, Princeton, N. J.

National Research Council Fellowships in the Medical Sciences, supported by the Rockefeller Foundation and the Lilly Research Laboratories, are available for 1953–54. They are intended for recent graduates, preferably under 30 years of age. Fellowships in tuberculosis are available under a grant from the National Tuberculosis Association; Oscar J. Balchum and Arthur M. Dannenberg, Jr., were this year's recipients. Other fellowships are those in radiological research, administered for the James Picker Foundation. Deadline for applications is *Dec. 10.* For full information, address the Fellowship Office, NRC, 2101 Constitution Ave., N.W., Washington 25, D. C.

The **National Science Foundation** has approved 52 grants and two contracts (totaling $728,250) in support of basic research in the biological and physical sciences and to support studies and conferences on science and scientific education. Awards went to institutions in 21 states and the District of Columbia, average $6300 per year, and range from six months to three years. Additional proposals are being evaluated.

Meetings and Elections

The **American Society of Plant Physiologists,** Western Section, has elected the following officers: chairman, Moyer D. Thomas, American Smelting & Refining Co., Salt Lake City; vice-chairman, Harlan K. Pratt, University of California, Davis; secretary-treasurer, D. J. Wort, University of British Columbia.

The dates of the New York meeting of the **Committee for the Scientific Study of Religion** (SCIENCE, **116,** 352 [1952]) have been changed from Dec. 26–27 to Dec. 28–29. Details of the meeting may be obtained from J. Paul Williams, Mount Holyoke College.

The **Hawaiian Academy of Science** will hold its 28th annual meeting Nov. 13–14 at Agee Auditorium, Experiment Station, HSPA. The first evening will be devoted to a symposium on Hawaii's resources. Cultivated crops, animal husbandry potentials, and mineral, marine, fresh-water, and forest resources are among the topics to be discussed. A variety of short papers on scientific work in Hawaii will be presented on Nov. 14.

The **International Astronomical Union** held its eighth general assembly in Rome, Sept. 4–13. Approximately 60 American astronomers participated as delegates at large, and seven were officially appointed by the Department of State and the National Research Council to represent the U. S. (J. J. Nassau, secretary and chairman, U. S. A. National Committee; I. S. Bowen; D. Brouwer; C. M. Clemence; F. L. Whipple; G. P. Kuiper; O. Struve, chairman of the delegation). Among the scientific activities of the meeting were four symposia on: stellar evolution, astronomical instruments, a catalogue of positions of faint stars, and the spectra of variable stars. The American contributions included a lecture by I. S. Bowen on the 200-inch telescope; by C. D. Shane on the Lick Observatory program of referring the measured motions of the stars to the system of extragalactic nebulae; by D. Brouwer on the astrometric work of the Yale Observatory; by M. Schwarzschild and J. L. Greenstein on the spectroscopic differences of "old" and "young" stars; by W. Baade on recent Mount Wilson and Palomar conclusions regarding the two stellar populations; by O. Struve on the spectra of the β Canis Majoris variables. Harlow Shapley gave an evening lecture on "Extragalactic Problems." The IAU decided to hold its next meeting in 1955 in Dublin. The newly elected officers for 1952–55 are: president, O. Struve (USA); general secretary, P. Th. Oosterhoff (Netherlands); vice presidents: V. A. Ambarzumian (USSR), A. Couder (France), E. Rybka (Poland), P. Swings (Belgium), R. v. d. R. Woolley (Australia). The outgoing president, B. Lindblad (Sweden) and general secretary, B. Strömgren (Denmark and USA) remain on the executive committee in an advisory capacity.

The following have been named as the 1952 winners of the annual **Lasker Awards** of the American Public Health Association: Brock Chisholm, of Toronto; Howard A. Rusk, of New York; Conrad A. Elvehjem, of the University of Wisconsin; Frederick S. McKay, of Colorado Springs, and H. Trendley Dean, of Washington, D. C. (joint award); and MacFarlane Burnet, of Melbourne. A special award was conferred on Chas.-Edw. Amory Winslow, of Yale, "for more than half a century inspiring and inspired leader, teacher, and exponent of public health for the nation and the world." Individual winners received $1000, and Dr. Winslow received $2500.

The **National Research Council** has appointed George W. Nace, of Duke University, staff assistant to the Division of Biology and Agriculture and to the Committee on Developmental Biology; Milton K. Akers, of the Department of Electrical Engineering at George Washington University, has been appointed assistant executive secretary of the Division of Engineering and Industrial Research.

Chemicals wanted by the **Registry of Rare Chemicals,** 35 W. 33rd St., Chicago 16, include: titanium sulfide; lead zirconate; triethyl aluminum; rubidium chromic sulfate; molybdenum carbonyl; β-aminobutyric acid; 4-aminooxine; divinyl sulfone; 2-amino-5-heptenoic acid; gallocyanine; 1,2,3,4-tetracarboxybutane; 8-methoxyquinoline; 2,4-dihydroxyazobenzene-4′-sulfonic acid; 2-chlorofluorene; chlorogenic acid; coprostane; epicholesterol; indican; thevetigenin; and quercitol.